CARIBBEAN EXAMINATIONS COUNCIL

CSEC® Information Technology

SYLLABUS
SPECIMEN PAPER
MARK SCHEME
SUBJECT REPORTS

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Caribbean Secondary Education Certificate®

SYLLABUS

INFORMATION TECHNOLOGY

CXC 30/G/SYLL 17

Effective for examinations from May–June 2020

CSEC®

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Please check the website, www.cxc.org for updates on **CXC®**'s syllabuses.

Information Technology Syllabus

♦ RATIONALE

Information Technology (IT) *continues to* evolve in response to the need for more efficient techniques to manage the significantly increased volume and sophistication of the knowledge reservoir of mankind. It merges the study of Computer Science, *Information and Communications Technology (ICT)* and Office Automation. *It* involves the collection, processing, storage, *retrieval*, and dissemination of information, and impacts both work and *social* activities. *The evolution of the field of Information Technology continues at a rapid pace. New technologies are constantly emerging and existing ones become obsolete soon after they appear. The rapid advances in technology undoubtedly have a profound effect on information technology education and, as such, Information Technology curricula must be refreshed to remain relevant.*

In a world characterized by rapid technological *innovations, it is imperative that Information Technology students are equipped with the requisite knowledge and skills that will enable them to function effectively both as producers and consumers of technology. It is also important to prepare students for the future by establishing foundational competencies which will enable them to be flexible to adapt to emerging technologies and new situations. To this end, the* ***CSEC®*** *Information Technology syllabus is designed to provide knowledge and skills in the essential Information Technology domains which include: computer fundamentals, problem-solving, networks, Web Technologies, productivity tools, computer and cybersecurity, as well as the social implications of information and communications technology. The goal is to use learner-centred and problem-based teaching, and assessment strategies to develop core competencies that will provide pathways to multiple post-secondary destinations.*

Information Technology is the key to development and productivity in this modern era and as such, Information Technology education must be seen as integral to meeting the developmental needs of our region. All citizens *should* have practical exposure to the applications of Information Technology in order to *narrow* the gap between Caribbean *and developed nations.* Consequently, this programme *of study* in Information Technology *promotes the development of* computer-related skills and encourages the development of analytical and design skills which are applicable in *all subject areas, the work environment and the wider society.* The syllabus aims to *provide a blend of knowledge* and practical experience *that fosters* innovation, self-confidence, together with *critical thinking* skills that will prepare students to meet *the ICT needs of the* region *and beyond.*

The Information Technology syllabus is based on objectives, skills and content which will cultivate the attributes of the Ideal Caribbean Person as articulated by CARICOM. That is, a Caribbean person who demonstrates multiple literacies, as well as independent and critical thinking, and questions the beliefs and practices of the past and brings this to bear on the innovative application of science and technology to problem-solving. Such a person will inevitably demonstrate a high level of self-confidence and self-esteem, a positive work ethic, and display and nurture creative imagination in the economic and entrepreneurial spheres and other areas of life. Also, in keeping with the UNESCO Pillars of Learning, this course of study will contribute to the development of a person who will learn to be, learn to know, learn to do, learn to live together, and learn to transform oneself and society.

♦ AIMS

The syllabus aims to:

1. *prepare students to function effectively in a dynamic technological era;*
2. *promote* the development of computer-related skills for application to *real-life situations*;
3. *prepare students to use information technology responsibly;*
4. *facilitate the development and application of problem-solving and other twenty-first century skills;*
5. *provide a foundation for post-secondary education; and,*
6. *prepare students for suitable employment.*

♦ ORGANISATION OF THE SYLLABUS

The syllabus is organised under eight main sections.

1. Computer Fundamentals and Information Processing:
   - (a) Computer Fundamentals.
   - (b) Information Processing Fundamentals.
2. *Computer Networks and Web Technologies.*
3. *Social and Economic Impact of Information and Communications Technology:*
   - (a) *Implications of Misuse and Cybersecurity.*
   - (b) *Impact on Jobs and Education.*
4. *Word-Processing and Web Page Design:*
   - (a) *Word-Processing.*
   - (b) *Web Page Design.*
5. *Spreadsheets.*
6. *Database Management.*
7. *Problem-Solving and Program Design.*
8. *Program Implementation.*

♦ SUGGESTED TIMETABLE ALLOCATION

It is estimated that the syllabus can be covered in approximately 160 hours or four periods per week during the fourth and fifth years in the secondary school. A suggested time allocation (in hours) is shown below for each section. The laboratory hours indicated are calculated on a per student basis.

	Section	Class	Lab	Field	Total
1.	*Computer Fundamentals and Information Processing*	*30*	*4*		*34*
2.	*Computer Networks and Web Technologies*	*11*	*-*	*2*	*13*
3.	*Social and Economic Impact of Information and Communications Technology*	*12*	*-*	*-*	*12*
4.	*Word-Processing and Web Page Design*	*5*	*15*	*-*	*20*
5.	*Spreadsheets*	*5*	*10*	*-*	*15*
6.	*Database Management*	*5*	*13*	*-*	*18*
7.	*Problem-Solving and Program Design*	*20*	*-*	*-*	*20*
8.	*Program Implementation*	*15*	*20*	*-*	*35*

Allied Subjects

Although no subjects are being specified as either prerequisites or co-requisites to Information Technology, it is expected that students would have pursued a course in Mathematics up to Grade 9 (Form 3).

♦ FORMAT OF THE EXAMINATIONS

Paper 01 (1 hour 15 minutes)	*Sixty multiple-choice items: 35 items from Sections 1, 2 and 3; 15 items from Sections 4, 5 and 6; and 10 from Sections 7 and 8.*
Paper 02 (2 hours)	*Four compulsory structured questions drawn from all areas of the syllabus. Marks will be allocated as follows: 35 marks toward the Theory profile, 30 marks toward the Productivity Tools profile and 25 marks toward the Problem-Solving and Programming profile. Knowledge of a specific programming language will not be tested.*
Paper 032 *Assessment for Private Candidates only* *(2 hours)*	*Alternate to the School-Based Assessment for private candidates. This paper will examine similar skills as those tested in Paper 031. The focus, therefore, will be on Productivity Tools and Problem-Solving and Programming. This paper will be a practical paper,*

consisting of five questions: four on Productivity Tools, worth 35 marks, and one on Problem-Solving worth 15 marks.

School-Based Assessment

Paper 031

The SBA component will comprise a practical project testing Section 4, Word-Processing *and Web Page Design*; Section 5, Spreadsheets; Section 6, Database Management; Section 7, Problem-Solving and Program Design; and Section 8, Program Implementation.

*The Project will carry 50 marks which will account for 25 per cent of the final grade. This 50 marks will be distributed as follows: 10 for Word-Processing; 5 for Web Page Design; 10 for Spreadsheets; 10 for Database Management; and 15 for Problem-Solving. The project will be marked by the teacher in accordance with **CXC®** guidelines and the marks should be submitted to **CXC®**. The assignment should be administered as specified in the instructions contained in the Guidelines to the Conduct of the SBA, on pages 31–42.*

♦ CERTIFICATION

*The subject will be examined for certification at the General Proficiency. The School-Based Assessment component for this syllabus is aligned to selected units within the regional qualification of the Caribbean Vocational Qualification (CVQ). Through this integration, once all requirements for issuing the CVQ are met, every student with acceptable grades will receive a Statement of Competence to recognize their competencies in selected units from the Level 1 Caribbean Vocational Qualification (CVQ) in Data Operations – Level 1 (**CCITI10106**). The decisions to award competencies will be based on the quality and relevance of the pieces of evidence presented for the occupational area.*

In addition to an overall grade, there will be a profile report that reflects the performance of each candidate under the following headings.

♦ DEFINITION OF PROFILE DIMENSIONS

Profile Dimensions

Theory — The ability to apply fundamental concepts and skills to Information Technology.

Productivity Tools — *The ability to apply standard features in the following areas:*

(a) word processor in the preparation of documents, as well as the candidate's ability to use web page design applications;

(b) spreadsheet program in solving problems and presenting data; and,

(c) database management program in storing and retrieving data.

Problem-Solving and Programming	*The ability to use analytical skills in the development of algorithms, expressed as flowcharts or pseudo code, that can then be implemented as applications or computer programs.*

MARK AND WEIGHT ALLOCATION FOR PROFILE DIMENSIONS

Paper/Profiles	***Theory***	***Productivity Tools***	***Problem-Solving and Programming***	***Paper Total***	***% Weighting Of Papers***
Paper 01	*35*	*15*	*10*	60	30
Paper 02	*35*	*30*	*25*	90	45
Paper 03	*-*	*35*	*15*	50	25
Profile Totals	*70*	*85*	*50*	200	
% Weighting Profiles	*35*	*40*	*25*		100

♦ HARDWARE AND SOFTWARE REQUIREMENTS

For Schools:

1. It is the responsibility of schools presenting candidates for the examinations to ensure that the required hardware and software are in place to achieve the syllabus objectives.

2. Candidates are advised to try out solutions to a variety of different problems on a computer using a programming language of their choice; no particular programming language will be assumed in this syllabus.

3. From the list provided below, teachers may select appropriate software for the Word-Processing, Spreadsheets, Database Management, *and Web Page Design* components of the syllabus.

RECOMMENDED SOFTWARE

Word-Processing	Spreadsheets	Database Management	*Web Page Design*
1. Microsoft Word 2. *Google Docs* 3. *Google Forms* 4. *OpenOffice Writer*	1. Microsoft Excel 2. *Google Sheets* 3. *OpenOffice Calc*	1. *Microsoft Access* 2. *OpenOffice Base*	1. *Microsoft Word* 2. Free online web services such as *www.wix.com*, www.webnode.com or www.weebly.com 3. *Google Sites*

♦ NOTES TO TEACHERS

1. Students should be aware of the input/process/storage/output cycle as it pertains to hardware and software components in Section 1.

2. *Section 7 should be taught before Section 8. Students should learn how to develop algorithms before they are introduced to writing code in a programming language.*

3. In Section 7, the focus should be on the development of solutions in the form of algorithms (pseudocode/flowchart). The problem-solving skills acquired in this section serve as a foundation for programming in Section 8.

4. *In Section 8, students are required to translate a suitable selection of the algorithms developed in Section 7 into an end-user application using one of the programming tools recommended by the centre. Use simple problems, for example, finding the average of a set of integers, or calculating tax payable, to illustrate how to develop simple programs.*

5. *In Section 8, laboratory sessions should be used to:*

   (a) familiarise the student with the features of the recommended translator;
   (b) identify and correct syntax errors;
   (c) identify and correct logic errors; and,
   (d) execute program and display results.

   It is recommended that students develop the algorithms on paper before converting into source code. This allows for more efficient utilization of computer time.

6. *While* it is expected that students *will* gain skills in the use of productivity tools through practice on specific packages, teachers should ensure that students have an appreciation of the generic operations of each of the productivity tools so that skills are transferable to other packages.

7. Although not a requirement of the course, it may be useful to apprise students of the history of computers.

8. A glossary has been provided to facilitate a uniform*ed* interpretation of the terminology used in the syllabus. Teachers are advised to make use of this glossary and also the list

of recommended texts. However, the reading list provided is not exhaustive and additional references should be consulted.

♦ REGULATIONS FOR RESIT CANDIDATES

*For **CSEC®** candidates, SBA scores can be carried forward only ONCE and only during the year immediately following the first sitting. In order to assist candidates in making decisions about whether or not to reuse a moderated SBA score, the Council will continue to indicate on the preliminary results if a candidate's moderated SBA score is less than 50 per cent in a particular subject. Candidates reusing SBA scores should register as "Resit candidates" and must provide the previous candidate number when registering. These candidates must rewrite Papers 01 and 02 of the examination for the year in which they re-register.*

Resit candidates may enter through schools, recognized educational institutions or the Local Registrar's Office.

♦ REGULATIONS FOR PRIVATE CANDIDATES

1. *Private candidates must be entered for examination through the Local Registrar or approved private institutions in their respective territories and will be required to sit Papers 01, 02, and EITHER Paper 031 OR Paper 032.*

2. *Paper 032 is a practical examination designed for candidates whose work cannot be monitored by tutors in recognized educational and approved private institutions. The Paper will be of 2 hours' duration and will consist of five questions. Questions will test the Productivity Tools and Problem-Solving and Programming profiles.*

3. *Candidates entered for the examination through private institutions and who opt to complete the SBA project must note the following:*

   (a) *Candidates' work must be monitored by tutors in the institution and feedback given before the final assessment of that component. Tutors must also monitor candidates' project to determine the veracity of work submitted. Tutors should not accept projects which were not monitored during development. The marks recorded in the four components will be collated to form the final SBA mark for submission by 30 April, in the year of the examination.*

   (b) *Marks must be submitted to the Caribbean Examinations Council on the School-Based Assessment forms provided online. The forms should be submitted electronically via the SBA data capture module on the Online Registration System (ORS) on the Council's website. Candidates who do not fulfil the requirements for the School-Based Assessment will be reported as "ungraded".*

   (c) *Candidates as well as tutors must retain a copy of the completed component as part of their portfolio.*

♦ *SECTION 1: COMPUTER FUNDAMENTALS AND INFORMATION PROCESSING*

GENERAL OBJECTIVES

On completion of this Section, students should:

1. develop an understanding of the fundamental hardware and software *components and the interrelationship among them;*

2. develop expertise in *evaluating computer systems; and,*

3. develop an understanding of basic information processing principles.

SPECIFIC OBJECTIVES	CONTENT
COMPUTER FUNDAMENTALS	
Students should be able to:	
1. explain the concept of Information Technology;	Definition and scope of Information Technology.
2. distinguish among the major types of computer systems *in terms of processing speed, storage and portability;*	Major types: (a) *Super Computers (for example, Cray).* (b) Mainframes (for example, IBM zEnterprise System). (c) Desktop systems. (d) Mobile devices *(for example, laptops, notebooks, netbooks, smartphones, tablets and game consoles).* (e) Embedded devices *(for example, special-purpose systems such as controllers in microwaves, car ignition systems, answering machines*).
3. explain the functions of the major hardware components of a computer system;	*Major components: input, central processing unit, primary memory (RAM and ROM), secondary storage, output.* (a) *Secondary storage devices: hard disk, magnetic tape, flash drive, memory card, and optical disks (CD, DVD and Blu-Ray).* (b) *Units of storage: bits, bytes, kilobytes, megabytes, gigabytes, terabytes.*

SPECIFIC OBJECTIVES	CONTENT
COMPUTER FUNDAMENTALS (cont'd)	
Students should be able to:	
4. *explain how the major hardware components of a computer system interrelate;*	*Input processing output storage (IPOS) cycle.*
5. *evaluate the relative merits of cloud storage and local storage;*	*Definition of cloud and local storage. Assessment criteria: capacity, cost, accessibility; security issues.*
6. *select appropriate input/output devices to meet the needs of specified applications;*	*Associate the following devices with suitable applications:* (a) *Input:* Optical mark reader (OMR), character readers (OCR, MICR), mouse, joystick, *bar code reader, document scanner*, light-pen, touch terminals, voice response unit, *Touch Screens (tablets, point of sale, ATM),* keyboard, *digital camera, biometric systems, sensors, remote control, sound capture, pointing devices, webcam.* (b) *Visual output: Monitors, Printers (laser, inkjet, dot matrix, thermal, plotters, 3D Printers), microfilm.* (c) *Audible output: speakers, headphones, earphones*.
7. *explain the role of the different types of software in computer operation;*	*System Software: Operating System, Utilities.* *Application software: general-purpose and special-purpose; integrated package; source: off the shelf, custom-written, and customized.*
8. *discuss the relative merits of the various types of user interface;*	*Hardware: touch screens, specialized keyboards.* *Software: command line, menu-driven, graphical user, touch.*

SPECIFIC OBJECTIVES	CONTENT
COMPUTER FUNDAMENTALS (cont'd)	
Students should be able to:	
9. *evaluate the suitability of a given computer system for a specific purpose;*	*Basic knowledge of system specification needed for purposes such as: to run a video game, web browsing, graphic design, video editing, and desktop publishing.* *Criteria:* (a) *Processing speed (CPU type and speed);* (b) *Memory (RAM);* (c) *Secondary storage (capacity and speed);* (d) *Types of software; and,* (e) *Input/Output devices.*
10. *troubleshoot basic computer hardware problems;*	*Cable problems (for example, loose cables).* *Monitor problems (for example, improperly adjusted monitor controls).* *Printer problems (for example, changing printer cartridges).* *Battery problems (for example, loose or dead battery).*
INFORMATION PROCESSING FUNDAMENTALS	
Students should be able to:	
11. *distinguish between data and information;*	Data as raw unprocessed facts; information as processed data. *Sources of data and information (people, places and things).* *Document types: turnaround document, human-readable and machine-readable forms; hard copy, and soft copy.*

SPECIFIC OBJECTIVES	CONTENT
INFORMATION PROCESSING FUNDAMENTALS (cont'd)	
Students should be able to:	
12. *evaluate the reliability of information obtained from online sources;*	*Evaluation of information retrieved electronically for authenticity, currency, relevance, and bias.*
13. *differentiate between* validation and verification of data;	Difference between validation and verification.
14. identify appropriate validation and verification checks given a particular scenario; and,	*Methods of validation: range check, reasonableness checks, data type checks, consistency checks, presence, format and length.* *Methods of verification: double entry and proofreading (to identify and correct typographical and transpositional errors).*
15. select appropriate file organization for particular application.	*File access methods: sequential, serial, direct and random.* *Application areas: archiving, payroll file, real time systems.*

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Organize students in groups to conduct a research on the major hardware components of a computer system. They should use a "show and tell" approach to present findings.*

2. *Arrange visits to local Computer Technology businesses to expose students to different system specifications needed, for example, running a video game, web browsing, graphic design, video editing, and desktop publishing.*

3. *Teachers should arrange for practical sessions in a computer laboratory. After demonstrations by the teacher and/or professional, students should be arranged in pairs to carry out activities such as attaching a monitor, keyboard, and mouse to the computer's system unit, fixing loose cables, and changing printer cartridges.*

4. *Use a video tutorial to illustrate the various types of user interfaces. Allow students to identify merits of using each interface.*

5. *Organize students in groups and assign the task of collecting samples of the different categories of input and output devices. They should then set up an exhibition area and be encouraged to invite the school population to visit booths.*

6. *Invite local software developers/software engineers/programmers to do guest lectures in which they explain the types of software and their role in computer operation.*

7. *Allow students to mount a display on the major types of computers systems, using pictures and other relevant information.*

8. *Encourage students to create a scrapbook with samples of information, data, sources of data and information, as well as different document types.*

9. *Arrange visits to local archives, libraries and media houses to expose the students to the work of appropriate file organization and access.*

10. *Engage students in activities during a class session to write scenarios for their colleagues to identify the appropriate data verification and validation checks that should be applied.*

♦ *SECTION 2: COMPUTER NETWORKS AND WEB TECHNOLOGIES*

GENERAL OBJECTIVES

On completion of this Section, students should *develop an awareness of*:

1. basic networking concepts, including mobile networks; and,

2. Internet and Web Technology concepts.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. distinguish among types of networks;	*Types of networks (local area network, metropolitan area network, wide area network, mobile network).* (a) *Concept of mobile network as radio-based common carrier.* (b) *Overview of mobile networks: from 2G to current. (Knowledge of the inner workings of mobile systems is NOT required)* *Wireless network technologies (for example, Bluetooth, Wi-Fi, hotspot).* *Level of privacy (intranet, extranet, Internet).*
2. explain the functions of the basic components of a network;	Basic components and functions: *(a) Transmission media:* *(i) Wired: twisted pair, coaxial, fibre; and,* *(ii) Wireless: infrared, microwave, satellite.* *(b) Switch, router, modem.* *(c) Network interface card/network adapter.*

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
3. assess the importance of mobile communication technologies as a component of modern communication networks; and,	*Suitability of mobile networks to various applications (for example, education, commerce, and journalism).*
4. *explain the interrelationship among key Web technology concepts.*	*World Wide Web.* *Hypertext Markup Language.* *Hypertext Transfer Protocol.* *Hyperlinks.* *Web Server.* *Web Page.* *File Transfer Protocol.* *Web Browser.* *Uniform Resource Locator.* *Upload and download.* *Email.*

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Engage students in a debate on the importance of mobile communication technologies to our daily lives, for example, the pros and cons of mobile technology in the fields of education, commerce, and journalism.*

2. *Engage students in a matching activity where they match the functions of the basic components of a network.*

3. *Engage students in role play activities where they illustrate how the different networks operate.*

4. *Invite someone with expertise in computer networks and web technologies to address the class and explain some of the concepts.*

♦ *SECTION 3: SOCIAL AND ECONOMIC IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT)*

GENERAL OBJECTIVES

On completion of this Section, students should be able to:

1. develop an understanding of the various elements of computer *security,* and data misuse *and the impact on individuals and organizations*;

2. maintain safe and secure computing environments; and,

3. assess the impact of *technological advancements* on different fields, disciplines *and* jobs.

SPECIFIC OBJECTIVES	CONTENT
IMPLICATIONS OF MISUSE AND CYBERSECURITY	
Students should be able to:	
1. outline the concepts of computer *security, cybersecurity and computer misuse;*	*Computer security and* cybersecurity as related to the assessment and minimization of risk. – Elements: vulnerability, threat, attack, countermeasure. Computer misuse by individuals and *groups/*organizations.
2. assess the *potential* impact of computer systems misuse based on the main *entities* impacted;	Misuse: (a) Cyberbullying, copyright infringement, data theft, denial of service attacks, transmission of viruses *and malware*, identity theft, online publication of obscene materials, phishing attacks, software and music piracy, financial abuses, violation of privacy, propaganda, electronic eavesdropping, industrial espionage; and, (b) Entity impacted: *individual, organization, government.*

SPECIFIC OBJECTIVES	CONTENT
IMPLICATIONS OF MISUSE AND CYBERSECURITY (cont'd)	
Students should be able to:	
3. describe suitable countermeasures to mitigate effects of identified threats;	*Physical measures*: backup and recovery procedures; hardware firewall, intrusion detection systems, *biometrics*. *Software measures*: effective passwords and authentication systems, encryption of data, firewall, *biometrics, antivirus and malware detection*. *Personal Security practices.* *Some practices include:* - verifying authenticity of email from companies or individuals, assessing website URLs for authenticity, limiting access to open Wi-Fi networks, securing mobile devices, *protection* in an online environment *(for example, social media)*.
IMPACT ON JOB SKILLS AND CAREERS	
Students should be able to:	
4. assess the effect of automation on job security;	*Job loss vs productivity gains in skilled and unskilled job categories.*
5. describe the roles of various personnel in computer-related professions; and,	*Network Engineer, Computer Programmer, Computer Support Specialist, Computer Systems Analyst, Administrators (Network, Systems and Database), Software Developer, Web Developer, Social Media Specialist.*

SECTION 3: SOCIAL AND ECONOMIC IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) (cont'd)

SPECIFIC OBJECTIVES	CONTENT
IMPACT ON JOB SKILLS AND CAREERS (cont'd)	
Students should be able to:	
6. assess the impact of information and communications technology on select fields.	*Economic implications of ICT on Education, Medicine, Business, Law Enforcement and Recreation.* *For example:* (a) *Impact on Education in terms of:* *access to information, reach (distance teaching), collaborative teaching and learning, plagiarism; online tutoring.* (b) *Impact on Medicine in terms of:* *access to information (for both medical personnel and patients), telemedicine, eHealth (online access to health services), implications for the quality of healthcare, increase in self-diagnosis, easy access to medical expertise in distant location (for example, teleradiology).* (c) *Impact on Business in terms of:* *E-commerce, Electronic Point of Sale (EPOS), telecommuting Email.* (d) *Impact on Law Enforcement in terms of:* *E-surveillance, finger printing, Biometrics.* (e) *Impact on Recreation in terms of:* *Music and gaming.*

SECTION 3: SOCIAL AND ECONOMIC IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) (cont'd)

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Using a screenshot of a student's offensive comment about a teacher/peer on social media as stimulus, engage students in a discussion on cyberbullying.*

2. *Allow students to observe short clips about various forms of computer systems misuse (for example, hacking and identity theft) then engage in discussions on cybersecurity.*

3. *Encourage students to write a report to be placed on the school's notice board to describe the threats associated with each specific vulnerability discussed in class.*

4. *Have students classify countermeasures into appropriate categories: physical or software related. Have students derive definitions of physical and software counter measures, based on classifications.*

5. *Engage students in a poster-making competition in which they illustrate good personal security practices.*

6. *Engage students in a web quest where they explore different scenarios that will culminate in obtaining authentic and reliable online sources.*

7. *Engage students in a debate where they explore the implications of companies utilizing automated kiosks to transact business. Have students discuss the effects of job loss versus productivity gained in skilled and unskilled categories.*

8. *Engage students in a project where they visit/research various businesses to determine the extent to which technology is being used in different positions.*

9. *Have students conduct research on cybersecurity and then present their information in a panel discussion format. (Students should be able to pose questions to the panel members).*

♦ *SECTION 4: WORD-PROCESSING AND WEB PAGE DESIGN*

GENERAL OBJECTIVES

On completion of this Section, students should:

1. have hands-on experience in the use of Word-Processing and Web Page Design in the development of computer-generated documents; and,

2. be able to express their aptitude and creativity in design.

SPECIFIC OBJECTIVES	CONTENT
WORD-PROCESSING	
Students should be able to:	
1. create a document using content from a range of sources;	*Importing text (combining documents).* *Typewritten text, images and other objects.*
2. use appropriate document formatting features;	*Formatting features:* font types and sizes, *colour,* underline, bold, italics, superscript and subscript, *tab stops, bullets and numbering, line spacing, justification (left, right, centre, full), highlight, uppercase, word wrap, page size, margins, page and section breaks, page numbers,* headers, footers, footnotes and endnotes.
3. use appropriate editing features to structure and organize a document;	*Drag and drop editing: perform block operations on selected areas of text within a document.* *Use search and replace functions appropriately to edit a document.* *Use of tables, table styles, shading, borders, row and column insertion, split cells, split tables, text direction and cell margins, cell size.* *Use of columns (one, two, three, left and right columns, column breaks).*

SPECIFIC OBJECTIVES		CONTENT
WORD-PROCESSING (cont'd)		
Students should be able to:		
4.	use the review *feature of a word processor to enhance document readiness;*	*Spell and grammar check, thesaurus, word count, language setting, comments, and track changes.*
5.	*appropriately use features that allow the protection of a document;*	Automatic save and backup copy, edit restrictions – password protection.
6.	*generate table of contents for a document;*	*Auto table of content.*
7.	use mail merge feature *in the preparation of a document for a variety of situations;*	Creation of primary documents and data files in mail merge application. Field names.
8.	*create a fillable electronic form for online use;*	*Use of content controls, such as check boxes, text boxes, date picker, drop-down lists, and command buttons.*
WEB PAGE DESIGN		
This section provides students with hands-on experience in the use of web design *tools* to create *a simple website.*		
Students should be able to:		
9.	plan *a* website *structure and organization of page;*	Reasons for the website. The intended audience. Number of web pages desired *(no more than 3 pages).* Content of each page. Layout of the web page.
10.	create simple *web pages using a variety of design features;* *(The use of HTML coding is not required.)*	Choosing an appropriate design for a page. Inserting and deleting text and graphics. Wrap text with image. Create *home page with hyperlinks.*

SPECIFIC OBJECTIVES	CONTENT
WEB PAGE DESIGN (cont'd)	
Students should be able to:	
11. *insert* hyperlinks *within different locations of a typical web page*; and,	Link to another web page. Link to a location within the web page. Link to an email address. Link to user-created files.
12. *evaluate* a website *for accuracy, user friendliness and effective display.*	*Considerations for publishing a website:* Verify that all the hyperlinks work correctly. Use a test audience. *Verify that all content is up-to-date.*

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Have students compare and contrast different types of word processors.*

2. *Encourage students to create newsletters/brochures/business cards/advertisements for Clubs and Departments within their school.*

3. *Arrange for students to perform the duties of the School Secretary for the Week, for example, students should prepare: notices for parent conferences, gate/corridor passes, and letters seeking sponsorship for a school activity.*

4. *Organize students in small groups to develop and create club or school web pages using a word processor or free online web services. Investors and/or Stakeholders should be invited to critique as students give their presentations.*

5. *Demonstrate how to add the Developer tab in different productivity tools to access Visual Basic for Applications (VBA) (for example, Microsoft Excel or Word).*

6. *Share examples of fillable forms where users order items online.*

♦ *SECTION 5: SPREADSHEETS*

GENERAL OBJECTIVE

On completion of this Section, students should develop expertise in the use of a spreadsheet package in the development of computer applications.

	SPECIFIC OBJECTIVES	CONTENT
	Students should be able to:	
1.	explain the purpose of a spreadsheet;	*Purpose of a spreadsheet: a spreadsheet is a table consisting of cells (columns, row locations) that hold accounting or financial data and simulates the traditional spreadsheet. It captures displays and manipulates data.*
2.	use appropriate terminologies and notions commonly associated with spreadsheets;	Common features: workbook, worksheet, column, row, *cell (cell address, range, label, value), formula, function.*
3.	*use* basic pre-defined systems functions;	Including sum, average, date, max, min, count, counta, countif, vlookup, pmt, *if*.
4.	create advanced arithmetic formulae;	Formulae including addition, subtraction, multiplication, division, and use of brackets.
5.	replicate (copy) formulae into other cells;	Relative addressing, absolute addressing, *naming of ranges*. Effect of move, copy, delete operations on formulae.
6.	manipulate columns and rows;	*Insert, delete and modify* columns and rows.
7.	manipulate data in a spreadsheet;	*Numeric Data formatting (currency, accounting, percentage, comma, decimal places).* Sorting data (*primary field, secondary field*, ascending vs descending order). Filtering data (*multiple criteria*, complex criterion). *Pivot Table (create one and two dimensional pivot tables, create frequency distribution from data and create pivot chart)*

SECTION 5: SPREADSHEETS (cont'd)

SPECIFIC OBJECTIVES		CONTENT
Students should be able to:		
8.	perform charting operations; and,	Select appropriate chart *types*: Column charts, Bar charts, line graphs, pie charts. Labelling charts: graph titles, labels on axes, *data labels*.
9.	Manipulate *one or more* worksheets.	Use of *one or* more worksheets to solve problems involving some of *or* all of the functions and operations listed above. Linking of two or more worksheets to solve problems.

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Teachers should engage students in using feedback on class activities towards completing their SBA.*

2. *Encourage students to complete exercises that use functions and formulas to effect a more efficient and effective solution.*

3. *Demonstrate examples of locating text and data on a spreadsheet so that data is not lost if rows or columns are inserted or deleted.*

4. *Encourage students to practise pasting versus moving various types of charts to a new sheet; inserting titles and axes labels. Students should also practise pasting charts to a word-processed document and adjusting the chart on the page.*

5. *Encourage students to practise entering test data for their programs to see the results and reinforce these concepts from Sections 7 and 8.*

♦ *SECTION 6: DATABASE MANAGEMENT*

GENERAL OBJECTIVES

On completion of this Section, students should develop expertise in the design of a database management system in the development of computer applications.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. explain the concept of a database;	*Definition of database:* (a) *repository of information; and,* (b) *collection of tables that are related to each other.* *Purpose of database.*
2. use terminology commonly associated with a database;	Database terminology: table, row (record), column (field), primary key, secondary key, candidate key, foreign key. Data types: *numeric; text; logical; date /time; currency.*
3. create a database; *and,*	Table structure with at least three data types and populated with at least 25 records. Modify a table structure: adding new fields, deleting fields, changing field definitions. *Establish primary keys.* *Establish relationships*: *show the joins between tables (one-to-one and one-to-many).*
4. manipulate data in a database.	*(a) Forms:* *(i) Use of form wizard only;* *(ii) select suitable fields; and,* *(iii) use of sub-form.* *(b) Queries:* *(i) more than one criterion;* *(ii) use of select;* *(iii) use of calculated field; and,* *(iv) two or more fields involving the use of relational and logical operators.*

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	*(c) Reports:* *(i) use of report wizard;* *(ii) use of sorting, grouping, statistical and summary features, for example, count, sum, and average;* *(iii) report generated to screen, printer and file; and,* *(iv) renaming of report title.*

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Highlight various paper-based databases of which students may be aware and discuss advantages of digitizing these paper-based records. From the discussion, have students generate definitions of a database and terminologies associated with a database.*

2. *Engage students in exercises where they create database tables and practise changing the general properties of database tables.*

3. *Engage students in activities where they practise manipulating table-editing features such as sorting, inserting and deleting records and fields.*

4. *Engage students in activities where they use given criteria to create simple queries that will pull specific records from a table or tables.*

5. *Engage students in activities where they create presentable reports based on tables and/or queries that can be distributed. Students should also practise generating additional report details such as summary options.*

♦ *SECTION 7: PROBLEM-SOLVING AND PROGRAM DESIGN*

GENERAL OBJECTIVES

On completion of this Section, students should:

1. develop the cognitive skills to solve problems; and,

2. *develop competence in* applying a structured approach to solving problems on the computer.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. outline the steps in problem-solving;	*Steps in problem-solving:* (a) define the problem; (b) propose and evaluate solutions; (c) determine the most efficient solution; (d) develop the algorithm; and, (e) test and validate the solution.
2. use the divide-and-conquer approach to decompose large everyday problems into smaller tasks;	*Basic treatment of the structured approach for solving complex problems.* ***Note:*** *It is not necessary to give a detailed treatment of the approach. Simple illustrations can be provided to help students recognize that most problems involve multiple tasks and that they should understand how to approach such problems in a structured manner.*
3. define a problem by decomposing it into its significant components;	The components are: input; process; and output. A defining diagram *(IPO Chart)* may be used to delineate the components.
4. distinguish between variables and constants;	Variables as an area of storage whose value can change during processing; the value of a constant never changes. Data types: integers, floating point (real), characters, *Boolean, string*.

SECTION 7: PROBLEM-SOLVING AND PROGRAM DESIGN (cont'd)

SPECIFIC OBJECTIVES		CONTENT
Students should be able to:		
5.	explain the concept of algorithms;	Definition of algorithms. Characteristics: finite number of steps, precise, unambiguous, flow of control from one process to another, terminate.
6.	represent algorithms in the form of *flowchart and pseudocode;* and,	Use of flowchart symbols: input/output, process, decision, directional arrows, start/stop. Pseudocode – Use of read, input, store, write, *print,* output, display, *conditional branching (if-then, if-then-else, nested conditions); loops (for, while, repeat).* Use of relational operators: <, >, =, <=, > =,< >. Logical operators: AND, OR, NOT*; use of truth tables.* Arithmetic operators: +, –, *, /, *MOD, DIV*.
7.	test algorithms for correctness.	*Desk checks/dry run:* construction and use of trace tables to verify results. Trace tables consist of variable names (identifiers) as column headings and values in the cells, one row for each pass.

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Provide students with simple everyday scenarios which would allow them to practise the steps in problem-solving and logical thinking. Examples of scenarios include giving directions to a particular location; or determining which mode of transportation (for example, airplane, bicycle, vehicle, walking) is best suited for travelling to a specific location based on weather conditions; or determining which of three groups of **CSEC®** subjects (for example, languages, sciences, arts) should be chosen given that a favourite subject is included in two of the groups.*

SECTION 7: PROBLEM-SOLVING AND PROGRAM DESIGN (cont'd)

2. *Illustrate using everyday problems, such as finding the exit within a hotel or preparing a three-course meal.*

   (a) *divide the problem into a number of sub-problems;*

   (b) *solve the sub-problems individually; and,*

   (c) *combine the solutions to the sub-problems to generate the solution for the original problem.*

3. *Present simple scenarios to help students appreciate the difference between variables and constants by using everyday values such as the percentage of road tax, amount of school fees, cost of bus tickets, cost of today's lunch, or time taken to walk from one class to another.*

4. *Present students with visuals to encourage them to identify flowchart symbols (for example, rectangular symbol to represent a process). Teachers can also use exercises to match pseudocode statements with select symbols (for example, start of algorithm (start/stop symbol), input (read/write symbol), and a condition (decision symbol).*

5. *Engage students in an activity to help them identify relational, logical and arithmetic operators and how a decision is transformed into a flowchart symbol or a pseudocode statement using suitable operators.*

6. *Encourage students to practise drawing flowcharts and producing accompanying pseudocode. They should then use pseudocode to draw the flowchart as practice towards their SBA assignment.*

♦ *SECTION 8: PROGRAM IMPLEMENTATION*

GENERAL OBJECTIVES

On completion of this Section, students should:

1. know how to translate an algorithm into a high-level program; and,
2. understand how to employ techniques to successfully execute a program.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. distinguish between low-level and high-level programming languages;	Low-level language (Machine or Assembly). High-level language (*For example,* Visual Basic, Pascal, C).
2. describe the sequence of steps in implementing a program;	*Steps in implementing a program:* (a) create source code; (b) *translate and/or link (on some systems this step is transparent to users);* (c) execute/run program; and, (d) *maintain program.*
3. perform checks and tests on programs to verify correctness;	*Errors: syntax, logic, runtime.* *Testing (test data).* *Debugging techniques.*
4. declare variables and constants using elementary data types;	Data types: integer, real/*double/float*, *character*, string *and Boolean/logical.*
5. translate algorithmic statements into high-level language syntax; and,	Assignment statements; input/output operations using standard input/output (reading data entered via keyboard, displaying data on monitor). *Syntax for arithmetic, logic and relational operators.* Syntax for conditional branching (for example, if-then, if-then-else, *nested if-then-else or case*). Syntax for Iteration (Loops): for, while, repeat.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
6. effectively document programs.	Importance of documentation. Features of internal documentation (use of mnemonic, variable names, use of comments, indentation, effective use of white space). *Features of external documentation (user manual).*

Suggested Teaching and Learning Activities

To facilitate students' attainment of the objectives of this Section, teachers/facilitators are encouraged to engage students in the teaching and learning activities below.

1. *Provide students with various examples of codes that represent high-level and low-level programming languages.*

2. *Use programming examples to demonstrate to students the effect of not declaring variables, constants, or arrays, and the advantage of initializing them to avoid processing erroneous data.*

3. *Provide opportunities for students to practise identifying test data for sample programs to understand the use of appropriate data (for example, negative, positive, or decimal values, text) for declared variables and the types of errors produced as a result of incorrect input.*

4. *Encourage students to use the selected programming language to practise writing code for simple applications based on flowcharts and pseudocode as practice towards their SBA assignment.*

5. *Engage students in activities where programming language code of declarations, input/output and assignment statements, conditional branching and loops are used to produce working programs.*

♦ *GUIDELINES FOR THE CONDUCT OF THE SCHOOL-BASED ASSESSMENT*

School-Based Assessment is an integral part of student assessment in the course covered by this syllabus. It is intended to assist students in acquiring and using certain knowledge, skills and attitudes that are associated with the subject. The activities for the SBA are linked to the syllabus and are part of the learning activities to enable the student to achieve the objectives of the syllabus. *Students are encouraged to work in groups.*

School-Based Assessment provides an opportunity to individualize a part of the curriculum to meet the needs of students. It facilitates feedback to the student at various stages of the experience. This helps to build their self-confidence as students proceed with their studies. School-Based Assessment also facilitates the development of the critical skills and abilities that are emphasized by this **CSEC®** subject and enhances the validity of the examination on which the candidate's performance is reported. SBA, therefore, makes a significant and unique contribution to both the development of relevant skills and the testing and rewarding of students for the acquisitions of those skills.

During the course of study for the subject, students shall obtain marks for the competence they develop and demonstrate in undertaking their SBA assignments. These marks contribute to the final marks and grades that are awarded to students for their performance in the examination.

The guidelines provided in this syllabus for selecting appropriate tasks are intended to assist teachers and students in designing assignments that are valid for the purpose of SBA. These guidelines are intended also to assist teachers in awarding marks that are reliable estimates of the achievement of students in the School-Based Assessment component of the course. In order to ensure that the scores awarded by teachers are in line with the **CXC®** standards, the Council undertakes the moderation of a sample of the School-Based Assessment assignments.

The Caribbean Examinations Council seeks to ensure that the SBA scores are valid and reliable estimates of accomplishment. Candidates are provided with the guidelines below in order to successfully complete the SBA.

The School-Based Assessment seeks to provide students with the opportunity to demonstrate their problem- solving and programming skills as well as their ability to use productivity tools effectively in:

1. entering, manipulating and presenting text data;

2. simulating a worksheet;

3. entering data, performing simple analysis on data and presenting data using a database management tool; *and,*

4. *applying programming language code to automate a segment of the project.*

ASSIGNMENT

The School-Based Assessment consists of one practical project consisting of *five* related components, prepared and marked by the teacher *in accordance with **CXC®** guidelines.*

The components will test Problem-Solving and Programming as well as the application of processes involved in the use of Database Management, Spreadsheets and Word-Processing and Web Page Design. The *five* components will therefore cover the Specific Objectives in Sections 4, 5, 6, 7 and 8.

Types of Projects

Teachers should develop assignments that expose the students to realistic applications which involve, but are not limited to the following areas:

(a) business (for example, storing and managing employee, customer and sales records, marketing);

(b) banking (for example, creation of different types of accounts, loans, interest, payments on loans, fixed deposits, investments);

(c) education (for example, enrollment in schools, academic record-keeping);

(d) entertainment (for example, analysis of data on distribution and sales of movies, music, electronic games);

(e) environment (for example, records of storms and hurricanes over specific periods and in named territories, calculation of cost of damage to infrastructure, housing, livestock, farms);

(f) law enforcement (collection and management of crime statistics collection and analysis of data on offenders, cost of maintaining prison populations);

(g) medicine (for example, managing patient records collection and analysis of data on diseases over a period of time and in various locations);

(h) monitoring (for example, analysis of data on accidents at intersections, counting and categorising visitor arrivals in Caribbean territories); and,

(i) sports (for example, collection and processing of data on athletes' sport meetings).

Word-Processing

This assignment should consist of the formatting, importing and/or documentation of *information.* ***The assignment must be chosen from TWO of the following****:*

(a) a document containing a table of contents and/or prepared for mass mailing;

(b) use of templates (such as memos, reports, faxes, simple brochures, flyers) or newspaper articles; and,

(c) a fillable form using the Developer. It should comprise no more than four controls (for example, text box, drop-down list, check box or date picker). The controls can be used more than once when designing the form. Manipulation of the controls should be limited to renaming labels and prompts (tags), and adding drop-down list properties.

Web Page Design

This assignment should be limited to one web page that is designed using a word processor or a free online web service. Students can insert screenshots or create the design of the web page at the end of the word-processed document. Alternatively, they can use the last page in their word-processed document to paste the link to the online web page. Only the candidate number placed near the top of the page should be used as a form of identification for the web page.

The web page should contain at minimum:

(a) a logo depicting the concept of the project;

(b) defined areas on the page for navigational links and content; and,

(c) at minimum two hyperlinks of the following:

- *link to a location within the web page;*
- *link to an email address;*
- *link to another web page (which may or may not exist); and,*
- *link to user-created files.*

Spreadsheet

This assignment should be saved as one workbook (comprising two or more worksheets). The tasks should be limited to:

(a) a maximum of TWO major tasks (for example, create the spreadsheet; modify the spreadsheet) consisting of no more than THREE requirements (for example, sorting of data and use of functions and formulas on data); and,

(b) the creation of no more than TWO types of charts.

Database Management

This assignment should be saved as one database file. The tasks should be limited to no more than:

(a) THREE tables or files.

(b) TWO queries (using criteria from one table, and more than one table).

(c) ONE calculation within queries.

(d) ONE form, showing a main and sub-form (for example, to search for a record, or to move to the next or previous record).

(e) ONE report, with grouping and sorting involving TWO or THREE tables.

Problem-Solving and Programming

This assignment should use programming language selected by the centre. Examples include but are not limited to:

(a) prompting for data entry with appropriate validation with suitable messages output to the user; and,

(b) input of data to variables and required calculations.

The code should be limited to:

(a) Input of values or sets of text.

(b) Output of results or messages.

(c) Conditional branching (if-then; if-then-else, or case).

(d) Iterations/Looping (for, repeat, or while).

The problem-solving section must be submitted as a PDF document.

Requirements	***Guidelines***
Cover sheet	*The information supplied here is essential since it is used to associate the submission with a particular candidate.*
Problem definition	*Students should provide the statement of the problem, that part of the problem that was chosen for coding in the spreadsheet.*
Algorithm	*Students are expected to include flowcharts or pseudocode for the segment of code that will be written.*
Source code	*A copy of the programming language code.*
Trace Table using test data	*Students are required to supply the test data that produced the output. This information would be necessary to determine whether the* tasks have been *performed correctly.*
Program execution	*Students are required to submit screenshots of working program showing data entry and results produced.*

ROLE OF THE TEACHER

The role of teacher is to:

(a) *Assign* the project for the School-Based Assessment.

(b) Provide guidance throughout the life of the projects. *The teacher should work* with candidates to develop a project management chart *with definite timelines for achieving clearly identified objectives, from project inception to project completion*.

(c) Guide students through the SBA by helping to clarify the problem or by discussing possible *approaches to solving the problem*. Teachers, *while giving guidance*, should guard against *providing a complete solution to the problem for the candidate or* prescribing a specific format *that* should be followed.

(d) Assess student's skills in problem- solving and algorithm development using flowcharts or pseudocode, coding an algorithm *using the selected programming language* and the effective use of productivity tools to perform prescribed activities. The development of the project is a continuous exercise that occurs during scheduled class hours as well as outside class times. At a time to be determined by the teacher the relevant component will be assessed and the marks recorded. *Copies of the completed documents should be kept by both the teacher and students.* The teacher should use the mark scheme provided by **CXC®** and include any comments pertinent to the conduct of the assessment.

(e) Guide students through the SBA by helping to clarify the problem or by discussing possible formats.

(f) Ensure that students are allowed sufficient access to equipment to allow successful completion of their projects.

SCOPE AND SIZE

The project should be the size and complexity for candidates to satisfactorily complete during the second year of the two-year course.

The WP and WBD, SS and DB sections of the project should each have approximately the same number of tasks and degree of complexity such that each project requires the same amount of preparation. The project should encompass some advanced processes in *Sections 4, 5 and 6.* Problem-Solving and Program Implementation should be based on the project and not attempted in isolation. It must, therefore, be an actual implementation of a simple aspect of the project.

Teachers are encouraged to design their School-Based Assessment at the commencement of the academic year. This would allow for the completion of sections of the project as topics are addressed. It is suggested that the Problem-Solving component be attempted when the teacher has completed Section 7 of the syllabus, and the Program Implementation component at the completion of Section 8.

ASSESSMENT CRITERIA

The following is the mark scheme for assessing SBA assignments. Teachers must clearly indicate the breakdown of the marks allocated for each question on the candidates' SBA paper.

Note to Teachers: The marks for the WP and WPD, SS and DB are to be summed and divided by 2 in order to provide the Productivity Tools mark out of 35.

WORD-PROCESSING – Maximum of 20 marks

Since teachers may vary the focus of their SBA from year to year, the Word-Processing component offers some choice. To obtain the 20 marks for Word-Processing, teachers may:

- ***Choose TWO of the three features:*** **tables, columns, and inserting/importing files. (2 marks each)**
- **Choose TWO of the three advanced features: Mail merge, table of contents and fillable forms. (5 marks each)**

All other objectives are compulsory

Specific Objective	Key Skills The effectiveness with which the candidate(s) has/have confidently used and/or manipulated:	Mark Allocation	Maximum marks per sub-section
	The following are compulsory (SO3).		
S4: SO3	**Document Formatting features**		**(4)**
	No more than FOUR features to be tested: • Any TWO: bold, underline, italics • Justification (centre, right, full) • Changes in line spacing • Superscript and/or subscript • Changes in font or font size • Page numbering		
S4: SO3	**Page Layout**		***(2)***
	• *Any* change in margins, page orientation, paper sizes or text orientation • Correct use of header OR footer OR footnotes OR endnotes	1 1	
	Select any two of the following (SO1 and SO2).		
S4: SO1	**Inserting/importing files**		**(2)**
	• Graphic / chart in document • Graphic/chart/table sized appropriately to fit in desired location/margins	1 1	
S4: SO2	**Columns**		**(2)**
	Correct use in entire document or selected text Mostly correct in document or selected text	2 1	
S4: SO2	**Tables**		**(2)**
	Correct number of rows and columns Correct formatting of table (e.g. border, shading of cells, colour)	1 1	
Specific Objective	**Key Skills** **The effectiveness with which the candidate(s) has/have confidently used and/or manipulated:**	**Mark Allocation**	**Maximum marks per sub-section**
	Select any TWO of the following (SO6, SO7 or SO8).		

S4: SO*6*	***Table of Contents***		***(5)***
	• *Auto-generation of table of contents* • *In suitable location* • *At least TWO levels of headings* • *Suitable headings chosen (1 mark EACH)*	*1* *1* *1* *2*	
S4: SO*7*	**Mail Merge Facility**		**(5)**
	Selection or creation of required merge fields in: • Data source • Primary document (*final document* consistent with merged document) Insertion of correct merge field in: • Appropriate section • Correct merge	 1 1 1 2	
S4: SO*8*	**Fillable Forms**		**(5)**
	Appropriate use of at least THREE of: • Option boxes, check boxes, text boxes, date picker, drop-down lists, and command buttons Layout of form for ease of use • Layout clear and easy to follow • Some aspects of layout not clear or easy to follow	 3 2 1	

WEB-BASED DESIGN (10 marks)

Specific Objective	*Key Skills* *The effectiveness with which the candidate(s) has/have used or applied*	*Mark Allocation*	*Maximum marks per sub-section*
S4: SO9	***Appropriate design features to create a simple web page***		***(3)***
	• *Inclusion of graphics and text* • *Appropriate use of text* • *Appropriate use of graphics*	*1* *1* *1*	
S4: SO9	***Web page for intended audience***		***(2)***
	• *Layout suitable for intended audience* • *Mostly suitable for intended audience*	*1* *1*	
S4: SO12	***Consistent Information on the page specific with requirements***		***(3)***
	• *Majority of information consistent with requirements* • *Somewhat consistent with requirements* • *A few aspects are consistent with requirements*	*3* *2* *1*	
S4: SO11	***Hyperlinks***		***(2)***
	The presence of a link for any TWO of the following: • *link to another web page;* • *link to a location within the web page;* • *link to an email address; and,* • *link to user-created files.*		

SPREADSHEET – 20 marks

Specific Objective	**The effectiveness with which candidate(s) use(s) or manipulate**	**Mark Allocation**	**Maximum marks per sub-section**
S5: SO3	**Pre-defined systems functions** – 1 mark each for correct use of any **THREE** functions		**(3)**
	• *Correct use of any **THREE** different functions*	*3*	
S5: SO4	**Arithmetic formulas** – *1 mark* each for any **THREE** formulas		**(3)**
	• *Correct use of any* **THREE** different formulas	3	
S5: SO5	**Replicate formulas into other cells**		**(2)**
	• Use of absolute addressing or range names (two different examples)	2	
S5: SO6	**Spreadsheet formatting**		**(4)**
	• Any TWO: Decimal place, currency, comma, percentage features • Justified, left, right, centre, font or font size • Advanced use such as merging cells, wrap text	2 1 1	

Specific Objective	The effectiveness with which candidate(s) use(s) or manipulate	Mark Allocation	Maximum marks per sub-section
S5: SO7	**Sorting data in the spreadsheet**		**(1)**
	• Data sorted in ascending/descending order as required	1	
S5: SO7	**Extracting data**		**(2)**
	• Simple filter in place • Evidence of criteria (for example, B3<20)	1 1	
S5:SO7	***Pivot Tables***		***(1)***
	• *Use of pivot tables to summarise a large group of data*	1	
S5: SO8	**Charting operations**		***(3)***
	• Ability to select required range of adjacent/non-adjacent cell for use in a chart • Appropriate chart such as bar/column chart, line graph, pie chart • *Appropriate labelling of chart title, chart axes and/or data labels*	1 1 1	
S5: SO9	**Use of two or more sheets**		**(1)**
	• Linking of cells in different sheets	1	

DATABASE MANAGEMENT – 20 marks

Specific Objective	The effectiveness with which candidate(s) use(s) or manipulate features to	Mark Allocation	Maximum marks per sub-section
S6: SO3	**Create a database**		**(5)**
	• Appropriate fieldnames • Appropriate data types • Populating table • Create minimum of two database tables/files • Selecting a suitable primary key	1 1 1 1 1	
S6: SO3	**Simultaneous use of two or more tables/files**		**(2)**
	• Joining between pairs of database tables/files • Evidence of relationship (1:1 or 1:M)	1 1	
S6: SO4	**Create queries**		**(5)**
	• Simple query (1 criteria) • Complex query: >1 criteria (1) using more than one table (1) • Correct use of and result from calculated field in query	1 2 2	
	Create forms		**(2)**
	• Form with sub-form created • Appropriate fields for sub-form	1 1	
S6: SO4	**Sort a database table/file/Report**		**(1)**
	• Evidence of sort	1	
S6: SO5	**Generate reports**		
	• Selection of appropriate fields for report • Statistical and/or summary features (for example, count, sum, average) • Grouping required fields • Correct specific report title (2) – Generic report title only (1)	1 1 1 2	**(5)**

PROBLEM-SOLVING AND PROGRAMMING (15 marks)

Specific Objective	The effectiveness with which candidate(s) employed techniques to create or design	Mark Allocation	Maximum marks per sub-section
S7: SO5	**Flowchart or pseudocode**		**(6)**
	• Start of Algorithm • Identifying user-friendly variable names • Initialising variables Processing • Request for data (prompt) • Storing data (reading data) • Appropriate and logical use of structures – Selection – Looping	1 1 1 1 1 1	
S7: SO7	**Trace table**		**(4)**
	• Variables identified in trace table • Appropriate test data • Changes in values correctly demonstrated – *Some errors in manipulating the trace table*	1 1 2 1	
S8: SO2	**Program Execution**		**(1)**
	• Working program	1	
	Program language features / working solution		**(3)**
S8: SO5	Variable initialization Control structures: • Appropriate use of selection statements (if-then, if-then-else, or case statement) • Looping – (while, repeat or for)	1 1 1	
S8: SO7	**Documentation**		**(1)**
	Program documentation (such as author, date created, statement of problem, and suitable inline comments)	1	

PROCEDURES FOR REPORTING AND SUBMITTING SCHOOL-BASED ASSESSMENT

(a) Teachers are required to record the mark awarded to each candidate under the appropriate profile dimension on the mark sheet provided by **CXC®**. The completed mark sheets should be submitted to **CXC®** no later than 30 April of the year of the examination.

Note: The school is advised to keep a copy of *all projects* as well as copies of the mark sheets.

(b) Teachers will be required to submit to **CXC®** *electronic* copies of the projects of a sample of candidates as indicated by **CXC®**. This sample will be re-marked by **CXC®** for moderation purposes.

Note: The SBA Data Capture Module of the Online Registration System (ORS) must be used for the submission of ALL SBA marks.

MODERATION OF SCHOOL-BASED ASSESSMENT

The candidate's performance on the project will be moderated. The standard and range of marks awarded by the teacher will be adjusted where appropriate. However, the rank order assigned by the teacher will be adjusted only in special circumstances and then only after consideration of the data provided by the sample of marked projects submitted by the teacher and re-marked by **CXC®**.

EQUIPMENT

The equipment should include an IBM-compatible computer with software that is capable of integration among word-processing, spreadsheet and database management applications. ***CXC®*** *will not be responsible for partial assignments submitted due to software incompatibility and/or integration problems.*

♦ *RECOMMENDED TEXTS*

Birbal, R. and Taylor, M.	*Log On to IT for CSEC.* Essex: Pearson/Longman, 2005.
Gay, G. and Blades, R.	*Information Technology for CXC CSEC*. Oxford: University Press, 2005.
Holligan, J. and Doyle, S.	*IT FOR CSEC*. Cheltenham: Nelson Thornes, 2006.
Jamrich, P. and Oja, D.	*New Perspectives on Computer Concepts,* 10th edition. Course Technology. Washington D.C. Thomson Publishing, 2007.
Robertson, L.	*Simple Program Design – A Step by Step Approach*. Course Technology, Washington D.C., 2006
Skeete, K.	*CXC Information Technology*. Cambridge: University Press, 2004

WEBSITES

http://www.gcflearnfree.org/subjects/technology/

http://www.excel-easy.com/vba.html

https://support.office.com/en-us/article/Create-a-fillable-form-39a58412-107e-426b-a10b-ac44937e3a9f

http://bigdata-madesimple.com/5-advantages-and-disadvantages-of-cloud-storage/

https://www.saylor.org/site/textbooks/Information%20Systems%20for%20Business%20and%20Beyond.pdf

♦ *GLOSSARY OF INFORMATION TECHNOLOGY CONCEPTS*

WORD	DEFINITION
Address	The identification of a particular location in memory where a data item or instruction is stored.
Algorithm	A sequence of instructions which rigorously defines a solution to a problem.
Assembler	A program which converts ASSEMBLY LANGUAGE into MACHINE CODE to be used by a computer.
Automation	Computer control of machines and processes.
Bandwidth	A characteristic of a communication channel that determines the speed at which data can be transmitted over the channel.
Bar code	A series of thick and thin black bars separated by spaces of varying widths representing data.
Bistable device	A device which can exist in two discrete stable states.
Bit	An acronym for binary digit. It can have a value of 1 or 0.
Blog	*Short for "Web log". A blog is an online journal or diary of an individual's opinions and latest news. It is updated regularly, in chronological order. Many blogs allow visitors to make comments, or "postings" in response to the blogger, or to ask questions.*
Broadband	*A term used to describe a technology that provides bandwidth that is greater than that provided by ordinary telephone lines, that is, greater than 64 kilobits per second. The greater the bandwidth, the greater the data-carrying capacity.*
Broadcast	*The transmission of data to all connected stations simultaneously.*
Byte	A group of eight bits, usually representing a single character.
CADD	Acronym for computer-aided design/drafting. The use of computers and graphics in design and drafting process.
CAM	Acronym for computer-aided manufacturing. The use of computers to control machines in the manufacturing process.
Character	One of the set of symbols that may be represented in a computer. Characters may be letters, digits, symbols.
Character codes	Binary patterns used to represent characters in a computer system.

WORD	DEFINITION
Cloud Computing	The use of a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.
Cloud Storage	A cloud computing model in which data is stored on remote servers and can only be accessed via the Internet, or "cloud." It is maintained, operated and managed by a cloud storage service provider.
Compiler	A program that translates the source program into executable machine code, and saves the code to a file (the object program) for later execution.
CPU	*Central Processing Unit*
Data corruption	The introduction of errors into data stored in a computer system.
Database	A collection of data files that may be used by a number of applications with storage and access to the data controlled by a set of programs known as Database Management System (DBMS).
Database management system	Programs and database files that allow timely and easy controlled access to data by a number of users.
Download	Process whereby programs or data are transferred via communications channels from a computer and stored on media located at the user's computer.
Dry-run	A manual traversal of the logic of a program.
DVD	*Digital Video Disk or Digital Versatile Disk. A high-density compact disk for storing large amounts of data, especially high-resolution audio-visual material.*
Electronic mail	Mail or messages transmitted electronically by computers via communication channels. It is usual for such messages to be held in a central store for retrieval at the user's convenience.
Ergonomics	*A field of study dealing with the comfort and safety of the human body by adjusting different designs in equipment, furniture, workstations and routines to fit the worker. (Ergonomics is used in the workplace to help prevent repetitive injuries.)*
Expert system	A software package that acts as a consultant or expert to the user. It is an "expert" in a specialised application or area and provides assistance to the user in solving problems in that area.
Field	*A component of a record designed to hold a single data item of a specified type.*

WORD	DEFINITION
Flowchart	*A graphical representation of an algorithm, comprising various symbols connected by arrows to show the step-by-step flow of data through a process.*
Font	A family or collection of characters (letters, punctuation marks, numbers and special characters) of a particular size and style.
Gigabyte	The equivalent of approximately one billion bytes.
Hard disk	A rigid disk used for storing data magnetically. Its rigid construction allows for higher storage densities. Access times for a hard disk are much faster than for floppy disks.
Hardware	The physical components of a computer system such as the Central Processing Unit (CPU), memory, input, output, and storage devices.
Home page	*The file available for access at a website intended chiefly to greet visitors, provide information about the site, and direct them to other sites with related information.*
HTML	*Hypertext Markup Language. A markup language used to structure text and multimedia documents used extensively on the World Wide Web.*
HTTP	*Hypertext Transfer Protocol. A protocol used to request and transmit files, especially Web pages and Web page components, over the Internet or other computer network.*
Information	Meaningful knowledge produced from raw data files.
Information retrieval	The process of retrieving specific information from data files.
Information Technology	*Information technology (IT) is the use of computers, storage, communication and other physical devices to create, process, store and exchange all forms of electronic data.*
Integrated package	This package combines several applications in a suite of programs. Most of these packages combine a word processor; spreadsheet and database program. Data are shared easily between these integrated programs.
Internet	*The Internet is the largest computer network system in the world. It consists of many smaller networks connected together by a global public network. The Internet is often called the information superhighway or cyberspace.*

WORD	DEFINITION
Intranet	*An intranet is a private network that belongs to an organization, and is designed to be accessible only by the organization's members, employees, or others with authorization. When part of an intranet is made accessible to customers, partners, suppliers, or others outside the company, that part is called an extranet.*
Interpreter	A computer program which interactively translates and executes a source program without permanently storing any executable code.
Joystick	An input device that uses a lever to control movement of the cursor or graphic images.
Justification	This is the adjustment of alignment of one or more lines of text with a particular margin, for example, alignment with the left margin, the right margin or both. The term justification often is used to refer to full justification of the alignment of text along both margins.
Keyboarding	The process of rapidly and accurately entering data into a computer via the keyboard as an input device.
Kilobyte	One thousand and twenty-four bytes.
LAN	Acronym for Local Area Network. A type of computer network where two or more computers are directly linked within a small area such as a room or building site. A common characteristic of this system is that computers are linked by direct cables rather than by telecommunication lines.
Light pen	A light-sensitive input device which when it touches the screen detects the presence or absence of light. It is used to select an entry or indicate a position.
Magnetic disk	A mylar (floppy disk) or metallic (hard disk) circular plate on which electronic data can be stored magnetically. Suitable for direct or random access data storage and retrieval.
Mail-merge	A facility found in full-fledged word-processing programs that draws information from a database, usually a mailing list, to print multiple copies of a document. Each copy contains some common text but each bearing different addresses.
Mainframe	A large-scale computer with a variety of peripheral devices, a large amount of backing store and a fast CPU. The term is often used in comparison with a smaller or subordinate computer. It should be noted that there is no clear dividing line between mainframes and minicomputers.
Margins	*Space provided to the left, right, top and/or bottom of a page of text or data.*

WORD	DEFINITION
Menu	A screen listing commands of action or alternatives to lead the user through an interactive program.
Menu-driven Interface	*A Program interface where the user is provided with a list of operations.*
Merge	The combination of two or more files on the basis of common field (key field).
MICR	Magnetic Ink Character Recognition.
MIDI	Musical Instrument Digital Interface. A standard for representing musical information in a digital format.
Microcomputer	A computer based on a microprocessor. See definition of microprocessor below.
Microfiche	An output medium consisting of microfilm sheets. Very high density storage can be attained using this method of storage.
Microprocessor	A single chip which contains the arithmetic/logic unit (ALU) and the control unit (CU).
Modem	Acronym for modulator-demodulator. A device that converts signals from analogue to digital and vice versa. *A modem allows computers t o exchange information through telephones lines.*
Monitor	A television-like device used to display data.
Mouse	An input device that controls the movement of the cursor. The cursor moves in response to the movement of the mouse on a flat surface.
Multiprocessing	*The ability of a computer to execute programs on two or more processors simultaneously. The program is distributed over several processors.*
Multitasking	*The concurrent execution (at the same time) of two or more related tasks. A group of cooperating tasks is executed simultaneously to achieve a common goal.*
Narrowband	*A term used to describe a technology that provides bandwidth that is less than or equal to that provided by ordinary telephone lines. That is, 64 kilobits per second or less.*
Online	*The term is used to describe peripheral devices under the control of the processor.*
Off-line	*Describes peripheral devices that operate independently and are not under the control of the processor.*

WORD	DEFINITION
Operating system	A set of programs that control and supervise the resources of a computer system. It also acts as an interface between the user and the computer.
Peripheral	Any hardware device connected to and controlled by the central processing unit.
Plotter	An output device specially designed to produce a hard copy of graphical data.
Point of sale terminal	A device that reads data at the source of a transaction (for example. a supermarket checkout) and stores it for subsequent transmission directly to the computer system for processing.
Primary Memory	*Random Access Memory and Read Only Memory.*
Printer	*A device specially designed to produce a hard copy of computer output.*
Protocol	A set of rules and procedures controlling the transmitting and receiving of data so that different devices can communicate with each other.
Pseudocode	A language consisting of English-like statements used to define algorithm.
Real-time	A processing mode in which the passage of real-time is critical to the application.
Record	A collection of fields on data related to one entity.
Resolution	A characteristic of a monitor's screen, determined by the number of pixels that can be displayed by it.
Software	A collection of programs, procedures and routines which direct the operations of a computer.
Software package	A fully documented program or set of programs generalized and designed to be used with little or no modification.
Sort	Redistribution of data into an order on the basis of the contents of a key item (sort-key).
Source code	Program written in high level language or assembly level language.
Source document	A document used for the initial recording of data relating to business transactions. Very often source data needs to be converted into machine-readable form for example, punched cards or paper tape, before it can be processed by a computer.

WORD	DEFINITION
Spell-check	A dictionary feature associated with a word processor which allows the user to easily detect and correct errors in spelling. One can add new words to the dictionary so that the latter may grow with usage, for example, in WordPerfect, WordStar and Microsoft Word.
Syntax	A set of rules defining the structure of statements in a programming language.
Telecommunication	The process of transmitting data between devices using transmission facilities such as telephone lines or microwave links.
TCP/IP	*(Transmission Control Protocol/Internet Protocol) These are a set of rules and regulations followed by computers on the Internet to communicate.*
Telecommuting	A method of working where an offsite employee uses computer and a communication channel to communicate with the office computer.
Telemarketing	The employment of telephone lines and computers to market products and manage accounts.
Touch terminal	Also called a touch screen. A device that allows data to be input by touching a screen with the finger or other object. The surface of the screen consists of a number of programmed touch points each of which may trigger a different action when selected by the user.
Turnaround document	A document which, after being output by the computer, can be used to record data.
Upload	Process of reading data from a user's computer storage and sending it to another computer via communication channels.
URL	*Each page on the World Wide Web has a unique address called the Uniform Resource Locator (URL).*
Validation	A checking process in a program which is aimed at finding out if data is genuine. Validation should be carried out on any data that is entered from the keyboard, even when this is simply a Y or N response.
Variable	*An area of storage whose value can change during processing.*
Verification	*Specific checks that ensure that the data entered matches (or is identical to) the data at the original source.*
VoIP	*Acronym for Voice over Internet Protocol. It is a protocol which governs the transmission of voice over the Internet. VoIP is often used abstractly to refer to the actual transmission of voice (rather than the protocol implementing it). VoIP is also known as IP Telephony.*

WORD	DEFINITION
Web browser	*A programme that allows users to view and explore information on the World Wide Web. Examples of popular browsers are Microsoft Internet Explorer and Mozilla Firefox.*
Web page	*A document on the World Wide Web, consisting of an HTML file and any related files for scripts and graphics. It is often hyperlinked to other Web pages.*
Web server	*A computer that delivers (serves up) Web pages. When a request is made to access a website, the request is sent to the web server. The server then fetches the page and sends it to your browser.*
Website	*A set of interconnected Web pages, usually including a home page, generally located on the same server, and prepared and maintained as a collection of information by a person, group, or organization.*
World Wide Web (WWW)	*The World Wide Web commonly referred to as the 'Web', is a graphical easy-to-use system of inter-linked files on the Internet. Vast amounts of information can be obtained through the use of the www.*

♦ *GLOSSARY OF BEHAVIOURAL VERBS USED IN THE INFORMATION TECHNOLOGY EXAMINATIONS*

Analyse	Examine key factors and constituent parts critically and in detail and suggest possible results/outcomes.
Assess	Present possible explanations or reasons for the importance of a particular structure, relationship or process and say what would be the appropriate explanation.
Classify	Place into groups according to observable characteristics, attributes, features or qualities.
Compare/Contrast	Identify and describe/examine similarities and differences between two elements/concepts/entities of the same or different kinds.
Define	Provide a brief statement giving the precise meaning of or outlining the nature, properties or essential qualities of a term, concept, and principle.
Describe	Provide statements of the features or characteristics of an object or process.
Differentiate/Distinguish	Provide an explanation of the differences between entities which allow them to be placed in distinct groups.
Discuss	Give a careful explanation of a concept or statement by providing a definition and explaining the arguments for or against it.
Evaluate	Explain the evidence for or against a given topic or concept and come to a conclusion.
Explain	Provide detailed, logical statements which make clear what happened, how it happened and why it happened.
Identify	Point out or describe distinguishing features (without giving explanation).
Illustrate	Show clearly by using appropriate examples, diagrams or sketches.
Label	Identify structures or parts with the use of pointers.
List	Itemize answers concisely and in order if specified.
Manipulate	*To use, modify or update original data, values or items.*
Name	Provide accurate labels, words or statements.

Outline	Give basic steps, organize information concisely to provide main points or features only.
Plan	Provide an outline of steps to be followed or the scheme of arrangements.
State	Provide a short concise answer without explanation.

SAMPLE SCHOOL-BASED ASSESSMENT

Description of the Project

National general elections have been a recurring feature among the democratic territories of the Caribbean. Every year, in one territory or another, citizens exercise their right to elect a government of their choice. However, the exercise is not without its attendant challenges of data management. Thousands of votes are cast on the day of the elections and an anxious, waiting public demands speed, efficiency and accuracy in the determination of results.

In preparation for the actual exercise, the Trinbarjam Elections Commission has hired you to simulate the elections exercise as a test run, prior to the actual elections which are to take place shortly in your country. You are required to utilize suitable word-processing, web page design, spreadsheet, database management as well as a programming application to design and implement computer-based solutions to the tasks involved in the simulation of the election process.

Spreadsheet

The Elections Commission has mandated that you design a spreadsheet that will accept pertinent data on constituencies and candidates' votes and generate information that would enable the outcome of the elections to be divulged to the population in the shortest possible time. **Four parties contest the elections: The Democratic Action Party (DAP), the Workers National Alliance (WNA), the United Progressive Movement (UPM), and the People's Democratic Revolution (PDR).** The spreadsheet is design to accept data from seven constituencies.

You are required to:

Task 1

1. (a) Design a spreadsheet with the below table in sheet 1.

Constituency	Percentage Voter Turnout
North	0.75
South	0.85
East	0.90
West	0.80
North West	0.75
South West	0.88
East Central	0.82

(b) Using **another** worksheet design a table to record the:

- Constituency
- Number of voters (The number of voters in a constituency ranges from 6,250 to 10,795.)
- Votes Cast
- Candidate's name
- Candidate rating (The rating assigned to candidates are 15, 20, 30 and 35. These ratings were determined by the results of a recent poll conducted in each

constituency by a noted pollster. **Each candidate in a given constituency has a unique rating**.)

- Party name

You must enter data for each candidate in each of the seven constituencies. **Use the Percentage Voter Turnout data to determine the number of votes cast (number of voters * percentage voter turnout).**

Rename the worksheet as Elections Data
Save your spreadsheet as **Elections**

Task 2

Duplicate the Elections Data worksheet. Rename the duplicate as Elections Data Backup.

Modify the Elections Data worksheet as follows:

1. (Insert a column before the one which displays the name of the political party. Using an appropriate column title, determine the votes received by each candidate in a given constituency. **The candidate's rating represents the percentage of votes received by the candidate in a given constituency. For example, given that 6400 votes were cast and a candidate has a rating of 20, the votes received by the candidate would be 20/100*6400.**

   Format the votes received by each candidate to zero decimal places.

2. Sort the data first on party (ascending order) and secondly on votes received (descending order).

3. The Trinbarjam Elections Commission needs to determine the following:
   - Whether or not a refund is due to a candidate. Use an appropriately labelled column to state "Refund Due" or "No Refund" for each candidate. A refund is due if the candidate's votes received equals or exceeds 20 per cent of the votes cast in the constituency.
   - A list of all candidates who should receive a refund. Extract the data to the bottom of the worksheet.
   - A table with summary data for the elections

Elections Data			
Party	Total Votes Received	Percentage of Votes Cast	
Total Votes Cast			
Constituency	No. of Voters	Votes Cast	Abstention

Note the following:

- **Format the Percentage of Votes Cast to one decimal place with the percent symbol.**
- **Centre the data in the worksheet.**
- **Merge and centre the cells in the row with the label "Elections Data"**

Charting and Summary Operations

Generate a column graph that compares the votes cast and abstention data by constituency. Provide an appropriate title, label the axes and display the data labels.

Create a pivot table showing the constituencies, the candidates' names and the total number of votes the candidates received.

Save your spreadsheet as **Elections**

Database Management

You are asked to use a suitable application to manage data on candidates nominated to contest seats in the general elections. Three tables must be used to store the data. The table with relevant personal data on each candidate should include: name, address, date of birth, gender, profession, constituency, constituency number, party and votes received. The constituency data table should include: the constituency name, constituency number and the number of voters in each constituency. An elections data table should include: the constituency number and the percentage voter turnout for each constituency.

The data to populate the tables must be sourced from the spreadsheet section of your project.

You should test your database by generating queries, reports and control forms:

Queries:

1. List the name, sex, age and profession of all candidates from the People's Democratic Revolution (PDR).

2. List the candidate name, party, number of voters and number of votes received for candidates in constituencies with more than 6500 voters and where the candidates received less than 1000 of the votes. Sort the data in descending order on the number of votes received by the candidate.

3. Using a calculated field determine the total votes cast in each constituency.

Report

4. Generate a report which lists the constituency, number of voters in the constituency, name of candidates, gender, party and number of votes received. The report should be grouped by constituency. Within each constituency the report should be sorted in descending order by number of votes received by each candidate. It should also give the total and average number of votes in each constituency. The report should have a two-line title as follows:

"Official Results
Trinbarjam National Elections"

Control Forms

5. Create a form to display information about the candidates.

Word-processing

Document 1

1. Each candidate must complete and submit a nomination form to the Trinbarjam Elections Commission. You are required to:

    (a) Design a fillable nomination form. It must allow for the entry of relevant data on the candidate, including the constituency which he/she intends to contest.

        (i) The letter head (with company Logo) of the Trinbarjam Elections Commission should be placed at the top.

Document 2

2. The results of the national elections must be delivered to each candidate. Using a suitable feature of your word processing application:

    (a) Create a document which should be mailed to the candidates. The requirements for the letter are:

        (i) It must be design on letter sized paper and must have a 0.7" margin on the left and right sides.
        (ii) The commission's letterhead (with company Logo) should be placed as the header in the letter. The font in the letterhead should be appropriately formatted for emphasis.
        (iii) Candidate's address.
        (iv) Salutation.
        (v) The first paragraph should congratulate and thank the candidates (insert candidate's name in the letter) for the manner in which he/she conducts his or her campaign.
        (vi) A summary table of results should be included with at least seven rows and three columns, with appropriate formats.
        (vii) The third paragraph inviting him/her to view the complete listing of the results on the commission's website and conclude the letter.
        (viii) Close with your name, your position is Chief Electoral Officer.

Web Page Design

The Trinbarjam Elections Commission has requested that you design a web page to provide the public with general information about the election. The web page should include the following:

- The commission's logo
- Display information about the elections (for example the total votes received by each party and the number of votes cast in each constituency).
- Links to the commission's email address and a web page which displays past election data results (this web page may or may not exist).

Data used in the web page should be sourced from the spreadsheet section of the project.

Problem-Solving

1. Develop an algorithm to print the names of the candidates who should receive a refund. A refund is due if the candidate's votes received equals or exceeds 20 per cent of the votes cast in the constituency. The algorithm should also determine and print the number of candidates who received a refund. Test the algorithm with data from ten candidates. The algorithm must accept as input the names of the candidates, votes received and the votes cast in the constituency. The algorithm should print the name of the candidate and the words "Refund Due" or "No Refund" and the number of candidates who received a refund. **Data to test the algorithm must be sourced from the spreadsheet section of the project.**

2. Design and execute a trace table to test the algorithm developed in question (1) above. The table should have a maximum of ten iterations.

Program Implementation

1. (a) Develop a problem statement for the algorithm developed in question (1) above.

   (b) Using the programming language Pascal or VBA, write code to implement/automate the algorithm in question (1) above.

Western Zone Office
9 August 2018

CARIBBEAN EXAMINATIONS COUNCIL

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INFORMATION TECHNOLOGY

Specimen Papers and Mark Schemes/Keys

Specimen Paper: - Paper 01
Paper 02
Paper 032

Mark Scheme and Key: - Paper 01
Paper 02
Paper 032

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

INFORMATION TECHNOLOGY

TABLE OF SPECIFICATIONS

SPECIMEN PAPER 2017

PAPER	SECTION	PROFILE	COGNITIVE LEVEL	NUMBER OF ITEMS	TOTAL ITEMS PER SECTION
Paper 01 (30%)	*1. Theory*	*Theory*	*Knowledge and Comprehension*	*40*	*35*
	2. Productivity Tools	*Productivity Tools*			*15*
	3. Problem Solving and Programming	*Problem Solving and Programming*	*Use of Knowledge*	*20*	*10*
			TOTAL no. of ITEMS	***60***	***60***

PAPER	QUESTION	PROFILE	COGNITIVE LEVEL	NUMBER OF MARKS	TOTAL MARKS PER SECTION
Paper 02 (45%)	1.	*Theory* *Productivity Tools*	*Knowledge and Comprehension* *Use of Knowledge*	*8* *12*	***20***
	2.	*Theory* *Productivity Tools*	*Knowledge and Comprehension* *Use of Knowledge*	*8* *12*	***20***
	3.	*Theory* *Productivity Tools* *Problem Solving and Programming*	*Knowledge and Comprehension* *Use of Knowledge*	*10* *15*	***25***
	4.	*Theory* *Problem Solving and Programming*	*Knowledge and Comprehension* *Use of Knowledge*	*10* *15*	***25***
			TOTAL no. of Marks	***90***	***90***

PAPER	QUESTION	PROFILE	COGNITIVE LEVEL	NUMBER OF MARKS	TOTAL MARKS PER SECTION
Paper 032 (25%)	1. *Word Processing*	*Productivity Tools*	*(Practical skills)*	*10*	***10***
	2. *Spreadsheet*	*Productivity Tools*	*(Practical skills)*	***10***	***10***
	3. *Database Management*	*Productivity Tools*	*(Practical skills)*	***10***	***10***
	4. *Web page Design*	*Productivity Tools*	*(Practical skills)*	***5***	***5***
	5. Problem solving and programming	Problem solving and programming	*Use of Knowledge*	***15***	***15***
			TOTAL no. of MARKS	***50***	***50***

CANDIDATE – PLEASE NOTE!

PRINT your name on the line below and return this booklet with the answer sheet. Failure to do so may result in disqualification.

_____

TEST CODE **01229010**

SPEC 2017/01229010

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INFORMATION TECHNOLOGY

Paper 01 – General Proficiency

1 hour 15 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 15 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

   Sample Item

   Which of the following pairs represents general-purpose software tools?

   (A) Spreadsheet and database software
   (B) Word processor and accounting software
   (C) Student record system and database software
   (D) Insurance processing and spreadsheet software

   Sample Answer

   ● Ⓑ Ⓒ Ⓓ

   The best answer to this item is "Spreadsheet and database software", so (A) has been shaded.

5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to that item later.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. When the computer is working on given instructions, it is called

(A) output
(B) storage
(C) processing
(D) input

2. Which of the following types of computers would process information at the fastest rate?

(A) Embedded
(B) Super computer
(C) Main Frames
(D) Mobile devices

3. Which of the following are functions of the control unit?

I. Read instruction
II. Direct operations
III. Execute instruction

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

4. Which of the following is a disadvantage of cloud storage?

(A) Accessibility (offline/without internet)
(B) Reduction of storage cost to organization
(C) Increased possibility for disaster recovery
(D) Efficient management of stored data

5. Which of the following storage media uses laser technology to store data?

(A) Flash Drive
(B) Magnetic tape
(C) CDROM
(D) Hard disk

6. Which of the following is an example of an embedded computer system?

(A) Desktop
(B) IBM z system
(C) Smart television
(D) Laptop

7. Which of the following input devices is used to read pencil or pen marks on a multiple choice answer sheet?

(A) OCR
(B) OMR
(C) POS
(D) MICR

8. The MOST suitable device for the output of architectural drawings is a

(A) plotter
(B) laser printer
(C) graphics tablet
(D) light pen

9. Which of the following output is an example of a hard copy?

(A) An oral speech delivered by a speaker
(B) A bill produced from a printer
(C) The display on a monitor
(D) A picture on a wall produced from a multimedia projector

GO ON TO THE NEXT PAGE

10. Which of the following tasks would MOST likely require an advance graphics card?

(A) Program development
(B) Web browsing
(C) SBA development
(D) Video editing

11. In modern computers, the CPU speed is measured in

(A) kilohertz
(B) gigabytes
(C) kilobytes
(D) gigahertz

12. Quality Developers is a company that writes programs to do specific jobs for other companies. These programs are called

(A) general-purpose software
(B) special-purpose software
(C) custom-purpose software
(D) off-the-shelf software

13. Which of the following are software interfaces?

I. Graphical user interface (GUI)
II. Touchscreen
III. Menu-driven

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

14. Desreen has a desktop computer system. She turns on the system and waits five minutes but no image is displayed. During troubleshooting, which of the following is MOST likely to be identified as the problem?

(A) Keyboard is disconnected
(B) The power cable to the monitor is loose
(C) The battery power connected to the system is loose
(D) Touchscreen is disabled

15. Which of the following is the name of the interface used by blind persons to perform operations on a computer?

(A) Icon
(B) Sensor
(C) Braille
(D) Touchscreen

16. John is required to email a copy of his SBA to his teacher. This emailed copy is referred to as

(A) soft copy
(B) hard copy
(C) tangible copy
(D) machine readable copy

17. Vera is taking an online class and is required to enter her password twice. This process is called the

(A) storing process
(B) validation process
(C) verification process
(D) authenticity process

18. Which of the following would be the BEST option to expand your laptop's storage capacity?

(A) DVD
(B) CD-ROM
(C) Memory card
(D) Magnetic tape

19. James Café keeps payroll information stored in files on a cloud account. Which of the following BEST describes how these files can be accessed?

(A) Serial
(B) Random
(C) Sequential
(D) Indexed sequential

20. Which of the following statements BEST describes the term 'information'?

(A) It is raw facts.
(B) It is meaningful.
(C) It does not have any value.
(D) It is not the result of processing.

21. Which of the following technologies is MOST suitable for transferring data between two mobile phones?

(A) Bluetooth
(B) Fibre optics
(C) Microwave
(D) Twisted pair

22. Uploading or downloading data to or from a remote computer is done using

(A) blogging
(B) instant messaging
(C) Internet relay chat
(D) file transfer protocol

23. Each website on the Internet can be accessed by entering a unique address. This address is referred to as the

(A) HTTP
(B) HTML
(C) FTP
(D) URL

24. Which of the following network components is BEST suited for connecting LANS in a metropolitan area network?

(A) Hub
(B) Switch
(C) Router
(D) Modem

25. Teachers are able to mark class registers online and provide instant feedback on assessment through the use of

(A) social media tools
(B) m-learning devices
(C) simulation software
(D) computer assisted learning

26. Which of the following BEST defines 'cyberbullying'?

(A) Connecting to a network
(B) Using an electronic device to harass someone
(C) Using electronic devices to connect to WiFi
(D) Using mobile devices to send a message to someone

GO ON TO THE NEXT PAGE

27. You received an email from someone who claims to be a representative from your school. The email asked you to click on a link to reset your password. You should proceed with caution because the email may be a

(A) spam threat
(B) malware attack
(C) phishing attack
(D) legitimate request

28. Using electronic devices to view a chat conversation between two friends, in real time, without their knowledge is

(A) propaganda
(B) a violation of privacy
(C) a denial of service attack
(D) an electronic eavesdropping

29. The use of "*********" to hide a password being entered into a computer system is termed

(A) antivirus
(B) phishing
(C) biometrics
(D) encryption

30. In an effort to secure data on a system, users are required to set a password in a specific format. Which of the following types of measures is this an example of?

(A) Physical
(B) Software
(C) Hardware
(D) Personal

31. Which of the following is a job task of a social media specialist?

(A) Maintaining a website
(B) Developing software for social use
(C) Installing or upgrading social media software on a computer system
(D) Generating and sharing content daily over a social media network

32. Which of the following are physical restrictions with respect to data security?

I. Firewall
II. Locking up the hardware
III. Biometric systems

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

33. Which of the following actions is NOT considered a computer crime?

(A) Piracy
(B) Hacking
(C) Encryption
(D) Industrial espionage

34. Including material obtained from online sources in an assignment and then submitting the assignment without giving credit to the online sources is referred to as

(A) plagiarism
(B) e-learning
(C) fraternization
(D) collaboration

GO ON TO THE NEXT PAGE

35. Telecommuting can BEST be described as

(A) communicating between two companies
(B) working from home by connecting home and office
(C) working from home by having employees at home
(D) communicating between home and office

36. In word processing, an efficient way to move the third paragraph in order to place it after the fifth paragraph is

(A) cut and paste
(B) copy and paste
(C) copy, cut and paste
(D) cut, copy and paste

37. The two files used to produce merged letters during a mail merge are the

(A) primary document and data source
(B) primary document and merged letters
(C) data source and merged letters
(D) primary document and current letter

38. Which of the following should be considered when creating a website?

(A) Cost of each webpage
(B) Position of the homepage in the website
(C) Compiler needed to develop the website
(D) Intended audience for the website

39. Which of the following should be done before publishing a website?

(A) Compile the source code.
(B) Create the algorithm for the website.
(C) Ensure that all hyperlinks are working correctly.
(D) Purchase the software needed to develop the website.

40. What is the name of the highlighted word or picture in a webpage that a user can click on to go to another webpage?

(A) Hypertext
(B) Bookmark
(C) Hyperlink
(D) Connection

41. Text entered into a spreadsheet is aligned towards the left by default. These entries are called

(A) labels
(B) values
(C) formulae
(D) functions

42. Which of the following formatting features is unique to numbers in spreadsheets?

(A) Bold
(B) Italics
(C) Custom
(D) Indent

43. To centre the title rows of a spreadsheet across the columns

(A) centre align the title rows
(B) centre align the title columns
(C) merge and centre the title rows
(D) merge and centre the title columns

44. Which of the following is an example of a spreadsheet function?

(A) function sum(A1, A2, A3)
(B) sum = A1 + A2 + A3
(C) = sum(A1:A3)
(D) = A1 + A2 + A3

45. Which type of application is BEST suited to prepare a budget?

(A) Database
(B) Spreadsheet
(C) Word processor
(D) Desktop publishing

46. Which of the following statements is NOT true of primary keys?

(A) They are unique identifiers.
(B) They are always in text form.
(C) They do not contain blank values.
(D) They may be composed of one or more attributes.

47. A field in a table that appears as a match of the primary key in another table is called a

(A) foreign key
(B) candidate key
(C) secondary key
(D) composite key

48. Which database feature can be used to list the names of the male students from a particular class?

(A) Table
(B) Form
(C) Query
(D) Report

49. What is the MOST appropriate database data type for a field holding the marks from a class test?

(A) Text
(B) Numeric
(C) Currency
(D) Date/Time

50. What is the name given to a collection of related fields in a database?

(A) Table
(B) Field
(C) Record
(D) Column

51. The following variables s, t and u, have been assigned the values shown.

s = 5
t = 6
u = 3

Which of the following statements does NOT evaluate to true?

(A) u > 7 and t < = 7
(B) s < t or u < = s − 2
(C) t <> 4 or s = 5
(D) u – 2 >= 1

52. Based on the following algorithm, what would be displayed for k?

```
j = 5
k = j
j = j + k
k = j + 3
display k
```

(A) 10
(B) 11
(C) 13
(D) 14

53. Which of the following algorithms does NOT display four consecutive numbers?

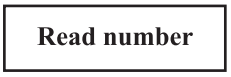
(A)
```
for v = 2 to 5
display v
```

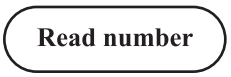
(B)
```
h = 1
while h < 5
display h
h = h + 1
end while
```

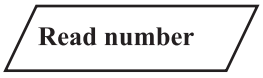
(C)
```
for k = 7 down to 4 step −1
display k
```

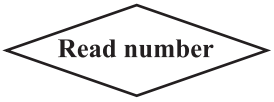
(D)
```
f = 6
while f < 3
display f
f = f – 1
```

54. The representation of the pseudocode statement "Read number" in a flowchart symbol is

(A) 

(B) 

(C) 

(D) 

55. The term used to describe a memory location whose value changes during program execution is

(A) variable
(B) volatile
(C) constant
(D) dynamic

56. Which of the following are high-level languages?

I. Pascal
II. COBOL
III. ASSEMBLY

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

57. Program implementation involves a number of steps. Which of the following steps is NOT legitimate?

(A) Linking
(B) Bonding
(C) Executing
(D) Compiling

58. Which of the following languages is only understood by computers?

(A) 4 GLs
(B) Machine language
(C) Natural language
(D) Procedural language

59. Errors that occur in a program when the rules of the programming languages are NOT obeyed are called

(A) syntax errors
(B) logical errors
(C) run-time errors
(D) execution errors

60. Which of the following is an example of a conditional construct?

(A) For – Next
(B) For – endfor
(C) If – then– else
(D) While – endwhile

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

Question	Key	Syllabus Objective	Profile		Question	Key	Syllabus Objective	Profile
1	C	1.4	P1		31	D	3.5	P1
2	B	1.2	P1		32	D	3.5	P1
3	C	1.3	P1		33	A	3.2	P1
4	A	1.5	P1		34	A	3.6	P1
5	C	1.3	P1		35	B	3.6	P1
6	C	1.2	P1		36	A	4.3	P2
7	B	1.6	P1		37	A	4.7	P2
8	A	1.6	P1		38	D	4.9	P2
9	B	1.6	P1		39	C	4.12	P2
10	D	1.9	P1		40	C	4.11	P2
11	D	1.9	P1		41	A	5.2	P2
12	B	1.7	P1		42	D	5.7	P2
13	D	1.8	P1		43	D	5.6	P2
14	B	1.10	P1		44	C	5.2	P2
15	C	1.8	P1		45	C	5.1	P2
16	A	1.11	P1		46	B	6.2	P2
17	C	1.13	P1		47	D	6.2	P2
18	B	1.4	P1		48	C	6.4	P2
19	C	1.14	P1		49	B	6.2	P2
20	B	1.11	P1		50	C	6.2	P2
21	A	2.1	P1		51	A	7.1	P3
22	D	2.4	P1		52	C	7.8	P3
23	D	2.4	P1		53	D	7.8	P3
24	C	2.2	P1		54	C	7.6	P3
25	D	2.3	P1		55	A	7.4	P3
26	B	3.2	P1		56	D	8.3	P3
27	C	3.1	P1		57	B	8.2	P3
28	D	3.2	P1		58	B	8.1	P3
29	D	3.3	P1		59	A	8.3	P3
30	B	3.3	P1		60	C	8.5	P3

TEST CODE **01229020 SPEC/2017**

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C A R I B B E A N E X A M I N A T I O N S C O U N C I L

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INFORMATION TECHNOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of FOUR questions. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
5. **If you use the extra page(s) you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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"*"Barcode Area"*"
Sequential Bar Code

Answer ALL questions.

1. Elaine wants to place her gluten-free recipes on the Internet and access them using a web address. She wants users to register in order to access her recipes and plans to store their information in an online database. She also needs to manage any emails and interact with her online clients when new recipes are uploaded.

(a) State the name of the computer-related professional that would be most suitable for

placing her recipes on the Internet

.....

managing her emails and online clients.

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(2 marks)

(b) Describe TWO tasks of EACH of the professionals in Part (a).

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(2 marks)

(c) Elaine soon receives hundreds of emails with strange email addresses and other requests to visit other websites. Explain two security practices that she should consider before responding to these emails.

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(4 marks)

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(d) Describe two measures that can be used to prevent against software attacks on Elaine's website.

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(2 marks)

(e) Users' data are stored in an online database. Apart from first and last name, list two fields that should be used to capture data on users who register for Elaine's recipes.

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(2 marks)

(f) Elaine wants to extract some information from the database. Complete the table by selecting the most suitable database feature from the list below.

Calculated Field	Form	Query	Report	Sort

Task	**Database Feature**
The list of users who have accessed her cupcake recipe	
How many users have registered	
An overview of the number of users who requested each recipe	
A list of the users by country but in ascending order	

(4 marks)

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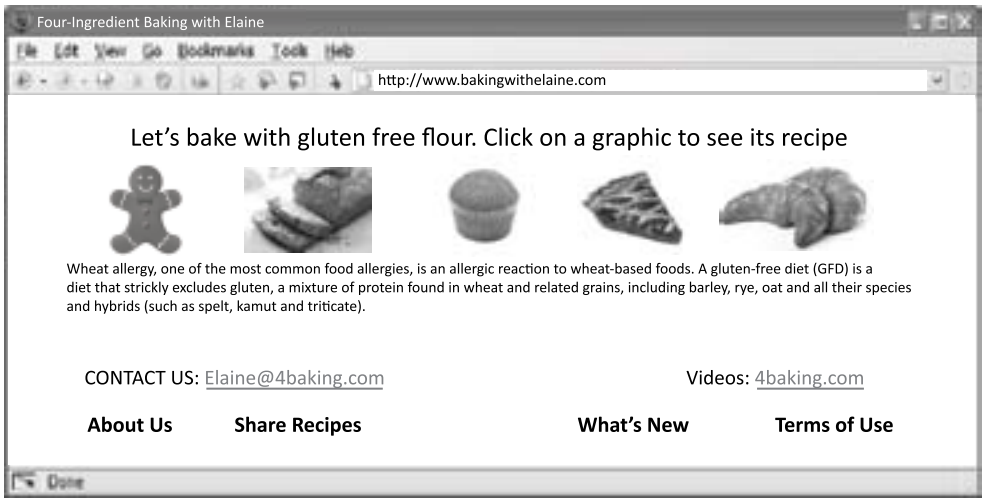
(g) A user searches for Elaine's recipes and locates the following layout:



Use the layout above to state

the general name given to this type of page

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a web address

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an email address

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a hyperlink

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(4 marks)

Total 20 marks

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2. John Taylor is the systems administrator at St Joseph's High School. He has been asked by the principal to prepare a report that will show the requirements for the computers and other equipment to be purchased for a new computer lab.

(a) List ANY FOUR of the major components that each computer system should have.

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(2 marks)

(b) State the function of ANY ONE of the major components of a computer system.

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(1 mark)

(c) John intends to create a network that spans the computer lab. State the name of the type of network that he needs to create.

.....

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(1 mark)

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(d) In preparing his report, John uses the Internet to assist him in finding the specifications of computers best suited for the computer lab.

Discuss ANY TWO approaches he could use to evaluate the reliability of the information he retrieves.

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(6 marks)

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The required report must include a well-organized spreadsheet outlining all the needs of the lab, and the expected costs in terms of equipment. The incomplete spreadsheet is shown below.

	A	B	C	D
1	***Expected Costs for New Computer Lab***			
2	**Description Item**	**Units**	**Cost per Unit**	**Total**
3	Student computer	30	$ 5 , 000.00	
4	Computer Table	30	$ 800.00	
5	Teacher Computer	1	$ 5,500.00	
6	Teacher Table	1	$ 750.00	
7	Student Chairs	30	$ 500.00	
8	Teacher Chairs	1	$ 650.00	
9	20ft UTP Cabling	15	$ 80.00	
10	Projector	1	$ 3,000.00	
11	Screen	1	$ 2,400.00	
12	White board	2	$ 380.00	
13	**TOTAL Expected Costs**			
14				
15	Average Item Cost			

(e) Cell A1 is formatted across the columns for effective presentation.

(i) State the name of the formatting feature used to achieve this.

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(2 marks)

(ii) Write the text for the formula to be inserted in D3 to calculate the TOTAL cost for student computers.

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(2 marks)

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(iii) Write the text for the function to be inserted in D13 to calculate the TOTAL expected costs.

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(2 marks)

(iv) Write a function that would insert the average cost per unit of an item in cell B15.

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(2 marks)

(v) John decides that he wants the rows reorganized so that they are in order of the most expensive to the least expensive.

Explain how he could do this using features of the spreadsheet software.

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(2 marks)

Total 20 marks

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3. Kara wants to buy a $350.00 costume for the upcoming carnival. She decides to sell some cakes in order to raise the funds for the costume.

(a) (i) Kara's friend ordered some cakes. Write an algorithm using pseudocode to prompt for the quantity of cakes ordered, then calculate and output the total, if the price for each cake is $5.00.

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(6 marks)

(ii) Kara sold 25 cakes at $5.00 each. Explain how Kara would determine whether she has raised enough funds to purchase her costume.

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(4 marks)

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"*"Barcode Area"*"
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(b) Kara wants to create the spreadsheet shown below to track the orders placed for the items.

	A	B	C	D	E	F
1						**Cost of Costume**
2						$350.00
3	**Date**	**Item**	**Cost**	**Quantity Ordered**	**Total Due**	
4	11 July	Chocolate cake	$20.00	6	$120.00	
5	11 July	Sponge cake	$20.00	5	$100.00	
6	14 July	Swirl cake	$20.00	2	$40.00	
7	17 July	Cupcakes cake	$20.00	12	$240.00	
8						
9						
10						

(i) Using the spreadsheet above, write the functions and/or formulas in cell E8 or E9 to illustrate whether Kara has raised enough funds.

.....

.....

(6 marks)

(ii) Write the function that would be entered in cell E10 to output 'Yes' if Kara would be able to purchase the costume, or 'No' if she has not raised enough funds.

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(3 marks)

(iii) Kara wants to insert another order for 10 July, in row 4. Explain what would happen to the data in row 4.

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(1 mark)

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(c) Kara does not want others to see her sales from the cakes. Explain how she could protect her spreadsheet.

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(1 mark)

(d) Kara is now very interested in learning more about spreadsheets. The courses that she prefers are offered during the day. Since she works during the day, she cannot register for them.

Suggest, with reasons, two other options that Kara could consider in order to take a similar course.

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(4 marks)

Total 25 marks

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4. (a) A local area network may be wired or wireless. Jennifer has a small apartment and has decided to set up a network that will connect all the devices in her home that she uses frequently. These devices are

- 1 desktop computer
- 1 laptop computer
- 1 android cellphone
- 1 android tablet
- 1 printer.

Draw lines that correctly map the devices on the left side of the table to the explanation on the right side of the table.

Router	Used to send messages to the right computer on a single network
Modem	Used when we two different networks need to be connected
Switch	Type of wired transmission media which is used on local area networks
Twisted Pair	Converts analogue signals to digital and digital signals to analogue
Network Interface Card	Prepares data, sends data, receives data, and controls data flow between a computer and the network to which it is connected

(5 marks)

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"*"Barcode Area"*"
Sequential Bar Code

(b) Explain ONE advantage and ONE disadvantage of using a wireless network over a wired network.

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(4 marks)

(c) State the name of the protocol (technology) most commonly used to provide wireless computer networking in a home or office.

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(1 mark)

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(d) Algorithms are used to express the steps required to solve a problem. Write an algorithm using simple pseudocode to do the following

- Prompt a user by displaying the following statement:

  Please enter positive integers one at a time and "–1" to indicate no further input.

- Accept the values from the user until –1 is entered

- Determine and display

  (i) the sum of the numbers

  (ii) the average of the numbers.

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(10 marks)

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(e) Study the following pseudocode.

```
Begin
  Declare selected, number, count
  count = 0
  print "enter your integers"
  read number
  selected = number
  while (count < 10)
     if(number < selected)
         selected = number
     count = count+1
     read number
  end while
  print selection
End
```

State the problem the algorithm solves and explain how it solves it.

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(5 marks)

Total 25 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

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"*"Barcode Area"*"
Sequential Bar Code

EXTRA SPACE

If you use this extra page, you MUST write the question number clearly in the box provided.

Question No. ☐

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"*"Barcode Area"*"
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C A R I B B E A N E X A M I N A T I O N S C O U N C I L

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

INFORMATION TECHNOLOGY

Paper 02 – GENERAL PROFICIENCY

KEY AND MARK SCHEME

SPECIMEN PAPER

2017

Information Technology
Paper 02 – General Proficiency
Key and Mark Scheme
SPECIMEN PAPER

SECTION I

SO	Question	Key	Mark
	1.		
(3:5)	(a)	Web developer Social media specialist	**2**
(3:5)	(b)	(Web developer) any TWO of: (i) Builds/creates websites; oversees development of/updates to website (Social media specialist): any TWO of: Post information to social media apps; responds to emails; sends mass emails/messages	**2**
(3:3)	(c)	Any Two explanations: (Similar/suitable responses are acceptable) • Verify the authenticity of the email, • Verify whether the emails are spam • don't click on the website links if she is unsure	**4**
(3:3)	(d)	Any TWO of: a firewall or antivirus or malware detection to prevent viruses or malicious attacks (3:3)	**2**
6:3	(e)	Any TWO of: • email address • types of recipes user requests • country • username (Similar/suitable responses are acceptable)	**2**
6:4	(f)	Query Calculated field Report Sort (ed query)	**4**
4.11	(g)	Home page or webpage http://www.bakingwithelaine.com or 4baking.com Elaine@4baking.com Back to top, link for each baking item, email address, and video (4baking.com)	**4**
		TOTAL	**20**

Information Technology
Paper 02 – General Proficiency
Key and Mark Scheme
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SO	Question	Key	Mark
	2.		
	(a)	• Input Device(s), Central Processing Unit/CPU, Memory, Secondary Storage, Output Device(s) ANY 4 correct [2 marks] ANY 2 or 3 correct [1 mark] 1 or 0 correct [0 marks]	**2**
	(b)	• Input Device(s) are computer system components that feed data into a computer; CPU or Central Processing Unit - is the hardware device in a computer that executes all the instructions from the software; Secondary Storage Devices – refers to non-volatile storage devices, such as hard disk drives; Output Devices – refers to peripheral devices that allow processed information or result to be converted into a format that is available outside of the computer system. Any one correctly explained [1 mark]	**1**
	(c)	Local Area Network [1 mark]	**1**
	(d)	• He could check the currency **[1]** of the information by looking at the date **[1]** of the article/information to ensure that the information is not so old that it is no longer useful [1]; he could check for biases **[1]** – he may need to look for objective sources **[1]** to get information on product quality as a seller may provide exaggerated views of the product quality **[1]**; He could check to ensure that the information is relevant [1] by checking to see if information on prices, technical specifications and delivery etc. are applicable to the region in which the school is located. **[1]** ANY 2 reliability tests and correct discussion (3 marks each as shown)	**6**
	(e) (i)	Merge **[1]** and center **[1]**	**2**
	(ii)	=B4*C4 1 mark Correct cells 1 mark for *	**2**
	(iii)	=Sum(D4:D13)) *[1 for correct function and 1 for correct parameter in the function]*	**2**

Information Technology
Paper 02 – General Proficiency
Key and Mark Scheme
SPECIMEN PAPER

SO	Question	Key	Mark
	2. cont'd		
	(iv)	=Average(C4:C13) *[1 for correct function and 1 for correct parameter in the function]*	**2**
	(v)	Sort the items by column C – Cost Per Unit **[1]** in descending order **[1]**	**2**
		TOTAL	**20**

Information Technology
Paper 02 – General Proficiency
Key and Mark Scheme
SPECIMEN PAPER

SO	Question	Key	Mark
	3.		
7.6	(a) (i)		**6**

Algorithm	Comment	Marks
Price = 5.00	Declarations and initialisation	1 mark
Prompt "Enter Quantity"	Prompt	1 mark
Accept Quantity	Input data	1 mark
TotalDue = Quantity * Price	Correct calculation of total due Error in calculation -1	2 marks
Print TotalDue	Output result	1 mark

7.2	(ii)		**4**

Algorithm	Comment	Marks
Sum (or total) the amount of money for all sales;	Calculation of sales	(1 mark)
Then find the difference: 350 - total sales	Finding difference	(1 mark)
If the total due is equal to or greater than 350, Then she has raised enough funds.	Determine whether enough funds were raised	(2 marks)

Information Technology
Paper 02 – General Proficiency
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SPECIMEN PAPER

SO	Question	Key	Mark
	3. cont'd		
	(b) (i)		**6**

Cell **E8:** =SUM(E4:E7) OR =SUM(E4..E7) OR =E4+E5+E6+E7	Correct SUM function: Correct Range: Correct brackets **and** equal sign **and** (colon or two dots):	1 mark 1 mark 1 mark
5.4 Cell **E9** Possible options to calculate the difference: =F2-E8 OR =F2-E8	Both cell references correct Equal sign Minus sign	1 mark 1 mark 1 mark

5.3	(ii)		**3**

=IF(E9>F2,"Yes","No") OR =IF(E9>0,"No","Yes")	=IF Condition Y/N Options	1 mark 1 mark 1 mark

Information Technology
Paper 02 – General Proficiency
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SO	Question	Key	Mark
	3. cont'd		
5.6	(iii)		**1**

5.6 Data in row 4 would <u>move to row 5</u> Or is pushed <u>down by one row</u>	Explanation showing that data is row 4 becomes data in row 5	1 mark

(c)	3.3		**1**

She could <u>encrypt</u> her file or use a <u>password</u> to protect it	Encrypt or Password (other suitable/appropriate responses can be accepted)	1 mark

(d)	3.6		**4**

<u>Any two:</u> <u>Access to information</u>: Purchase a book and learn on her own Watch you tube videos Access information on the Internet Online learning (class) Online tutoring	<u>Suitable reasons</u>: E.g. Level of knowledge could determine if she wants to learn on her own (book, watch videos) Or prefer an online class /tutor	<u>Two options</u> (1 mark each) = 2 marks <u>Suitable reason for each option</u> (1 mark each) = 2 marks

			TOTAL	**15**

Information Technology
Paper 02 – General Proficiency
Key and Mark Scheme
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<table>
<tr><th>SO</th><th>Question</th><th>Key</th><th>Mark</th></tr>
<tr><td></td><td>4.</td><td></td><td></td></tr>
<tr><td>1.9</td><td>(a)</td><td>
<table>
<tr><td>Switch</td><td>Used to send messages to the right computer on a single network</td></tr>
<tr><td>Router</td><td>Used when we wish to connect two different networks together</td></tr>
<tr><td>Twisted Pair</td><td>Type of wired transmission media which is used on local area networks</td></tr>
<tr><td>Modem</td><td>Converts analogue signals to digital and digital signals to analogue</td></tr>
<tr><td>Network Interface Card</td><td>Prepares data, sends data, receives data, and controls data flow between a computer and the network to which it is connected</td></tr>
</table>
</td><td>5</td></tr>
<tr><td></td><td>(b)</td><td>Advantage – reducing clutter by reducing wires; allowing her to print from anywhere in her home rather than needing to take the device and connect it to her printer; easier installation of new devices (provided they are wireless compatible); allowing her to print from the mobile phone and tablet which would not have traditional printing ports etc. [2 marks for identifying and explaining ANY ONE advantage]

Disadvantages – Can require greater care in relation to security as the transmission media lends itself more easily to interception; Some persons have concerns related to their health and wireless signals in their homes.[2 marks for identifying and explaining ANY ONE disadvantage]</td><td>4</td></tr>
<tr><td></td><td>(c)</td><td>WiFi</td><td>1</td></tr>
</table>

Information Technology
Paper 02 – General Proficiency
Key and Mark Scheme
SPECIMEN PAPER

SO	Question	Key	Mark
	4. cont'd		

	(d)	Begin
		Declare number, sum, average, count [1]
		count=0
		sum=0
		print "Please enter…."
		read number
		while(number!=-1)
		sum=sum+number
		count=count + 1
		read number
		end while
		count=count+1
		read number
		end while
		print "sum=", sum
		print "average=" sum/count
		End
		
		Declare appropriate variable [1 mark]
		Initialise the variable [1 mark]
		Read first value [1 mark]
		Loop control condition [2 marks]
		Statements in loop [3 marks]
		Print Sum [1 mark]
		Print Average [1 mark]
			10

	(e)	The algorithm allows the user to enter 10 numbers **[1]** after which it displays the smallest of the numbers entered **[1]** **(2 marks)** It does this by checking each number entered to see if it is smaller that the smallest number received thus far. **[1]** If it is, then that number is recorded as the smallest number by storing it in the variable selected. **[1]** When the program exits the loop any value stored in the variable selected will be the smallest **[1]** – so it is displayed using the print statement. **(3 marks)**	**5**
		TOTAL	**25**

TEST CODE **01229032**

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C A R I B B E A N E X A M I N A T I O N S C O U N C I L

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INFORMATION TECHNOLOGY

Paper 032 – General Proficiency

ALTERNATIVE TO SCHOOL-BASED ASSESSMENT

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of FIVE questions, both Theory and Practical. Answer ALL questions.

2. Write your answers in the spaces provided where appropriate.

3. Do NOT write in the margins.

4. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**

5. **If you use the extra page(s) you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

6. **For practical questions, please save your work frequently.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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"*"Barcode Area"*"
Sequential Bar Code

Answer ALL questions.

1. WORD PROCESSING

Below is a sample letter which is to be sent to customers of Cars Inc. As the secretary of the organization, you are to prepare ten letters for appropriate customers using mail merge.

Cars Inc

May 18, 2017

<Title> <first name> <last name>
<Position>
<Company>
<Address>

Dear <title> <last name>,

We are writing you this letter reminding you of your outstanding balance of <amount> which has been due for over <period>. As a result, if this payment is not made within 30 days, we will then be forced to take legal action.

Thanks for your co-operation.

Sincerely,

Peter King
Sales Manager

Making a world of difference

(a) Type the letter indicated above as your primary document.
Save as Cars1
(1 mark)

(b) Insert an appropriate logo into the header and add ONE other feature to the letter.
Save as Cars2
(2 marks)

(c) Populate the letter by including merge fields for the ten customers.
Save as Cars3
(5 marks)

(d) Merge the documents.
Save as Cars4
(1 mark)

(e) Protect the merged document by restricting editing.
Save as CarsInc **(1 mark)**

Total 10 marks

GO ON TO THE NEXT PAGE

"*"Barcode Area"*"
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2. SPREADSHEET

(a) Retrieve the workbook DEALERSHIP, and perform the following tasks on the STOCK worksheet. The data should reflect what is shown below.

	A	B	C	D	E
1	**MANUFACTURER**	**OPENING STOCK**	**CLOSING STOCK**	**PRICE**	**REVENUE FROM SALES**
2	NISSAN	5	3	85 000	
3	TOYOTA	5	4	100 000	
4	MITSUBISHI	5	1	90 000	
5	MAZDA	5	5	75 000	
6	SUZUKI	5	2	55 000	
7					
8					
9					

(i) Format the labels in row 1 to Arial font, bold, 12 point, and centre the data in the cells horizontally and vertically.

(2 marks)

(ii) Insert a formula in cell E2 to calculate the REVENUE FROM SALES for cars from the Nissan Manufacturer, and **replicate** your formula in cells E3:E6.

(2 marks)

(iii) In the range A8:A9, enter the following text:

TOTAL REVENUE
AVERAGE REVENUE

Then insert appropriate functions in range B8:B9 which will compute the total and average revenue from the sales of all vehicles.

(2 marks)

(iv) Apply currency and two decimal places to the data in cells D2:E6.

(1 mark)

GO ON TO THE NEXT PAGE

"*"Barcode Area"*"
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(b) Retrieve the worksheet SALES. A copy of the worksheet is provided below. Using this worksheet, perform the following tasks.

SALES

	A	B
1	**2018 Revenue**	
2	**QUARTER**	**REVENUE ($)**
3	Quarter 1	1 155 000.00
4	Quarter 2	925 000.00
5	Quarter 3	1 290 000.00
6	Quarter 4	

(i) Link the missing value in cell B6 with cell B8 from the STOCK sheet in the DEALERSHIP workbook to complete the 2018 Revenue.

(1 mark)

(ii) Filter the REVENUE data for the quarters where the revenue was less than $1 000 000.00. Set up the extraction range in a blank area of the STOCK sheet in the DEALERSHIP workbook.

Save your workbook with the filename
DEAL(CANDIDATENUMBER)
Example: DEAL(0200010002) **(2 marks)**

Total 10 marks

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3. DATABASE

The following questions relate to database management.

The owner of a car dealership uses a stock card system to record the details of vehicles in his inventory. Retrieve the database called DEALER and perform the following tasks on the table STOCKCARD. The data should reflect what is shown below.

Make	Model	Registration Number	Colour
Audi	A4	PCE 427	Silver
Audi	S4	PCS 4	White
BMW	X3	PBH 2340	Red
BMW	X5	PCY 888	Blue
Mercedes	C180	PBB 3962	Green
Mercedes	E200	PBR 4747	Black
Mercedes	E200	PCT 6531	Gold
Mercedes	S500	PDM 1	Black

(a) Insert a primary key using the MOST appropriate field. **(2 marks)**

(b) Add ONE appropriate field name and data type to the table. **(2 marks)**

(c) The report below is to be generated from your database.

Make	Model	Registration Number	Colour
Audi	A4	PCE 427	Silver
	S4	PCS 4	White
BMW	X3	PBH 2340	Red
	X5	PCY 888	Blue
Mercedes	C180	PBB 3962	Green
	E200	PBR 4747	Black
	E200	PCT 6531	Gold
	S500	PDM 1	Black

Generate this report and save your database.

(3 marks)

Save your database with the filename
STOCKCANDIDATENUMBER: STOCK(candidate#) eg. STOCK(12345667).

GO ON TO THE NEXT PAGE

"*"Barcode Area"*"
Sequential Bar Code

(d) Suggest ONE database feature that can be used by the dealer to simplify the entry of new vehicles and their details into his inventory.

.....

(1 mark)

(e) Describe ONE validation check that could be used on the Registration Numbers as they are entered.

.....

.....

(1 mark)

(f) Identify the database feature that could be used to arrange the registration number of vehicles in ASCENDING order.

.....

(1 mark)

Total 10 marks

4. WEBPAGE DESIGN

Amery created a website for his small photography business and was eager to have it published. However, he was told that he should consider completing some checks before doing so.

(a) Insert 1st, 2nd and 3rd in the following table to indicate the order in which the activities must be completed.

Activity	Rank
Use a test audience.	
Maintain a website.	
Verify that all the hyperlinks work correctly.	

(3 marks)

(b) Give ONE example of a hyperlink that could be used on the webpage. Explain its purpose.

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(2 marks)

Total 5 Marks

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5. PROBLEM-SOLVING AND PROGRAMMING

Mr Smith is the CEO of Techno Store, which is a local distributor for computers and other electronic devices. He has solicited your help to make his business efficient.

Using pseudocode, write an algorithm to

1. accept the name and cost for EACH type of device
2. prompt to enter '1' if taxable or '2' if non-taxable
3. calculate VAT of 16% using conditional branching
4. calculate the total cost of the item after adding VAT
5. output the name and total cost

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Total 15 Marks

END OF TEST

"*"Barcode Area"*"
Sequential Bar Code

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"*"Barcode Area"*"
Sequential Bar Code

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®

INFORMATION TECHNOLOGY

PAPER 032

MARK SCHEME

SPECIMEN

INFORMATION TECHNOLOGY
PAPER 032
MARK SCHEME

1. Specific Objectives:

a) 1 mark for typing the letter accurately

1 mark

b) 1 mark for the logo placed in the header

1 mark for use of another formatting feature.

2 marks

c) 1 mark for every ***two*** field names entered correctly.
(There are 10 fields to be entered)

5 marks

d) 1 mark for merging the documents.

1 mark

e) 1 mark for use of protection feature.

1 mark

Total 10 marks

2. Specific Objectives:

a) (i) Arial font, Np;d, 12 pt - 1 mark

Centre - 1 mark

2 marks

(ii) = (B2 -C2) * D2 1 mark

Replication - 1 mark **2 marks**

(iii) Next to total revenue: = sum(E2:E6)

Next to Average Revenue: = avg(E2:E6) or =(A8/5)

2 marks

(iv) All cells with currency format - 1 mark

1 mark

(b) (i) Links data correctly - 1 mark

1 mark

(ii) Filter correctly applied - 1 mark

Extraction range setup correctly - 1 mark

2 marks

Total 10 marks

INFORMATION TECHNOLOGY
PAPER 032
MARK SCHEME

3. Specific Objectives:

a) Primary key inserted (1), Registration number (1) **2 marks**

b) Cost, currency **2 marks**

c) All fields (1) Data grouped (1); Correct report format (1) 3 **marks**

d) Form **1 mark**

e) Eg. Must start with the letter 'P' or other suitable response **1 mark**

f) Sort **1 mark**

Total 10 marks

4. Specific Objectives: 4.11, 4.12

a)

Item	**Rank**
Use a test audience.	2
Maintain a website	3
Verify that all the hyperlinks work correctly.	1

3 marks

b)

One Example (1 mark)	**Explanation (1 mark)**
Http://www.anotherlink.com	Link to another web page.
BacktoTop	Link to a location within the webpage.
EmailUs or MailTo: specimen@cxc.org	Link to an email address.
Download Here	Link to user-created files.

2 marks

Total 5 marks

5. Specific objectives:

Key 1 – Using REPEAT Loop

Header: Techno_Store appropriate heading (1)

Declaration: The purpose of this algorithm is to output the name and total cost for a device. Declaration (1)

Constant

Vatpercent = 0.16 Use of constant (1)

Variables

Name1, answer of string Use of datatypes - three or more (2)

Cost, total_cost, vat of real

Response of char

Body

Step 1: Start (1)

Step 2: Repeat (appropriate use of iteration (1)

Step 3: Print (Enter the name of device)

use of Output statement (1)

INFORMATION TECHNOLOGY
PAPER 032
MARK SCHEME

Step3: Read name1 use of Input statement (1)

Step 4: Print(Enter the cost of, name1)

Step 5: Read cost

Step 6: Print (Enter "Y" if item is taxable or "N" if it is non-taxable)

Step 7: Read Response

Step 8: If (Response = "Y")then (use conditional branching

1 mark for If-then and 2 marks for If-then-else)2mks

Set vat ← Vatpercent * cost

Else

Set vat ← 0

Endif

Step 9: set total_cost ← vat + price

1 mark for assignment variable and 1 for correct variables used

Step 10: Print (The total cost for a , name1 , is, total_cost)

1 mark for each output (2 marks)

Step 11: Print (Do you have another item?)

Step 12: Read Answer

Step 13: Until (answer = "No")

Step 14: Stop Terminator 1 mark

Key 2 – Using FOR Loop

Header: Techno_Store appropriate heading (1)

Declaration: The purpose of this algorithm is to output the name and total cost for a device. (1)

Constant

Vatpercent = 0.16 Use of constant (1)

Variables:

Name1, of string Use of datatypes - three or more (2)

Cost, total_cost, vat of real

Response of char

Num of integer

INFORMATION TECHNOLOGY
PAPER 032
MARK SCHEME

Body:

Step 1: Start (1)

Step 2 : Print (how many items did you purchase?)

Step 3: Read num

Step 4: For I = 1 to num do appropriate use of iteration (1)

Step 4i:Print (Enter the name of device) use of Output statement (1)

Step4ii: Read name1 use of Input statement (1)

Step 4iv: Print(Enter the cost of, name1)

Step 4v: Read cost

Step 4vi: Print (Enter "Y" if item is taxable or "N" if it is non-taxable)

Step 4vii: Read Response

Step 4viii: If (Response = "Y")then

(use conditional branching - 1 for If-then and 2 for If-then-else)2mks

Set vat ← Vatpercent * cost

Else

Set vat ← 0

Endif

Step 4ix: set total_cost ← vat + price

(1 for assignment variable and 1 for correct variables)

Step 4x: Print (The total cost for a , name1 , is, total_cost)
(Output results 1 mark for each output) 2 marks

Step 4xi: Endfor

Step 5: Stop Terminator (1)

Key 3 – Using WHILE Loop

Header: Techno_Store appropriate Heading (1)

Declaration: The purpose of this algorithm is to output the name and total cost for a device. (1)

Constant

Vatpercent = 0.16 Use of constant (1)

Variables:

Name1, of string Use of datatypes - three or more (2)

Cost, total_cost, vat of real

INFORMATION TECHNOLOGY
PAPER 032
MARK SCHEME

Response of char

Num, count of integer

Body:

Step 1: Start (1)

Step 2 : Print (how many items did you purchase?)

Step 3: Read num

Step 4: While count<=num do appropriate use of iteration (1)

Step 4i: Print (Enter the name of device) Output statement (1)

Step4ii: Read name1 Input statement (1)

Step 4iv: Print(Enter the cost of, name1)

Step 4v: Read cost

Step 4vi: Print (Enter "Y" if item is taxable or "N" if it is non-taxable)

Step 4vii: Read Response

Step 4viii: If (Response = "Y")then

(use conditional branching - 1 for If-then and 2 for If-then-else)

Set vat ⟵ Vatpercent * cost

Else

Set vat ⟵ 0

Endif

Step 4ix: set total_cost ⟵ vat + price calculation

(1 for assignment variable and 1 for correct variables used)

Step 4x: Print (The total cost for a , name1 , is, total_cost)

(1 mark for each output) 2 marks

Step xi Count ⟵ count +1

Step 4xii: Endwhile

Step 5: Stop Terminator (1)

Total 15 marks

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE

JANUARY 2004

INFORMATION TECHNOLOGY

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INFORMATION TECHNOLOGY
JANAUARY 2004

GENERAL COMMENTS

Some 382 candidates registered for the January 2004 Information Technology Examination (Technical Proficiency) compared with 324 in January 2003. Some 289 candidates wrote the examination compared with 266 in Janauary 2003.

DETAILED COMMENTS
Paper 1 – Theory (Structured Essay)

The mean score for this paper was 30.8 out of 90. The range of marks was 0 to 64. The responses of candidates to questions on this paper were indicative of candidates lack of understanding of the fundamental terms and concepts of the subject. The format for the programming section was simplified by having shorter questions and a break-down of marks allocated. The results showed an improvement of candidates who attempted these questions and a consistent number of candidates who did not attempt any programming question.

Question 1

Observations

a) Too many varying responses for the two main sections of the CPU, which ranged from monitor to modem to processor.
b) Many candidates confused ROM with RAM.

Suggested Responses

(a) The control unit
Purpose: directs and coordinates most of the operations of the computer,
Arithmetic and logic unit
Purpose: performs arithmetic, logical operations, comparison and logical Operations.

(b) Similarity: both can be used to store data Difference: data in ROM cannot be changed while data in the EPROM can be erased and new data written.

Question 2

Observations

a) Not well answered. Most candidates did not know the terms for the specified hardware devices.
b) The methods of data capture were clearly not known by many candidates.

Suggested Responses

(a) (i) Read/write head
(ii) Track
(iii) Sector

(b)(i) MICR: Magnetic-ink character recognition
(ii) OMR: Optical mark recognition
(iii) OCR: optical character recognition

Question 3

Observations

a) Poorly done. Candidates could not compare the characteristics of secondary storage devices.
b) (i) Poorly done. Candidates could not find the binary and BCD representation of a decimal number.
(ii) Poorly done. Candidates could not find the two's complement of a number.

Suggested Responses

(a) Capacity: 3, 1, 2
Access Time: 3, 2, 1
Reliability: 3, 2, 1

(b) (i) Binary: 11101010
BCD: 001000110100

(ii) 7 = 0111
-5 = 1011 (two's complement)
7-5 = 0111+1011 = 10010 = 0010

Question 4

Observations

a) Parts (i) and (ii) were well done. Part (iii) was poorly done. Candidates had difficulty stating the purpose of utility programs although some were able to gave correct examples. Many responses were “performs a specific task.”

b) Not well done. Several candidates completely omitted this part. The most common answer was “pictures.” Candidates seem not to be familiar with the term graphical user interface.

Suggested Responses

(a) (i) Coordinates all the activities’ among the computer resources.

(ii) Performs a specific task, usually related to managing a computer, its devices, or its program.

(iii) Performs a specific task eg. Word processing.

(b) Icons, window, pull-down menu.

Question 5

Observations

This question was generally well done. It was however observed that some candidates described simplex communications as one in which data can flow in both directions but not simultaneously. The question was attempted by most of the candidates.

Suggested Responses

(a)(i) LAN: network that connects computers and other devices in a limited geographical area eg. Room

WAN: network that connects LAN’s or computers in a large geographical area eg. Two countries

(ii) Simplex: allow data to travel in only one direction
Duplex: Allow data to direction simultaneously

(b) Print appears faded on paper

Question 6

Observations

a) Candidates were not able to distinguish among MICR, OCR and OMR.
b) Candidates seem not to understand the term "peripheral device."
c) Very limited knowledge shown of the application or benefits of information to a business entity.

Suggested Responses

(a) (i) Bar code scanner, touchscreen
Printer, keyboard
(ii) Computers are networked

(b) - Complete business activities
- Make decisions
- Develop, create and distribute products and services.

Question 7

Observations

a) (i) The majority of candidates were unable to distinguish between a web-site and a web server. Many responses stated that a web server was an individual who created websites or an individual who 'surfed the web'. This question was not well answered.

(ii) The majority of candidates did not indicate that e-mail was an electronic process. Many of the responses could have been used to define a non-computer related area. The reference to a 'personal address for sending and receiving mail' could be applicable to a postal address. Additionally, the majority of candidates did not indicate knowledge of URL, although a few candidates stated what URL stood for.

b) This question was fairly well done.

Suggested Responses

(a) (i) Website: collection of web pages where each web page can contain text, graphics, sound and video and links to other documents.
Web Server: computer on the lnternet that stores and delivers web pages.

(ii) URL: Address of a web page on the Internet.

Email Address: a combination of a user name 1 and a domain name that identifies a user so that he /she can receive Internet email.

(b) - Sell goods and services
- Get feedback of number of visitors

Question 8

Observations

a) Well done.
b) Candidates did not understand the first part of the question. Candidates wrote about the results of infection and not the method of infection. The removal of virus part was well done, although some candidates mentioned biological viruses such as diskettes left in the dust.
c) Well done. Many candidates did not write about unauthorized use or access, or access through communication means.

Suggested Responses

(a) - Keep computers in restricted area
- Password protect computer file
- Encrypt file

(b) Infection
- Download an infected file from the Internet, or
- Open an email attachment, or
- Use infected disk

Removal:
- Use a virus detection and removal program

(c) - Software Piracy: unauthorized copying, using or selling of copyrighted software.
- Hacking: unauthorized access to a computer system (through communication means)
-Computer Fraud: changing of information in a computer without authorization for personal benefits or malicious reasons.

Question 9

Observations

a) Some candidates were very vague in their responses. In some areas, candidates looked at how the computer can help the teacher in presentation of lessons. So responses such as saving children's test scores, preparing lessons, tests, handouts, preparing attendance sheets were given. Some candidates misinterpreted the question as advantages of using the computer in the classroom.

b) Some candidates confused videoconferencing and telecommuting, although both have the advantages of saving the cost of travel.

Suggested Responses

(a) - Printouts of course work
- Use of computer-aided instruction software
- Simulations: computer-based models of real life situations
- Distance learning or on-line learning

(b) (i) Video conferencing: communication between two or more geographically separated people who use a network or the Internet to transmit video and audio signals.

(ii) Save on travel cost

Save on communication cost

Question 10

Observations

a) In most cases candidates' responses implied that the expert system was for storing patient records. Also, some responses suggested that the system was given to doctors and monitor patients.

b) Most responses indicated that the Database Administrator was responsible for input/process/store of data. Some responses were to create and maintain the database.

Suggested Responses

(a) - Provide support to medical expert in decision-making
- Help experts arrive at an accurate solution much faster

(b) - Creates and maintains the data dictionary
- Establishes and monitors database security and performance
- Implements and tests backup and recovery systems

Question 11

Observations

a) Most responses stated that the dry-run was "checking for errors", rather than responses expected. Few candidates mentioned manually testing for correctness.
b) Some responses were to remove viruses or incorrect data rather than errors. Few responses included both locating and converting errors.

Suggested Responses

(a) Dry Run: manually working through the program using a set of input values

(b) Debugging: locating and correcting errors which were found in a program

Question 12

Observations

a) Generally answered well – most answers included "human readable" and 'easy to understand'.
b) Generally well done
c) Little mention was made of the computing executing binary instruction.
d) Candidates did not seem to recognize that the value is a constant. Most candidates explained in terms of 'formatting as a decimal rather than a percentage'.

e) Generally well answered.
f) Generally well answered. Most candidates did no recognize that -56.95 was a valid numeric value.
g) Few responses submitted.
h) Not well answered. Many candidates appeared to misinterpret the purpose of error checking.

Suggested Responses

(a) High level languages are:
1. easy to understand.
2. Easily written in English type language.

(b) The term is compiling, interpreting or translating

(c)It must be converted so that the machine can interpret/understand and execute the code.

(d) tax = *0.15* shows that it is a constant value

(e) data type of cost is: number

(f) 45.50 valid

(g) high invalid

(h) -56.95 valid

(g) if (Cost < 0) or (cost = 0) then output ('error')

(h) Insert this code at below line 2 or newline 3

Question 13

Observations

a) Fairly well done. Some candidates made use of variable names which did not reflect the problem to be solved, such as num1, a, X.
b) Not well done. Many answers attempted were to process one student's grades. No attempt at repetition was made other than writing three separate programs. Programming code was not used.

Suggested Responses

(a) (i) Input: Course and Exam marks

(ii) Processing: Final course and exam marks

(iii) Output: Final

(b) Program calc (input, output);
Var course, exam, final, x: integer;

```
BEGIN
FOR x:=l TO 3 DO Begin
 Writeln ( \ Enter course mark:');
 Readln (course mark:');
 writeln ( \ Enter course mark:') ;
 final:= course + exam
 writeln('Final mark = ', final);
END
```

Question 14

Observations

a) Generally well done. Candidates were able to complete the trace table accurately.
b) The pattern was recognized and explained.

Suggested Responses

14. (a) Recall:

```
READ x

FOR M = 1 to X DO

 Y = 2*M

  Z =   (12-    Y )

END FOR

PRINT Z
```

Solution:

X	M	Y	Z
5	1	2	10
5	2	4	8
5	3	6	6
5	4	8	4
5	5	10	2

(b) The pattern is : Y is in ascending order from(2 to 10), while Z is in descend ing order (from 10 to 2)

Paper 2 - Integrated Practical Paper

General Comments

The mean for this paper was 36.3 out of 90 and the range of marks was 0 to 79. In many cases, the printouts were not properly collated for ease of identification of data for each question.

Some printouts were incomplete – evidence could be seen of data tables being used from the printout of the reports, without the data tables being printed. All tables, queries and reports should be printed as requested.

Detailed Comments

Question 1 - Spreadsheet

Observations

a) This question was generally done well.

b) i) This question was done well. Some candidates inserted the text “Total” at the wrong location.
ii) Question generally well done.

c) Both parts i) and ii) of this question were generally done well.

d) This question was not done well. The majority of candidates calculated the average using the incorrect range.

   i) This question was not done well. Candidates used the incorrect range in finding the maximum and minimum values

e) The majority of candidates inserted the title correctly, however, many were unable to merge the cells and center the title across the columns of data.

f) Majority of candidates used the date function correctly, however, many inserted the date with an incorrect format

g) This question was generally done well.

h) This question was generally done well.

i) This question was generally done well.

j) This question was poorly done. Candidates were unable to set up the required criteria for extraction of data. Instructors must ensure that candidates spend more time in practicing the use of the data extraction tools provided in the spreadsheet programs.

k) This question was generally well done.

l) This question was done poorly. The majority of candidates were unable to select the required data range for illustrating the chart.

m) This question was done poorly. The majority of candidates were unable to select the required data range for illustrating the chart.

Question 2 – Database Management

Observations

a) This question was fairly well done. The majority of candidates successfully imported the data from the spreadsheet provided. Evidence was seen where candidates imported the field headings as data within the database table.

b) This question was done well – Some students inserted the "Region" field as a text field, which was inappropriate for the use of the field.

c) This question was generally done well

d) This question was generally done well. Some candidates however created the "Region" field as a text field.

e) i) This question was poorly done. Many attempts at the query showed an unsuccessful join between the PERSONEL and RECOMMENDATIONS tables.

ii) The majority of candidates did this question incorrectly. Candidates performed this query as a list of doctors from the PERSONEL table, rather than make use of the summary query to display the number of doctors in the table.

iii) Very few candidates attempted this question.

f) The majority of candidates did this question fairly well. Data content for the report was correct in most cases. However, the majority of candidates were unable to format the report title into two separate lines. In some instances, data on the report was not properly formatted so that all data was displayed clearly – some field names and data were not seen in their entirety.

Question 3 – Word Processing

Observations

a) This question was not done well. Candidates did not realize they were re quired to set all four margins.

b) Most candidates inserted the footer. However, in many instances, the text was not italicized. Some candidates used a footnote rather than a footer.

c) This question was done well. Some candidates separated the text of the heading and thereby lost the mark for accuracy.

d) This question was done poorly. Some candidates centered the text rather than fully justifying.

e) The majority of candidates did not attempt this question.

f) This question was done reasonable well by the majority of candidates. Many candidates did not type the document in its entirety. In some cases, the re-quired punctuation was omitted.

g) This question was done well by the majority of candidates. In many in stances, the spreadsheet data was inserted correctly at the required location.

h) This question was done well by the majority of candidates. In many in-stances, the spreadsheet pie chart was inserted correctly at the required location.

i) This question was done well by the majority of candidates. In many in stances, the database report was inserted correctly at the required location.

j) In most cases, the correct data source was used, however the majority of candidates were unable to successfully complete the mail merge.

Paper 3/2 - SBA Alternative

The mean for this paper was 23.3 out of 60 and the range of marks was 1 to 51.

Question 1 – Spreadsheet

Observations

a) This question was done poorly. The majority of candidates did not suggest the use of a formulae

b) This question was done well. Candidates gave the correct formula in the majority of cases.

c) This question was done poorly. The majority of candidates were unable to explain how to complete the task of computing the FEES, PMT and DUES for other members by using the copy and paste feature.

d) This question was done well. Candidates were able to suggest the correct text alignment for the numeric column headings.

e) This question was done well. Candidates were able to suggest the format required for the monetary values of the spreadsheet.

f) This question was done satisfactorily. Some candidates did not suggest a meaningful field for sorting the data.

g) This question was poorly done. The majority of candidates were unable to describe the use of simple criteria to extract data.

h) This question was well done. The majority of candidates were able to correctly suggest the cell to change so that all others would change automatically.

i) This question was fairly well done. Some candidates were unable to suggest the merging of cells and centering of the heading across the columns.

j) This question was done satisfactorily. The majority of candidates did not indicate the correct data range required to construct the graph.

Suggested Responses

Question 1

(a) - E2 = if(D2=”Council”,1500,2500}

(b) - G2 = E2-f2 or F2-E2
- F2 = *H2+12* or Sum(H2:I2}

(c) - Select range E2:G2
- Copy range to E3:G6

(d) - Centre or right-aligned numeric columns

(e) - Decimal
- Currency format with $ symbol
- Comma separating thousands; 0 dp

(f) - Sort on last name
- (Sort on last name and then status)

(g) - Setup criterion and extraction range
- Insert criteria (Due>O)
- Select data range and perform query

(h) - Change formula in cell E2

(i) - Insert appropriate blank rows (rows I and 2)
- Enter title in cell Al (and select border)
- Select the range AI:II and choose the merge centre

(j) - Use chart feature and select Pie
- Data range: the two totals; label range: 2 types of members; format data labels for slice to include name and percentage

Question 2 - Database

Observations

a) Many students did not write appropriate one-word names for the field names. For example MEDALS is preferred to 'Medals won for each member' as a field name.
b) Some responses revealed that the students did not understand what 'unique' meant.
c) Generally well done
d) Although most students mentioned importing the spreadsheet, there were too many responses simply stated 'cut and paste'.
e) Many candidates suggested a relationship instead of stating the ID field as the field to link the tables.
f) The majority of candidates stated ascending and descending instead of sorting and indexing. Possibly poor wording of the question.
g) Generally well done. Some candidates used <20 for more than 20 goals
h) Not well answered. Candidates do not know the formula used, although many of them gave the correct answer in a sentence.
i) Students did not write the field name used to obtain the total result.
j) Many candidates omitted the selection of the fields for the report. Some candidates included creating a query which showed that they understood report creation.

Suggested Responses

Question 3

(a) - Centre and bold club name
- Font: different style and larger font

(b) - Import graphic file to document with letterhead or
- Copy graphic and paste in letterhead

(c) - Insert a footer
- Text enter with italics font and centred

(d) - Checking status bar for fully justified icon
- Text aligns to both left and right margins

(e) - Do a search for ‘futball’ and replace with ‘football’ or
- Perform a spell check

(f) - Use the cut and paste feature
- (Cut par 2 and paste below par 5)
- (Cut par 5 and paste in below par 1)

(g) - >20 under Home field
- <5 under the medals field

(h) - TotGoal: {HOME} + {OVERSEAS}

(i) - Query the table to display field: Medals
- Use group by sum

(j) - Perform query to show required results
- Create report on query
- Select fields
- Enter heading in report

Question 3 – Word Processing

Observations

a) Well answered. Some candidates even stated WordArt and headers, when bold and font use was preferred.
b) Copy and paste was the general answer. Many candidates suggested scanning the graphic although the question stated that the graphic file was given.
c) Generally well done. There was a trend to state how to centre OR italicize the motto, but not both.
d) Very well done. Candidates showed thorough knowledge of the various ways to verify that the text was fully justified.

e) Very well done. Candidates not only suggested the search and replace, but as the question was worded, a spell check was also acceptable.

f) Many candidates simply stated cut and paste, instead of giving at least some detail on how the cut and paste was used to interchange the paragraphs.

g) Candidates showed good knowledge of the print dialog box. However, some others simply wrote 'I would go to Print Setup and change the necessary things'.

h) Generally well done. Candidates knew how to manipulate columns.

i) This was not well answered although many attempted it. Many candidates reversed the number of rows and columns.

j) Very well done. Many candidates correctly stated to export the report or copy the database report and paste in the word document. However there were still those who simply stated 'copy and paste'.

k) Too many responses of 'merge them into one'.

l) Candidates are not explaining explicitly how to indent or change line spacing. Responses are too general and vague. Also too many omitted to state that the text should be blocked first.

m) Not well answered. Over half of the candidates did not attempt this question. Many candidates did not state that the data source was the database table. Also, too few stated the output of the merge as 15 merged letters.

Suggested Responses

(a) - Centre and bold club name
- Font: different style and larger font

(b) - Import graphic file to document with letterhead or
- Copy graphic and paste in letterhead

(c) - Insert a footer
- Text enter with italics font and centred

(d) - Checking status bar for fully justified icon
- Text aligns to both left and right margins

(e) - Do a search for 'futball' or and replace with "football" or
- Perform a spell check

(f) - Use the cut and paste feature
- (Cut par 2 and paste below par 5)
- (Cut par 5 and paste in below Par 1)

(g) - Place cursor in page 3. {l)or (Select print current page)
- set number of copies to **5**

(h) - Block text in third paragraph; select columns and choose 2 columns
or
- Column break

(i) - 4/5 rows and 3 columns

(j) - Export report to word processing and paste
- Retrieve report ln page 5 or -
- Copy each document and paste in one documnent

(k) - Create a new document and retrieve each file in a specific location. Save as one document
- Copy and paste in one document

(1) - Block paragraph 4 and select indent
- Block paragraph 4 and change line spacing to 1.5

(m) - Type text for letter and insert merge fields
- Data source: database table created
- 15 personalized letters

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JUNE 2004

INFORMATION TECHNOLOGY

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INFORMATION TECHNOLOGY
JUNE 2004

GENERAL COMMENTS

In June 2004, 18,643 candidates from the participating territories entered for the Information Technology examination; 633 entered for General Proficiency and 18,010 for Technical Proficiency. This represents an increase of 5 per cent in registration for the Information Technology examination when compared with June 2003.

DETAILED COMMENTS

General and Technical Proficiencies

Paper 01 – Structured Essay

This paper consisted of four sections. Sections 1 and 2 consisted of ten compulsory short-answer questions testing the theory profile and is common to both the Technical and General Proficiencies. Section 3 is the Programming section for Technical Proficiency candidates only and Section 4 is the Productivity Tools section for the General Proficiency candidates only. The mean scores for General and Technical Proficiencies were 41.05 out of 90 and 26.31 out of 90 respectively. The range of marks obtained by the General and Technical Proficiencies candidates were 4 - 81 and 0 - 75 respectively.

Programming continues to be an area of weakness in Paper 1 for the Technical Proficiency candidates. Most candidates were not well-prepared to handle the questions in the Programming section.

SECTION 1

Question 1

(a) (i) Well answered by the majority of candidates.

(ii) Well answered by the majority of candidates.

(iii) Poorly done. Many candidates were confused about the difference between ROM and RAM.

(b) Well answered. Majority of the candidates were able to identify at least one of the factors that affect the quality of display on a monitor.

Question 2

(a) (i) Fairly well done. Some candidates identified the equipment used and not the process involved.

(ii) Generally well done.

(iii) Poorly done. Majority of the candidates were not familiar with the concept of voice recognition. Some were not clear about the difference between sound input and sound output.

(b) (i) Fairly well done. Some candidates could not explain how dot-matrix printers generate hardcopy output.

(ii) Poorly done. Most candidates were not familiar with this type of printer.

(iii) Fairly well done. Some candidates could not explain how ink-jet printers generate output on paper.

Question 3

Poorly done. Many candidates were not familiar with integrated software packages and could not compare them with a single application package to provide the required answer.

Question 4

(a) Satisfactorily done. Most candidates did the binary or the BCD but not both. Some candidates could not divide by 2.

(b) Poorly done. Most candidates could not compute the two's complement of binary numbers.

Question 5

(a) Poorly done. Most candidates did not give the difference between the two types of interface.

(b) Poorly done. Many candidates viewed the question as asking for the installation of the two operating systems on two separate computers rather than on one computer.

Question 6

(a) Satisfactorily done. Most candidates were able to provide the advantages and disadvantages of using a computer network.

(b) Fairly well done. Some candidates were confused about the difference between a file and a folder.

(c) Poorly done. Some candidates gave answers for the whole computer system rather than the monitor only.

SECTION 2

Question 7

(a) (i) Poorly done. Most candidates could not name the peripheral device.

(ii) Poorly done. Most candidates could not name the component.

(iii) Poorly done. Many candidates viewed the Internet service provider as the Telephone Company.

(b) (i) Poorly done. Most candidates stated what the search engine did rather than what it is.

(ii) Well done by the majority of candidates.

Question 8

(a) Satisfactorily done. The majority of candidates gave general responses rather than specific uses of computers.

(b) Well done. Most candidates only used security measures as a method of prevention of crimes. Very few candidates spoke about laws and punishment as a preventive measure.

Question 9

(a) (i) Satisfactorily done. Most candidates could define CAD but not CAM.

(ii) Poorly done. The majority of candidates were unable to establish the link between CAD and CAM.

(b) Well done by the majority of candidates.

Question 10

(a) Satisfactorily done. Most candidates could only provide one quality of information but not both.

(b) Satisfactorily done. Most candidates could only provide two measures to protect a computer system from viruses.

(c) Poorly done. Most candidates responses indicate that archiving is the same as backing up.

(d) Poorly done. Most candidates were able to describe only one step to prevent the deliberate theft or corruption of data.

SECTION 3 – PROGRAMMING (For Technical Candidates)

Question 11

This question was generally well done. The candidates who scored full marks demonstrated excellent skills in pseudocode development. Some candidates found it difficult to write simple mathematical formulae to do simple calculations. Many candidates found it difficult to implement the IF –THEN –ELSE statement. Many candidates did not use the correct syntax.

Question 12

(a) The majority of candidates showed adequate skills in assigning variables for data entry. However, some candidates used numeric values instead of variables for input and for their calculations. Arithmetic operators were not used correctly, with some candidates using the letter "A" for add and "S" for subtract.

(b) This part was misinterpreted by most candidates. Most candidates rewrote the code although instructed not so to do. Many candidates knew that the WHILE statement was required but made a poor attempt at placing a proper condition with Boolean operators, variables and equality operators.

Question 13

(a) (i) Well done by the majority of candidates.

(ii) Most candidates figured it to be a high-level language. Some candidates indicated 3rd level language to 6th level language.

(iii) Satisfactorily done. Many candidates did not understand this part.

(b) Poorly done. Few candidates stated the advantage of the compiler and the advantage of the interpreter. Most candidates stated the functions of the compiler and the interpreter and provided the difference between them.

Question 14

(i) Well done by the candidates who attempted it.

(ii) Well done by the candidates who attempted it.

(iii) Poorly done. Very few candidates obtained any mark for this question.

SECTION 4 – PRODUCTIVITY TOOLS (For General Candidates)

Question 15

(a) Well done by the majority of candidates. Some candidates incorrectly stated the use of the enter key.

(b) Well done by the majority of candidates. Some candidates used copy and paste.

(c) Poorly done. Most candidates could not explain the result of the full justification of a paragraph.

(d) Well done. Some candidates explained how to print 13 pages instead of page 13.

(e) Satisfactorily done. Many candidates were not familiar with landscape printing.

(f) Poorly done. Many candidates did not mention how to centre the page number.

(g) Poorly done. Many candidates could not explain why the tab moves an inch.

(h) Well done by the majority of candidates.

Question 16

(a) Well done by the majority of candidates.

(b) Satisfactorily done. Most candidates stated currency format but did not indicate the decimal places.

(c) Poorly done. Most candidates were unfamiliar with absolute addressing.

(d) Well done by the majority of candidates.

(e) Well done by the majority of candidates.

(f) Well done by the majority of candidates.

(g) Well done by the majority of candidates.

Question 17

(a) Satisfactorily done. Most candidates found difficulty in proposing a suitable field size – too small or extremely large. Some candidates suggested a size for the logical field.

(b) Well done by the majority of candidates.

(c) Well done by the majority of candidates.

(d) Poorly done. Many candidates did not know how to insert a field.

(e) Satisfactorily done. Most candidates stated query without providing the criteria.

(f) Poorly done. Many candidates did not indicate the use of the query in preparing the report.

Paper 02 – General Proficiency

This paper consisted of two sections. Section 1 consists of four questions on Information Processing of which candidates are required to do question 1 and any two other questions. Section 2 consists of four questions on Programming of which candidates are required to do question 5 and any two other questions.

The mean score for this paper was 49 out of 100. The range of marks obtained by the candidates was 6 - 92.

SECTION 1 – INFORMATION PROCESSING

Question 1

(a) Well done by the majority of candidates.

(b) (i) Poorly done. Many candidates could not state the reasons why documentation is important.

(ii) Satisfactorily done. Many candidates could not recognize the diagram.

(iii) Well done. Many candidates provided the description but not the data element.

(iv) Poorly done. Many candidates were not clear about the fields in the records.

(v) Satisfactorily done. Many candidates listed the names of the two checks rather than described them. Some candidates gave verification methods instead of validation methods.

(vi) Generally well done by the majority of candidates.

(vii) Generally well done by the majority of candidates.

(viii) Generally well done by the majority of candidates.

(c) Very well done by the majority of candidates.

Question 2

(a) (i) Satisfactorily done. Many candidates viewed typographical error as graphical error and transposition error as communication error.

(ii) Well done. Candidates were clear about the difference between batch and interactive modes.

(iii) Satisfactorily done. Many candidates could not give examples of data type checks.

(b) (i) Generally well done by the majority of candidates.

(ii) Generally well done by the majority of candidates.

(iii) Poorly done. Many candidates confused the fetching of data with instructions.

(iv) Poorly done as many candidates could not do part (iii).

(v) Poorly done as many candidates could not do part (iv).

Question 3

(a) (i) Satisfactorily done. Many candidates connected transaction to update instead of transaction to master.

(ii) Generally well done. Many candidates did not take out the repeated numbers.

(iii) Generally well done by the majority of candidates.

(iv) Satisfactorily done. Most candidates could not describe the merging transaction.

(b) Poorly done. Many candidates could not correctly identify the required conditions.

Question 4

(a) Very well done by the majority of candidates.

(b) Satisfactorily done. Some candidates were unable to differentiate between the base and the exponent.

(c) Very well done by the majority of candidates.

(d) (i) Very well done. Most candidates were able to give two or more ways to represent negative numbers.

(ii) Poorly done. Many candidates were unable to use two's complement representation to do subtraction.

SECTION 2 – PROGRAMMING

Question 5

(a) Satisfactorily done. Most candidates obtained 1 - 2 marks with very few obtaining the full marks.

(b) Well done. Most candidates obtained full marks. Some candidates did not understand what was required.

(c) Poorly done. Candidates failed to realize that there was a one to one relationship between the algorithm given and the program code required. Many candidates used pseudocode instead of actual programming statements.

(d) Generally well done. The majority of candidates obtained full marks.

(e) Poorly done. Candidates could not identify the iterative structures and most confused them with selection. Candidates were also unable to distinguish between a Repeat … Until Loop and a While … Loop.

(f) Poorly done. Candidates were unable to identify unit testing and integrated testing as the solution for this question. Those candidates who understood the question scored full marks.

Question 6

(a) Satisfactorily done. Most candidates scored 1 mark for this question losing the other mark for leaving out the data type in the declaration of the array.

(b) Very well done. Almost all candidates who attempted this question scored the full marks.

(c) Well done. Candidates were able to illustrate the swapping process successfully although they used a wide variety of diagrams.

(d) Well done. Most candidates were able to gain full marks for the algorithm for swapping items in the array, however, they lost marks carelessly in the parts (ii) and (iii) by confusing their variable names and not using appropriate array references in their algorithms.

Question 7

(a) Satisfactorily done. Many candidates misunderstood that 999 was the rogue value and that the algorithm had to determine the number of positive and negative integers. Some candidates did not use flowcharting symbols.

(b) Candidates who did well on part (a) also did well in this part. Marks were lost because a full program was not written and hence declaration and initialization of variables were not done.

(c) Fairly well done. Many candidates misinterpreted the question and gave different types of comments instead of giving actual examples which should be placed in the program.

Question 8

(a) Well done by the majority of candidates.

(b) (i) Very well done by the majority of candidates who attempted this part of the question.

(ii) Very well done by the majority of candidates.

(iii) Satisfactorily done. Many candidates did not use the terms ascending and descending sort, rather, they described the swapping operations.

(iv) Poorly done. Many candidates stated pseudocode algorithm as their responses.

Paper 03 — School-Based Assessment

The presentation of the general projects were wide and varied. There are too many projects written in Visual Basic where the candidates' knowledge in the rigors of programming cannot be tested.

A few projects were also not of the standard of this proficiency as they consisted of only 3-8 pages of basic information, and no other means to ascertain the candidates' knowledge of the various aspects of the project.

There were also some projects which were too similar in nature and others which were too complex for CSEC proficiency.

There were still instances of candidates having submitted General proficiency projects when they were registered for Technical proficiency.

Teachers' marking:
Generally teachers followed the SBA mark scheme allocated.

TECHNICAL PROFICIENCY

Paper 02 – Word Processing, Spreadsheets and Database Management

This paper consisted of three questions testing word processing, spreadsheet and database management. This paper contributed 50% towards the final mark in this examination.

The mean score for this paper was 45 out of 90. The range of marks obtained by the candidates was 0 - 90.

For spreadsheet, the candidates found difficulties with questions testing absolute addressing, date function, formatting the spreadsheet and appropriate labeling of axes in the charts.

For database management, candidates found difficulties with questions testing the linking tables, using calculated fields and summarizing statistics in queries and using landscape printing to ensure all relevant information are printed on the report.

For word processing, candidates found difficulties in questions testing integrating a database report into a word processing document. Many candidates found it difficult to use a database table as the data source to perform a merge. Many candidates did not ensure that all punctuation marks were included in the primary merge letter.

<u>Question 1</u> – Spreadsheet

(a) Well done. Some candidates retrieved the incorrect file from the disk.

(b) Well answered by the majority of candidates.

(c) Generally well done. Most candidates used the appropriate formulae.

(d) Satisfactorily done. Some candidates did not do the calculation. Most candidates did not use absolute addressing.

(e) Well done by the majority of candidates.

(f) Well done. Most candidates used the appropriate formulae.

(g) Poorly done. Most candidates used incorrect formulae and did not provide the required format.

(h) Well done by the majority of candidates.

(i) (i) Well done. Some candidates did not use zero decimal position.

(ii) Well done. Some candidates did not right-align all numeric headings.

(iii) Well done. Some candidates found it difficult to centre and merge.

(iv) Well done. Some candidates placed the borders in the incorrect range.

(v) Satisfactorily done. Some candidates did not use the date function.

(j) Satisfactorily done. Most candidates sorted only one column and not the entire spreadsheet.

(k) Generally well done by the majority of candidates.

(l) Very well done. Some candidates did not label the axes appropriately. Some candidates used the incorrect data to construct the chart.

(m) Very well done. Some candidates did not include the label and percentages for each slice. Some candidates used the incorrect data to construct the chart.

Question 2 – Database Management

(a) Generally well done. Some candidates imported the field names as one record.

(b) Satisfactorily done. Some candidates could not modify the database structure to insert a field.

(c) Not well done. Many candidates ignore this question. Many candidates did not sort on the correct field and order.

(d) Well done. Some candidates did not enter the data correctly.

(e) Poorly done. Most candidates scored less than half of the marks for this part of the question. Many candidates found difficulty in joining tables. Most candidates felt that the fields to be joined must have the same name, which is not the case. The insertion of a calculated field in a query posed the greatest difficulty.

(f) Satisfactorily done. Many candidates lost marks on the title and format of the report. Some of the information was truncated when the report was printed as candidates did not use landscape printing.

Question 3 – Word Processing

(a) Generally well done. Some candidates did not change the font to Arial.

(b) Some candidates confused footer with footnotes. Some candidates fully justified only part of the letter.

(c) Satisfactorily done. Some candidates inserted the merge fields in the wrong order and without space between them. Some candidates were not keen in placing all the punctuation marks in the correct position.

(d) Well done. Some candidates inserted only part of the spreadsheet.

(e) Well done. Some candidates inserted the bar chart instead of the pie chart.

(f) Satisfactorily done. Many candidates had difficulty in inserting the database report.

(g) Merge was well executed by the majority of candidates. Most candidates did not print out the primary document and the required merge letters.

Paper 02/2 – Word Processing, Spreadsheets and Database Management

This paper is the alternative to paper 2 and consisted of three questions testing word processing, spreadsheet and database management.

The mean score for this paper was 44 out of 90. The range of marks obtained by the candidates was 0 - 89.

For spreadsheet, candidates found difficulties with absolute addressing, date and count functions, formatting the spreadsheet and labeling the axes in the chart.

For database management, candidates had difficulties with linking tables, inserting calculated fields and summarizing statistics in queries and the use of landscape printing where appropriate.

For word processing, candidates were not keen in including all punctuation marks in the merge letter. Candidates also found difficulty with integrating a database report in a word processing document and also in using a database table as the data source to perform the merge.

Question 1 - Spreadsheet

(a) Well done. Candidates retrieved the correct file.

(b) Well done. Candidates saved the file under a new name.

(c) Well done. Most candidates were able to insert new rows.

(d) Well done. Some candidates entered their candidate numbers in the incorrect cells.

(e) Satisfactorily done. Some candidates did not right-align the headings.

(f) Poorly done. Most candidates did not create the page header.

(g) Poorly done. Most candidates could not use the COUNT function and therefore, did not answer this part of the question.

(h) Well done. Some candidates did not enter data in the correct cells, while some candidates abbreviated the word maximum to max and minimum to min.

(i) Well answered. Most candidates were able to use the MAX and MIN functions.

(j) Well answered by the majority of candidates.

(k) Well done. Some candidates did not format to one decimal place. Some candidates did not use the formula provided to calculate the batting average.

(l) Well answered by the majority of candidates.

(m) Satisfactorily done. Most candidates sorted only one column. Many candidates were unfamiliar with secondary sort.

(n) Well answered by the majority of candidates.

(o) Generally well done. Some candidates did not label the axes appropriately.

(p) Generally well done. Some candidates did not include the percentages in each slice.

Question 2 – Database Management

(a) Generally well done by the majority of candidates.

(b) Generally well done by the majority of candidates.

(c) Generally well done by the majority of candidates.

(d) Well done by the majority of candidates.

(e) Well done by the majority of candidates.

(f) (i) Poorly done. The majority of candidates could not insert a calculated field in a query.

(ii) Well done by the majority of candidates.

(iii) Well done by the majority of candidates.

(iv) Well done by the majority of candidates.

(g) Poorly done. The use of calculated field posed a difficulty to many candidates.

(h) Well done by the majority of candidates.

(i) Poorly done. Many candidates found difficulty with joining tables.

(j) Well done by the majority of candidates.

(k) Well done. Many candidates were able to do the grouping.

<u>Question 3</u> – Word Processing

(a) (i) Well done by the majority of candidates.

(ii) Satisfactorily done. Some candidates did not change all the margins.

(iii) Well done. Some candidates confused footer with footnotes.

(iv) Satisfactorily done. Some candidates did not select all the text.

(v) Satisfactorily done. Some candidates did not select all the text in the body of the letter.

(vi) Satisfactorily done. Some candidates did not use the find and replace feature.

(b) Well done by the majority of candidates.

(c) Well done. Some candidates did not apply the bold feature.

(d) (i) Poorly done. Many candidates could not locate the data source and hence, could not insert the merge fields.

(ii) Poorly done. Many candidates could not locate the data source and hence, could not insert the merge fields.

(iii) Well done by the majority of candidates.

(iv) Well done. Many candidates did not insert all the punctuation marks.

(e) Well done. Many candidates did not reformat the pie chart after insertion.

(f) Well done. Many candidates did not reformat the query after insertion.

(g) Well done. Many candidates did not reformat the report after insertion.

(h) Satisfactorily done. Many candidates did not print out the merge letters indicated in the instructions.

Paper 3 – School-Based Assessment

General Comments

- Teachers should ensure that the samples submitted are properly organised (in terms of sequencing) and secured (bound). A minimum of five samples per teacher is required. These samples should be selected as specified in the SBA guidelines of the syllabus.
- Some teachers submitted samples with no criteria or mark scheme. This made it difficult at times to determine how the teacher allocated the marks. The mark scheme provided by CXC should be further subdivided in cases where two or more marks are awarded for a particular skill. The mark awarded should be clearly shown on the scheme. Marksheets must be submitted for all samples.
- In some cases, teachers showed marks awarded but no printed work was there to moderate. Teachers must ensure that the printed work is shown for the students to get the marks that they have awarded.
- Marks should not be awarded for skills that are substantiated by a hardcopy. The submission of floppy disks or other media is not required for moderation of the SBA. Only the printed copy of the SBA is corrected.
- Teachers should ensure that candidates are clear on the printing requirements. In some cases, candidates printed the same document several times. This succeeds only in wasting resources.
- Although the SBA is an integrated exercise, the individual components are still distinct. Hence candidates should ensure that the components are properly delineated in their submission.
- Unless it is absolutely necessary, candidates who obtain zero marks for any component should not have their SBA submitted for moderation.
- All formula sheets for the spreadsheet component should be printed (to include row and column headings where possible).
- Teachers should avoid providing templates for students. This hinders creativity.

Detailed Comments

Word Processing

Task A: Mail Merge

- This section was well done. Candidates showed competence in this area.
- Performance in this section was a marked improvement over last year. Most candidates used authentic merge codes and therefore performed the merge successfully. In some instances however, the primary and secondary documents were not included and therefore could not be evaluated.
- In most instances, data sources were complete and included for evaluation.
- Almost every candidate was able to submit an acceptable letter showing the first and last person from the data source.

Although this section was well done, teachers should revisit the format and presentation of letters.

Task B: Report

- Candidates did produce the list of participants and presenters. However, it was not imported or produced from the database in many cases.
- Most candidates attempted the sort by “country”. However, several teachers did not recognise that the sort was by country and not by last name.
- Most candidates attempted this part. In some cases the budget was inconsistent with that in the spreadsheet. Additionally, some candidates did not import the spreadsheet, but instead printed directly from the spreadsheet application and inserted the page into the document.
- In most cases a comment was made, although very brief in some cases, and irrelevant or inconsistent with what was shown in the spreadsheet.

Task C: Addendum

- It was perceived that many candidates were unaware of the meaning and content of an addendum. Therefore many variations were seen.
- Some candidates imported the "Additional Expenses" table instead of the report.
- Some candidates did not import the report, but instead printed directly from the database application and inserted the page into the document.

Formatting and Presentation

- Most candidates were able to gain these marks by showing consistency in the presentation of the letters and the report.
- In some cases, candidates did not effectively integrate their data, and as a result, items which should appear in both the word processing and spreadsheet or database application, appeared only once and varied in the other two.

Spreadsheet

- The spreadsheet component of the SBA was fairly well done. Candidates showed a high level of proficiency in the use of a variety of system functions such as table lookup functions, IF function and sum function. Candidates demonstrated a high proficiency in linking different worksheets in the same workbook.
- Weaknesses were seen in the use of absolute referencing. Candidates showed a preference for hard coding constants in formulas rather than using cell references.
- Some candidates had difficulty interpreting the requirements defined in SBA for creating the budget. Most candidates did not specify the assumptions made when doing their calculations. Further, some candidates did not follow the suggestions given for printing.
- Candidates should choose a layout for the spreadsheet that makes it easy to follow the work that they have done. They should make good use of page breaks and the formatting features available to make their submission attractive and readable. About 30% percent of the candidates were able to achieve this effectively.

Database Management

Use of consistent data from the spreadsheet:

- About 50% of the candidates used the correct data from the spreadsheet, which was from Task 2. The other candidates used either the data from Task A (before deleting the fourth person) or used the data source in the word processor.

Creation of tables

- Table "Persons": Candidates did very well with this table adding Day 1 and Day 2. The candidates had all the fields. However, in populating Day 1 and Day 2, some candidates added records for all of the members in the table instead of adding for Participants only (not presenters).
- Table 'Equipment': Candidates prepared this table with all the fields very well. A few candidates put two or more types of equipment for one day in the same record or both days in the same record. Majority of the candidates added two or more topics to the ones listed. Some did not pay attention to field types. For example, the reference to auto-number.
- Table 'Expenses': This table was well created by all candidates. Some candidates did not include expenses that were rejected. Some candidates created a table with all the field names but only gave records to a few of the attendee's names.
- Table 'Linking': The majority of the candidates performed the links well. They had the common field between the three tables created and populated correctly.
- Majority of the candidates created Expense as either currency or number but a few used this field as text and lost a mark.

Queries

- Calculation of OHP requests: This was not well done. Majority printed out the records that had OHP requests but did not count them. A minority of them did not attempt the question.
- Trinidad: Majority of the candidates performed this query well. A minority did not get a result. The candidates only searched for participants in 75% of the cases and the remainder searched for anyone, whether participant or presenter.
- Topics-2: This was not well done. Majority of the candidates had the right criteria (Day 2) but did not have all the fields required. Most of them had Topics but not the names of the presenters.
- Day 2: This query was well done by the candidates. In some cases candidates put more fields than needed but they had the criteria correct and equipment list.
- Rejected: This query was attempted by all candidates. Some candidates performed the update on a limited set of records from their expense table. Some candidates performed a calculation on the expenses but it was not 10%.

Reports

- Report of Participants: Majority of the respondents performed this report. In most cases it was well done. In some cases the candidates did not group by country or sorted by name or both. In a few cases the candidates did not have the right criteria – they printed all the names and not the names of the participants only.
- Report on Additional Expenses: Majority of the respondents attempted this report and in most cases it was well done. In some cases the respondents did not include all the fields that were requested and some of them did not give the report the heading that was given (“Additional Expenses from Participants”).

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

JUNE 2005

INFORMATION TECHNOLOGY

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INFORMATION TECHNOLOGY
JUNE 2005

GENERAL COMMENTS

In June 2005, 21 269 candidates from the participating territories entered for the Information Technology examination; 762 entered for General Proficiency and 20 507 for Technical Proficiency. This represents an increase of 14 per cent in registration for the Information Technology examination when compared with June 2004.

DETAILED COMMENTS

General and Technical Proficiencies

Paper 01 – Structured Essay

This paper consisted of four sections. Sections 1 and 2 which is common to both the Technical and General Proficiencies consisted of eleven compulsory short-answer questions that tested the theory profile. Section 3 is the Programming section for Technical Proficiency candidates only and Section 4 is the Productivity Tools section for the General Proficiency candidates only. The mean scores out of 90 for General and Technical Proficiencies were 51.82 and 36.38 respectively. The range of marks obtained by the General and Technical Proficiencies candidates were 5 - 51 and 0 - 85 respectively.

Programming done only by the Technical Proficiency candidates continues to be an area of weakness. Candidates' responses in this section indicate that they were not well-prepared to handle the questions.

SECTION 1

Question 1

(a) Poorly done. Many candidates did not provide an acceptable function of the control unit.

(b) Well done by the majority of candidates.

(c) Satisfactorily done. Many candidates confused ROM with RAM.

(d) Satisfactorily done. Many candidates confused ROM with RAM.

Question 2

(a) Generally well done by the majority of candidates.

(b) Poorly done. Many candidates could not differentiate between a byte and a word.

(c) Well done by the majority of candidates.

Question 3

Well done by the majority of candidates.

Question 4

(a) Satisfactorily done. Many candidates named the direct access storage device but not the serial access storage device.

(b) Poorly done. Many candidates did not state the relationship between a track and a sector.

(c) Well done by the majority of candidates.

Question 5

(a) Satisfactorily done. Many candidates provided the binary representation but not in 8-bits.

(b) Poorly done. Most of the candidates provided the incorrect answers.

(c) Poorly done. Many candidates provided the binary representation instead of the Binary Coded Decimal (BCD) representation.

(d) Poorly done. Many candidates did not provide the two's complement representation of the given number.

Question 6

(a) Well done by the majority of candidates.

(b) Satisfactorily done. Many candidates could not specify the function of the mail merge feature.

SECTION 2

Question 7

(a) Satisfactorily done. Many candidates were not clear about the relationship among the three terms provided.

(b) Poorly done. Many candidates could not differentiate between the two terms given.

Question 8

(a) Well done by the majority of candidates.

(b) Satisfactorily done. Many candidates provided the job specification rather than the skills required.

Question 9

(a) Satisfactorily done. Many candidates only named the physical access method but did not describe it. Most candidates focused on high tech access methods and omitted the simpler ones such as the use of lock and key.

(b) Satisfactorily done. Many candidates identified but did not describe the software methods. Some, on the other hand, confused physical access with software access methods.

Question 10

(a) Poorly done. Many candidates indicated that computer fraud is a person.

(b) Satisfactorily done. Many candidates provided the actions but not the reasons for the actions. Some candidates provided unsuitable actions.

Question 11

(a) (i) Satisfactorily done. Many candidates did not make a clear distinction between a file librarian as against the traditional librarian.

(ii) Poorly done. Most candidates did not state the function of the Electronic Data Processing Auditor.

(iii) Poorly done. Many candidates had difficulties in expressing the job function of the computer consultant.

(iv) Satisfactorily done. Many candidates did not state the job function of the Data Communications Specialist.

(b) (i) Satisfactorily done. Many candidates confused teleconferencing with telemarketing, telecommuting and video conferencing.

(ii) a) Satisfactorily done. Many candidates did not provide three advantages of Teleconferencing.

b) Well done by the majority of candidates.

SECTION 3 - PROGRAMMING (For Technical Candidates)

Question 12

This question was generally satisfactorily done. Some candidates had difficulties in interpreting the mathematical aspect of the problem.

(a) Satisfactorily done. Some candidates used numeric values instead of variable names.

(b) Well done by the majority of candidates.

(c) Satisfactorily done. Many candidates misinterpreted the question and found the square root instead of the squares. Some candidates found the square of part (b) instead of the values from part (a).

(d) Satisfactorily done. Many candidates did not use the IF statement properly.

(e) Well done by the majority of candidates.

Question 13

This question was poorly done. Most of the candidates used pseudocodes instead of a structured language. The candidates who used the structured codes could not code the algorithm properly. Most candidates did not use a LOOP structure to find the sum and average of the collection of integers. Those who used the LOOP structure did not use it properly.

(a) Poorly done. Few candidates attempted this part.

(b) Poorly done. Many candidates did not input the values.

(c) Poorly done. Many candidates could not find the average and the sum.

Question 14

(a) Poorly done by the majority of candidates. Many candidates could not provide an example of a high level language.

(b) Poorly done. Many candidates could not explain what each statement does.

(c) Poorly done. Many candidates did not attempt this question.

Question 15

(a) Well done by the majority of candidates.

(b) Well done by the majority of candidates.

(c) Poorly done. Many candidates could not recognize the value of the antique watch to be 7000.

(d) Well done by the majority of candidates.

SECTION 4 - PRODUCTIVITY TOOLS (For General Candidates)

Question 16

(a) Well done by the majority of candidates.

(b) Satisfactorily done. Many candidates identified the justification as centred rather than fully justified.

(c) Poorly done. The majority of the candidates did not select the text before formatting.

(d) Poorly done. The majority of candidates provided methods that were not efficient.

(e) Satisfactorily done. Some candidates indicated the use of the spacebar instead of the tab key.

(f) Well done by the majority of candidates.

(g) Well done by the majority of candidates.

Question 17

(a) Satisfactorily done. Some candidates incorrectly identified 6 rows rather than 5 rows.

(b) Well done by the majority of candidates.

(c) Satisfactorily done. Some candidates omitted the identification of the cell.

(d) Poorly done. The majority of candidates failed to recognize that the formulas should be copied.

(e) Well done by the majority of candidates.

(f) Well done by the majority of candidates.

(g) Poorly done. Many candidates could not explain the use of the format feature correctly.

(h) Satisfactorily done. Many candidates could not provide the default alignment for numeric data.

Question 18

(a) Well done by the majority of candidates.

(b) Poorly done. Many candidates provided another field rather than another record.

(c) Well done by the majority of candidates.

(d) Satisfactorily done. Many candidates only identified one way of arranging records.

(e) Well done by the majority of candidates.

(f) Poorly done. Many candidates failed to identify the required fields in creating the report.

TECHNICAL PROFICIENCY

Paper 02 – Word Processing / Spreadsheets and Database Management

This paper consisted of four questions testing word processing, spreadsheet and database management.

The mean score for this paper was 86.02 out of 150. The range of marks obtained by the candidates was 0 - 150.

For spreadsheet, the candidates had difficulties with absolute addressing, sorting, percentages formatting and criterion search.

For database management, candidates had difficulties with linking tables, using calculated fields and summarizing statistics in queries and creating reports based on queries.

For word processing, candidates had difficulties changing margins and preparing the main document for a mail merge.

Question 1 – Word Processing

(a) Well done by the majority of candidates.

(b) Well done by the majority of candidates.

(c) Poorly done. Many candidates were unable to set the margins correctly.

(d) Satisfactorily done. Some candidates did not type the text in capital letters as was required.

(e) Well done. Some candidates inserted the title in two lines and did not use the Arial font.

(f) Poorly done. Many candidates inserted the file in the wrong position. While some inserted the file in the correct paragraph, but the table was broken up.

(g) Satisfactory done. Many candidates did not insert the data in the correct row.

(h) Poorly done. Many candidates did not right-align the table. Some candidates removed all the borders or did not remove any border at all.

(i) Well done. However, some candidates did not type in the data accurately.

(j) Well done. In many cases the title was affected by the columns.

(k) Poorly done. Many candidates did not attempt this question.

(l) Poorly done. Many candidates did not use the spell checker feature.

(m) Poorly done. Many candidates did not use the find and replace edit feature.

(n) Well done. Some candidates typed the word at the bottom of the page or use footnotes rather than using footer.

(o) Well done. Some candidates typed the page number instead of using the automatic page numbering feature.

(p) Well done by the majority of candidates.

Question 2 – Database Management

(a) Poorly done. The majority of the candidates used the spacebar rather than tabs for correct alignment. Many candidates did not insert the line.

(b) Well done by the majority of candidates.

(c) Satisfactorily done. Most candidates used the correct merge fields but some inserted additional fields or inserted the fields in the wrong position.

(d) Satisfactorily done. Some candidates inserted the data rather using the mail merge feature.

(e) Well done by the majority of candidates.

Question 3 – Spreadsheet

(a) Well done. Some candidates did not move the data to begin in cell A6.

(b) Well answered by the majority of candidates.

(c) Generally well done by the majority of candidates.

(d) Well done. Some candidates had errors in the data.

(e) Well done by the majority of candidates.

(f) Well done. Some candidates had spelling errors.

(g) Satisfactorily done. Many candidates did not use the merge and centre feature.

(h) Satisfactorily done. Many candidates used the wrong data range.

(i) Poorly done. Many candidates could not use the percentages format.

(j) Satisfactorily done. Many candidates had difficulties in formatting the data to percentage style.

(k) Well done by the majority of candidates.

(l) Generally well done by most of the candidates.

(m) Satisfactorily done. Many candidates did not enter the correct data in the correct location.

(n) Poorly done. Many candidates did not compute all the required functions.

(o) Poorly done. Many candidates did not insert the border in the correct range.

(p) Poorly done. Many candidates sort on only one field rather than on the whole data range. Some candidates used the wrong sort.

(q) Poorly done. Many candidates did not attempt this question.

(r) Poorly done. Many candidates did not select the correct data range.

(s) Well done.

Question 4 – Database Management

(a) Generally well done by the majority of candidates.

(b) Generally well done by the majority of candidates.

(c) Satisfactorily done. Some candidates had problems in modifying the Risk field. Many candidates had the Risk field named “Y” instead of “Risk”.

(d) Generally well done by the majority of candidates. Some candidates deleted a field instead of the particular record. Some candidates deleted more than one record.

(e) Generally well done by most of the candidates.

(f) (i) Well done. Some candidate printed the risk field only, instead of the requested fields.

(ii) Well done by the majority of candidates. Some candidates used the wrong criteria such as <5, <=5, =5 and >=5 instead of >5.

(iii) Satisfactorily done. Some candidates had difficulties with adjusting the date format.

(iv) Poorly done. The majority of the candidates could not use the required function and as such, grouped more than the single field required. Some candidates used the count function instead of the function to sum.

(v) Poorly done. The majority of the candidates could not use the maximum function.

(vi) Poorly done. The majority of the candidates could not use the average function.

(vii) Poorly done by most of the candidates. Many candidates were unable to create the calculated field or to assign an appropriate label for the calculated field column.

(g) (i) Generally well done by the candidates who attempted this question. However, many candidates had difficulties with inserting the required title of the report, linking the tables required for the report and sorting the data in the report.

(ii) Poorly done by the majority of candidates. Many candidates had difficulties creating a report based on a query. Most of the candidates who used a query did not use the given criteria and hence had incorrect data in their reports.

Paper 02/2 – Technical Proficiency

This paper is the alternative to paper 2 and consisted of four questions testing word processing, spreadsheet database management and integration among the three.

For spreadsheet, candidates had difficulties with absolute addressing labelling the axes in the chart, sorting and formatting.

For database management, candidates had difficulties with linking tables, inserting calculated fields and summarizing statistics in queries.

For word processing, candidates had difficulties with setting tabs, line spacing, using search and replace functions and using a database table as the data source to perform the merge.

Question 1 – Word Processing

(a) Well done by the majority of candidates.

(b) Satisfactorily done. Many candidates were unable to set the correct margins and instead used the default margins.

(c) Well done by the majority of candidates.

(d) Well done by the majority of candidates.

(e) Satisfactorily done. Some candidates did not use the arial font style.

(f) Poorly done. Many candidates inserted the file in the wrong location, while others were not able to insert it at all.

(g) Poorly done. Many candidates had difficulty in inserting the row in the correct position.

(h) Poorly done. Many candidates were unable to remove the borders from the table.

(i) Satisfactorily done. The majority of candidates inserted the text in the wrong position.

(j) Well done by the majority of candidates. Some candidates were unable to perform correct column break.

(k) Satisfactorily done. Many candidates set 1.5 line spacing for the entire column instead of the required paragraph.

(l) Satisfactorily done. Many candidates inserted the footer in the wrong position.

(m) Poorly done. Many candidates did not use the search and replace feature.

(n) Satisfactorily done. Majority of the candidates inserted the page number in the wrong position.

(o) Well done by the majority of candidates.

(p) Well done.

Question 2 – Word Processing

(a) Poorly done. Majority of the candidates did not set the tabs correctly.

(b) Well done by the majority of candidates.

(c) Poorly done. Majority of the candidates were unable to insert merge fields.

(d) Poorly done. Majority of the candidates could not perform the merge because of the problem in part (c).

(e) Poorly done. Majority of the candidates typed the individual letters instead of performing the mail merge.

Question 3 – Spreadsheet

(a) Well done. Candidates retrieved the correct file.

(b) Well done. Some candidates used only the last 4-digits of their candidate numbers rather than their full candidate numbers.

(c) Satisfactorily done. Some candidate did not use the date function.

(d) Generally well done by most of the candidates.

(e) Generally well done by most of the candidates.

(f) Satisfactorily done. Many candidates did not use the merge and centre feature.

(g) Generally well done by most of the candidates.

(h) Generally well done by most of the candidates.

(i) Poorly done. Many candidates had difficulties in using absolute addressing.

(j) Poorly done. Many candidates did not format the cells to percentage.

(k) Generally well done by most of the candidates.

(l) Generally well done by most of the candidates.

(m) Satisfactorily done. Many candidates did not ensure that the given text was entered correctly.

(n) Generally well done by most of the candidates.

(o) Satisfactorily done. Many candidates did not sort the data correctly.

(p) Poorly done. Many candidates did not attempt this question.

(q) Generally well done. Some candidates did not insert the appropriate title.

(r) Well done.

Question 4 – Database Management

(a) Generally well done by the majority of candidates.

(b) Generally well done by the majority of candidates.

(c) Satisfactorily done. Some candidates removed only fields instead of the entire record, while other deleted more than the required records.

(d) Well done by the majority of candidates.

(e) Well done by the majority of candidates.

(f) (i) Satisfactorily done. Some candidates were unable to specify the criteria conditions.

(ii) Well done by the majority of candidates.

(iii) Satisfactorily done. Some candidates used too many fields to perform the calculation.

(iv) Poorly done. Many candidates used the average instead of the minimum summarizing statistics.

(v) Poorly done. The majority of the candidates did not attempt this question.

(g) (i) Well done by the majority of candidates. Some candidates did not join the required tables and showed lack of creativity in providing a suitable title.

(ii) Well done by the majority of candidates.

Paper 02 - General Proficiency

This paper consisted of two sections. Section 1 consists of four questions on Information Processing of which candidates are required to do question 1 and any two other questions. Section 2 consists of four questions on Programming of which candidates are required to do question 5 and any two other questions.

The mean score for this paper was 60.04 out of 150. The range of marks obtained by the candidates was 0 - 143.

Question 1

(a) Poorly done. Many candidates did not recognize the diagram as the data processing cycle.

(b) (i) Satisfactorily done. Some candidates, however, provided the business definition of a transaction.

(ii) Poorly done. Many candidates were unable to recognize which keys were to be deleted or inserted.

(iii) Poorly done. Many candidates failed to recognize that the transaction file would have remained the same after processing.

(iv) Well done by the majority of candidates.

(v) Poorly done. Some candidates used 'stored' instead of 'not sorted'.

(vi) Poorly done. Many candidates displayed a lack of understanding of the file generation concept.

(c) (i) Poorly done. Most candidates interpreted the question as asking about the actual physical collection of data instead of the ways in which data is collected.

(ii) Poorly done. The majority of candidates thought it was for back-up purposes.

(iii) Satisfactorily done. Many candidates stated the various checks but did not provide the description.

(iv) Poorly done. Most candidates said it was magnetic ink character recognition (MICR).

(v) Well done by most of the candidates.

Question 2

(a) (i) Well done. Some candidates interpreted the advisory number as a code for a particular hurricane rather than a specific advisory.

(ii) Poorly done. The majority of candidates interpreted the exclamation point as urgency code rather than end of code or end of data marker.

(iii) Well done by most candidates.

(iv) Well done. Most candidates indicated the sender's initials but did not correct the errors in the date and sequence number.

(v) Satisfactorily done. Most candidates gave additions/changes to the format of the code rather than rules on the format given.

(vi) Satisfactorily done. Some candidates stated interactive rather than on-line method of receiving the data and did not realize that no reply would have been necessary from the hurricane centre.

(vii) Poorly done. Most candidates provided incorrect reasons.

(b) (i) Poorly done. Most candidates were unable to properly explain the difference between serial and sequential order.

(ii) Well done by most candidates.

(iii) Satisfactorily done. Some candidates inserted the key at the beginning of the serial list rather than at the end of the list.

(iv) Poorly done. Most candidates provided the speed of access for each list (list 1 then list 2) rather than compared the access speed of the lists together.

(v) Poorly done. Most candidates gave the speed of access for EACH list rather than considering the two lists together.

Question 3

(a) Poorly done. Many candidates provided written explanations instead of a diagram to illustrate the difference.

(b) Well done by most candidates.

(c) (i) Poorly done. Most candidates gave separate phases for each of the three statements.

(ii) Satisfactorily done. Some candidates confused testing strategies with methods of implementation.

(iii) Well done by the majority of candidates.

(iv) Well done by most of the candidates.

(v) Poorly done. Most candidates did not realize that both systems could be time consuming and costly.

(vi) Well done by most of the candidates.

Question 4

(a) Poorly done. Many candidates omitted this part of the question. Those who attempted it, presented their results in the form of a trace table. Little attention was paid to the fact that results should have been presented for each line of the program.

(b) (i) Well done by the majority of the candidates.

(ii) Poorly done. Most candidates converted the binary to its decimal value, without recognizing that a two's complement representation was required.

(c) Satisfactorily done. Most candidates were able to convert 19 to binary but were unable to accurately complete the solution.

(d) (i) Poorly done. The majority of candidates had difficulties with floating point representation.

(ii) Poorly done. Most of the candidates incorrectly referred to the table immediately below the question to form solutions.

(e) (i) Poorly done. Many candidates were not familiar with the formula.

(ii) Satisfactorily done. Most candidates were able to recognize that eight (8) different operation codes were possible.

Question 5

(a) Satisfactorily done. Many candidates gave a variety of responses which included assembly language and pseudocode.

(b) Well done by most of the candidates.

(c) Poorly done. Most candidates were unable to assign a value to a variable.

(d) Well done by most of the candidates.

(e) (i) Well done by most of the candidates.

(ii) Poorly done. Candidates used numerical values instead of the actual constant.

(iii) Satisfactorily done. Some candidates failed to recognize that the glass was a semi-circle and instead used the formula for circle.

(iv) Well done by most of the candidates.

(v) Satisfactorily done. Some candidates used the incorrect formula.

(vi) Well done by most of the candidates.

(f) Well done by most of the candidates.

(g) Satisfactorily done. Some candidates calculated labour cost but forgot to add it to total cost.

(h) Well done. Some candidates simply rewrote the print statement given in the question.

(i) Well done by most of the candidates.

(j) Well done by most of the candidates.

(k) Poorly done. Many candidates declared constants that were not used in their programs.

(l) Poorly done. Candidates did not declare variables which were used in their programs.

Question 6

(a) (i) Well done by most of the candidates.

(ii) Poorly done. Most candidates assumed that the salaries were already stored in variables.

(iii) Poorly done. Candidates were unable to calculate and print total salary.

(b) Poorly done. Most candidates did not attempt this question. Many candidates rewrote the code by inputting the value 1275.

Question 7

(a) (i) Poorly done. Many candidates did not recognize that the variable name “s” was not meaningful.

(ii) Well done. Some candidates used the multiplication sign “x” instead of asterisk (*).

(iii) Well done. Some candidates interpreted the result as cost, others as price.

(b) (i) Well done by most of the candidates.

(ii) Well done by most of the candidates.

(iii) Poorly done. Most candidates were unable to correctly define ‘program documentation’.

(c) (i) Poorly done. The majority of candidates identified a single flaw and a single line number, but failed to provide the correct code.

(ii) Poorly done. Most candidates provided inaccurate trace tables.

(iii) Poorly done. Most candidates provided inaccurate results.

Question 8

(a) (i) Well done by the majority of candidates.

(ii) Well done by the majority of candidates

(iii) Satisfactorily done. An appropriate programming language was not used. Most candidates gave pseudocodes rather than proper syntax.

(b) (i) Satisfactorily done. Most candidates provided only a single variable for life expectancy.

(ii) Well done by most of the candidates.

(iii) Well done by most of the candidates.

(iv) Well done by most of the candidates.

(v) Well done. Read statement was properly used.

(vi) Well done. Most candidates were able to use the condition statement properly and were also able to set up the calculations properly.

(vii) Well done. Print statement was properly used.

(c) Poorly done. Most candidates did not attempt this part.

School-Based Assessment

The format of the SBA changed significantly this year. For the first time, teachers were required to produce an IT SBA description and the associated mark scheme. The descriptions that were produced, in most cases complied with the CXC guidelines given in terms of length and complexity.

Although some teachers used past SBAs, others were able to produce some very interesting scenarios that showed evidence of time spent in thought and development. This is worthy of commendation. Many SBAs were created SBAs based on current events in their countries. Special mention must be made of the teachers in Grenada, where some of the topics dealt with the effects of Hurricane Ivan in 2004. Also notable were the SBAs from Guyana which dealt with the health issues arising from the flooding in Guyana in 2004.

It is highly recommended that teachers actually mark each sample as though they are returning it to the candidate. In doing so, the moderators are able to see how the teacher marked and what the teacher was looking for. This is very useful in the moderation process.

Project Description and Mark Scheme

Teachers should NOT include the official name/trademark of CXC as part of the assignment.

While assignments prepared by teachers, were carefully thought out, planned and presented, the development of accompanying Mark Schemes showed some deficiencies. The following are worthy of note:

1. Some did not comply with the model presented in the guidelines. The marks awarded for specific areas exceeded the respective allocations. As a consequence, the weightings for the respective sections of the spreadsheet were compromised. It is to be noted also that the total allocation specified for each component of the SBA is twenty (20) marks. Some teachers did not adhere to this guideline.

2. A large number of descriptions and mark schemes were not submitted and as a result some candidates were disadvantaged.

3. Some teachers did not present a detailed breakdown of how the marks were awarded for the various subsections of the project. That is, they may have awarded, for example, 4 marks for formatting, but failed to say what specific formatting issues were being assessed or under what conditions a candidate would lose some or all of these marks.

Mail Merge

When testing the mail merge, the project must be sufficiently substantive to allow for the insertion of a reasonable number of merge fields. Teachers should also encourage candidates to submit:

- the data source in the word processing component of the SBA, even if it was created in spreadsheet or database software.
- the primary document showing the genuine merge fields, must be submitted once a mail-merge question is done.

Packaging

Teachers should ensure that all marks awarded are substantiated with an appropriate printout. Each printout should be clearly labelled indicating what it represents. While it is intended that the SBA be an integrated project, each section (Word Processing, Spreadsheet, Database solutions) should be clearly delineated and labelled.

Diskettes

All submissions should be printed. It is noted that the moderation process is performed on printed documents; hence no diskettes/CDs are required. Candidates should ensure that the appropriate documents are printed.

Word Processing

WP1: Headers, Footers, Footnotes, Endnotes
Headers and footers were well done. There was an increase in the number of samples which showed footnotes and endnotes, and in these samples the topics were well done.

WP4: Columns

This area was well done, especially for the samples in which brochures and flyers were done. There was a small number of samples in which columns were not executed at all.

WP6: Document Formatting Features

This area was well done by the majority of the samples submitted.

WP8: Mail Merge Facility

This section was well done by the majority of the samples submitted. Prints of the data source, and the primary document (i.e. Document clearly showing the merge field) were missing.

WP 10: Importing Files

Generally, the importation of files among applications was well done. Candidates demonstrated a high proficiency in manipulating charts and tables within a document.

WP12: Overall Presentation of SBA Sub-sections

This was well done for a high percentage of the samples submitted. However, in the majority, some samples needed better organization of each sub-section.

Spreadsheet

Generally, candidates exhibited a high level of proficiency in most of the spreadsheet skills that were tested. The use of advanced system functions such as VLOOKUP(), COUNTIF(), COUNT() and IF() are worthy of note. Candidates generally were able to use and link several worksheets in the problem solution. Some candidates were also able to use a variety of formatting skills efficiently to enhance the solution.

The creation of charts was another area where candidates demonstrated a high level of proficiency. Candidates were able to create the charts specified in the various assignments and label them appropriately.

Further, candidates were able to transfer data among applications efficiently. That is, objective SS14 was very well done by most candidates.

However, there were still some common areas of concern. The following should be noted:

1. System Functions: The SUM and AVERAGE functions were common system functions used. In many instances, these functions were used inappropriately. Candidates prefaced simple arithmetic formulae with SUM and AVERAGE. Some common examples of this were

   (i) = Sum(A1/B5)

   (ii) = Sum(A1 + A2 + A2)

   (iii) = Average(A1*A5)

   Each of these examples demonstrates the use of an expression as the parameter for the system functions rather than a data range and constitutes inappropriate usage.

2. Formula: The creation of suitable and relevant formulae was generally well done. However, there were still some candidates who were unable to use absolute and relative addressing appropriately and efficiently. Some candidates used numbers in their calculations rather than cell referencing. Some used relative addressing where absolute addressing would have been appropriate. Teachers need to address this area carefully.

   The printing of formula sheets continues to be a major problem. In a large number of instances these were not printed. Candidates should ensure that they:

   (a) Print the formula sheets directly from the spreadsheet software application package rather than copying it to a word processing package.

   (b) Always include column and row headings when printing spreadsheets in order to improve readability and for verification of cell references.

   (c) Include gridlines/borders in the printout.

   (d) AVOID EXCESSIVE PRINTING OF FORMULA SHEETS. It is not necessary to reprint formula sheets if only changes in the data have occurred. Further printouts of formula sheets are only necessary if they demonstrate changes in formulae.

3. While most candidates demonstrated a high level of proficiency in charting operations, others cut and pasted graphs from excel into word, instead of copying and pasting. Hence, no evidence of the chart(s) appeared in the Spreadsheet solution.

4. Teachers should avoid or minimize the testing of areas of the syllabus that cannot be easily verified by printouts or have a heavy subjective component. Examples include SS3, SS4, copying and pasting (SS5), and SS6. Where these objectives are used in the mark scheme, clear descriptions of how marks are awarded must be submitted for moderation.

5. SBAs are generally moderated using the printouts submitted by candidates. Hence, diskettes or CDs are not required and should not be included with the SBA submissions.

6. When sorting on primary and secondary fields, the data should contain sufficient and appropriate data (e.g. duplicates in the primary field) to clearly demonstrate that sorting has occurred on both key fields.

7. Printouts should be clearly labelled indicating the task being completed in the worksheet, particularly where changes in data - insertions/deletions of rows/columns, changes in fixed data or constants, have occurred.

8. If the SBA is submitted as one package, clearly indicate where each application solution begins and ends. The tasks within each application should also be clearly delineated.

9. Teachers should make an effort to have data in a spreadsheet fit one sheet.

10. Adding rows/columns to the end of an existing table does not constitute an insertion. Candidates do not get credit for this operation under objective SS7.

11. A major weakness seen by most candidates was the use of complex criterion reference. To be awarded marks in this area, candidates must show evidence of the criteria as well as the output range. Both ranges must be visible in the printouts.

Database Management

The quality of the SBAs submitted has improved when compared with those from 2004. The majority of schools used the Microsoft Office suite for their productivity tools. From the quality of work submitted, it was evident that teachers had a good working knowledge of the SBA guidelines and many ensured that their project outlines and marking criteria satisfied the requirements outlined in the guidelines. However, the following were observed with respect to the database submissions.

1. Many samples did not include a detailed project description along with their samples, the absence of which makes it difficult to verify the correctness of the database tables, queries and reports based on the instructions given to candidates.

2. Many samples did not include a mark scheme to delimit the marking criteria used by teachers in arriving at the mark given to the sample.

3. Some samples, whilst including a mark scheme

   (a) did not subdivide the mark scheme based on the guidelines given by CXC

   (b) awarded marks which totalled more than 20 marks

   (c) did not suitably weight the marking scheme based on the skills tested; for example, in some instances as much as 8 marks were awarded for the creation of tables, whereas 2 marks were awarded for report building.

4. Some samples did not include the table structures to verify the use of primary keys, field data types and relationships between tables. Often, database reports were used to verify the use of relationships between tables.

5. Some samples, whilst including the table structures, printed too much information in the use of the Microsoft Access documenter feature. Teachers must ensure that candidates are shown how to use this tool to minimize the production of unnecessary output from all structures used in creating the database.

Generally, there were many instances where there was insufficient evidence provided on the printouts of samples submitted, to verify the marks awarded by teachers. Teachers must ensure that they adhere to the guidelines provided by CXC outlining the process of preparing and submitting SBAs.

Candidate Performance
Overall, candidate performance was quite good.

Tables
From the moderation, candidates demonstrated their ability to create tables with a high degree of competence. Many also demonstrated their ability to import data from their spreadsheets to be manipulated as a database tables. Candidates demonstrated their recognition of appropriate field types and their ability to add and delete records and fields from their databases.

In most samples, relationships were used between tables to generate queries and reports. In some instances however, candidates did not identify and use primary keys in their tables to further support the table relationships created.

Queries
Most queries were done fairly well. Some candidates had difficulty in performing calculating queries. There were however, some projects in which most of the queries were very simple. Some projects did not test the ability to create calculating or summary queries; whereas some teachers created questions which could not be answered by the candidates, based on the problem description given. This highlights the need for teachers to ensure that queries and reports which are set for their SBAs, are answerable based on the data to be used in the tables. Also, questions which are set should be directly testing specific objectives in the syllabus for CXC CSEC Information Technology Technical proficiency. An example is where candidates are requested to create forms as a part of their database SBAs. While this is a desirable skill, it is not an objective on the syllabus and hence should not be awarded marks on the marking criteria of the SBA.

Reports
Candidates' reports were generally well done. In some instances, SBAs only called for very simple reports without the use of search criteria, grouping or summary calculations. Some samples have clearly shown that some teachers have not made use of the CXC guidelines for creating the problem for their SBAs. However, in many instances, projects suitably tested the creation of reports with an adequate level of difficulty for the CSEC level.

INFORMATION TECHNOLOGY
JANUARY 2006

GENERAL COMMENTS

In January 2006, 400 candidates from the participating territories entered for the Information Technology examination. This represents an increase of 11 percent in registration for the Information Technology examination when compared with January 2005 (359).

DETAILED COMMENTS

Technical Proficiency

Paper 01 – Structured Essay

This paper consisted of three sections. Sections I and II consisted of twelve compulsory short-answer questions. Section III is the Programming section and consisted of five questions. The mean score was 37.09 out of 90. The range of marks obtained was 9 - 79

Programming continues to be an area of weakness in Paper 1. Most candidates were not well-prepared to handle the questions in the programming section and seem unfamiliar with basic programming concepts.

SECTION 1

Question 1

(a) This question was well done by the majority of candidates. A few candidates identified figure 3 as power button, magnetic tape or hard disk and figure 4 as hard disk or speakers

(b)(i) This was well done by the majority of candidates.

(ii) The majority of candidates correctly selected figures 2 and 4. Some candidates selected diskette and CD/DVD – ROM as peripherals.

(iii) The majority of candidates selected figure 2 or figure 4 rather than both.

Question 2

(a) Many candidates did not show the conversion of 10 to binary but did the bit inversion and added 1 step correctly.

(b) Many candidates did not show the complete calculations when adding the two binary numbers provided.

(c) This was well done by the majority of candidates.

Question 3

(a) The majority of candidates did not identify the use of the mouse button for the pop-up and pull-down menus. Many candidates simply gave examples of menu items and stated what to click.

(b) This question was poorly done by the majority of candidates who provided vague answers such as "top of the screen" and "lower left hand corner of the screen" as the locations for the menus.

Question 4

(a) The majority of candidates provided the correct number of directories but not the reasons.

(b) This was well done by the majority of candidates. Some candidates state only the file extensions and not the complete names of the files.

(c) This was poorly done. The majority of candidates confused copying with moving.

Question 5

(a) This was satisfactorily done. Some candidates give the correct answer but not the explanation while others confused the definition of simplex with that of half-duplex and full-duplex.

(b) This was satisfactorily done. Sending a fax and using a beeper are examples of simplex communication because in both the fax and beeper communication, the data flow in one direction.

SECTION II

Question 6

(a) This was well done by the majority of candidates.

(b) This was also well done by the majority of candidates

(c) This was well done by the majority of candidates.

Question 7

(a) This question was poorly done. Most of the candidates were able to state what the term "WWW" represents but had difficulty in stating what the terms "FTP" and "IRC" represent.

(b) This was poorly done. The majority of candidates could not clearly express the difference between a website and a webpage. A Webpage is a single visual representation of information on items relating to a specific theme. A Website is a collection of webpages linked together to provide information on entire institutions, organizations and themes.

(c) This was well done by the majority of candidates.

Question 8

(a) This was poorly done. Most candidates were unable to provide the appropriate association of the items in table 1 with those of table 2.

(b) This was also poorly done. Many candidates provided examples of multi-tasking and multi-user instead of stating the required conditions.

Question 9

(a) This question was well done by the majority of candidates.

(b) This was well done by the majority of candidates.

Question 10

(a) This was well done by the majority of candidates.

(b) This part was also well done by the majority of candidates.

Question 11

(a) This question was poorly done. Most candidates could not describe the roles of the System Analyst and the Network Manager. A possible solution given shows:

System Analyst – Studies the system, proposes changes and assists in the implantation of changes

Network Manager – Organizes and oversees the installation of machines and peripherals that are part of the network.

(b) Well done by the majority of candidates.

Question 12

(a) This was poorly done. Many candidates mentioned the used of the telephone only.

(b) This was well done by the majority of candidates.

Question 13

(a) This question was poorly done. The majority of candidates could not provide one advantage and one disadvantage of high level and low level languages.

(b) This was poorly done. The majority of candidates could not provide the names of the programming languages.

Question 14

(a) This was poorly done. The majority of candidates could not identify the Input, Processing and Output statements.

(b) This was poorly done. Most candidates could not complete the trace table to determine the output.

Question 15

This was poorly done. The majority of candidates were not familiar with the terms. Suggested answers are given below:

(a) Object code – Code in machine language after it has been converted from source code.

(b) Executing – running the program to see its results.

(c) Test Data – data used to check if the program is working correctly.

(d) Syntax Error – mistakes in the programming language, for example, mis-spelt words

Question 16

This was well done by the majority of candidates. Some candidates had difficulty in assigning a value to a variable.

Question 17

This was poorly done by the majority of candidates. Suggested answers are given below:

(a) Logical operation compares values. eg. a < b

(b) Arithmetic operation performs addition, subtraction, division or multiplication, for example, a + b

(c) Conditional statement is used to execute certain statements if a condition is true, otherwise branch to execute other statements, OR IF-THEN-ELSE, for example, If x = 4 then write x else x = x + 1.

(d) A loop repeats statements until a certain condition is true, for example, Repeat x = x + 1 until x = 4.

Paper 02 – Word Processing, Spreadsheet and Database Management

This paper consisted of three questions testing Word Processing, Spreadsheet and Database Management.

Question 1 – Spreadsheet

This question was satisfactorily done. Most of the candidates did not attempt the part of the question testing the filtering the data to satisfy given criteria. Many candidates also had difficulty with the use of absolute addressing and formatting data to percentages with one decimal place. Many candidates did not provide their formula sheets and were also unable to format their worksheet to fit on one page.

Question 2 – Database Management

This question was poorly done. The majority of candidates had difficulty with querying the database and joining tables. Many candidates could not sort the records in the database on two fields. A few of the candidates attempted the report but did not use the correct fields and were unable to insert the footer. Many candidates did not name their files as required and printed out numerous unwanted pages.

Question 3 – Word Processing

This question was satisfactorily done. The majority of candidates were able to perform the required word processing tasks. The insertion of the pie chart into a word processing document was satisfactorily done. Mail merge was attempted by a few candidates. Of these, many did not insert the correct fields and some inserted the fields in the wrong position. The merging of the primary document with the data source was done successfully by those candidates who attempted this part of the question.

Paper 03/2 – Alternative to SBA

This paper consisted of three questions testing Word Processing, Spreadsheet and Database Management.

Question 1. Word Processing

This question was poorly done. Many candidates could not provide clear explanations of how the required word processing tasks were done. Many candidates could not indicate the text in the memo which should be replaced by merge fields and the number of merge fields to use.

Question 2. Spreadsheet

This question was satisfactorily done. Some candidates had difficulty in explaining the purpose of the chart provided; constructing the spreadsheet that was used to draw the chart and sketching another set of sales data on the chart provided.

Question 3. Database Management

This question was poorly done. Many candidates had difficulties with querying the database. Most candidates wrote the results of the queries instead of the syntax of the queries. The majority of candidates were able to identify the various fields of the report.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

HEADQUARTERS

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

MAY/JUNE 2007

INFORMATION TECHNOLOGY

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INFORMATION TECHNOLOGY

MAY/JUNE 2007

GENERAL COMMENTS

In June 2007, 24 755 candidates from the participating territories entered for the Information Technology examination; 980 entered for General Proficiency and 23 775 for Technical Proficiency. The final number sitting the examination was 20 653, with 856 writing the General Proficiency and 19 797 writing the Technical Proficiency. In 2006, 19 718 wrote the examination hence there was a 4.7 percent increase in the number of candidates writing the Information Technology examination in 2007.

DETAILED COMMENTS

PAPER 01 – THEORY

This paper consisted of four sections. Sections I and II consist of ten compulsory short-answer questions, testing the theory profile and are to be done by both the Technical and General Proficiency candidates. Section III tests competency in Programming and is to be done by Technical Proficiency candidates. Section IV focuses on competency in Productivity Tools and is to be done by General Proficiency candidates.

The mean scores on the Theory profile for the General and Technical Proficiencies were 47.72 out of 90 (approximately 53 percent) and 34.47 out of 90 (approximately 38 percent), respectively. Marks ranged from 1 – 79 for the General Proficiency candidate and 0 - 81 for the Technical Proficiency candidate.

In Section III, programming continues to challenge candidates. Most candidates were not well prepared to handle basic concepts in Programming.

SECTION I

Question 1

This question tested candidates' competency as it relates to the identification, categorization and use of input, output and storage devices.

There were nine objects and the majority of candidates correctly identified and categorized five of these. Objects 4, 5, 8, and 9 challenged candidates. In particular object 5 (USB Flash Drive) was referred to by colloquial names such as Tom drive, Tongue drive, joint stick and USB.

The majority of candidates were unable to identify a specific use for icon 4 in Information Technology. Uses include back-up and archiving.

Question 2

This question tested candidates' ability to identify and categorize printers and to state their uses.

The majority of candidates were able to identify printer 2 by name and to state its use. Many candidates were unable to identify printer 1 (Plotter).

Many candidates identified a printer that was noisy and were able to explain its purpose.

Many candidates seemed unfamiliar with the thermal printer and confused it with the laser printer. In addition, some candidates described the printing mechanism rather that the use of the printer.

Question 3

This question tested candidates' ability to distinguish between the types of user interfaces.

The majority of candidates were able to identify the interfaces but did not use the correct terminology such as graphical user interface and command line interface.

Most candidates were able to describe one advantage and one disadvantage of interface 1 (graphical user interface) but could not do the same for interface 2 (command line interface).

The majority of candidates were able to identify the interface where a mouse is used.

Question 4

This question tested candidates' ability to identify files and folders in a directory structure.

This question was poorly done by the majority of candidates who could not distinguish between a file and a folder in a directory structure. In addition, the majority of candidates were unable to write the path of a file in the directory structure.

Question 5

This question tested candidates' ability to identify and take corrective actions to solve problems when using a diskette.

This question was well done by the majority of candidates who were able to identify the errors and provided corrective measures. Some candidates confused the reason for the errors with the corrective measures.

SECTION II

Question 6

This question tested candidates' ability to describe IT applications used in the areas of finance, education, entertainment and communication.

This question was well done by the majority of candidates who were able to correctly identify the relevant IT applications.

Question 7

This question tested candidates' ability to identify and explain concepts associated with the Internet.

The majority of candidates were able to explain the meanings of the Internet terms and to state their uses.

Question 8

This question tested candidates' ability to identify tasks and qualifications of personnel in a computer-related environment.

The majority of candidates were able to identify the tasks and qualifications of a computer system consultant and an end-user support provider. Some candidates did not know what the term "qualification" meant.

Question 9

This question tested candidates' ability to describe the concepts of teleconferencing and videoconferencing.

This question was well done by the majority of candidates; although, some candidates could not provide the correct equipment needed for teleconferencing and video conferencing.

Question 10

This question tested candidates' ability to identify computer crimes.

This question was not well done by the majority of candidates. There was the tendency to simply describe the crimes rather than state whether the crime occurred in the given scenario.

SECTION III – PROGRAMMING

Question 11

This question tested candidates' ability to identify different generations of programming languages.

This question was not well done. Many candidates did not identify the generation of the programming language but instead stated the programming languages used in the diagrams.

Many candidates could not provide one advantage and one disadvantage of each generation. Some candidates seemed to be familiar with only the third generation of programming languages.

Question 12

This question tested candidates' ability to identify programming statements.

The majority of candidates were able to correctly identify Input and Process statements but could not identify the single Output statement.

Question 13

This question tested candidates' knowledge of variables and data types.

The majority of candidates were able to identify the variables but were unable to indicate the correct data types for the variables. Many candidates were also able to compute the value of the variable, Total.

Question 14

This question tested candidates' ability to trace a segment of programming codes.

This question was not done well. The majority of candidates could not trace through the segment of programming code correctly. Many candidates copied the program code but did not state the output.

SECTION IV

Question 15

This question tested candidates' knowledge of basic features of a word processing program.

This question was done satisfactorily by the majority of candidates. There were some areas however, in which candidates experienced difficulty. These included:

- Describing the difference between centre text and fully justified text;
- Describing the sequence of steps to get a task done.

Question 16

This question tested candidates' knowledge of basic features of a spreadsheet program.

This question was well done by the majority of candidates. Some candidates however, were unable to explain the use of absolute addressing.

Question 17

This question tested candidates' knowledge of basic features of a database management program.

The question was satisfactorily done by the majority of candidates. There were some areas, however, in which candidates experienced difficulty. These included:

- Creating the structure of the table with appropriate field names, type and size;
- Providing an example of a record;
- Printing the output of a query.

PAPER 02 & 02/2 – TECHNICAL PROFICIENCY

Paper 02 consisted of three questions testing the profiles Word Processing, Spreadsheet and Database Management.

Paper 02/2 is the alternative to paper 02 and tests the same three profiles namely, Word Processing, Spreadsheet and Database Management.

The mean score for paper 02 was 91.78 out of 150 (approximately 61 percent). The range of marks obtained by the candidates was 0 – 150.

The mean score for paper 02/2 was 92.22 out of 150 (approximately 62 percent). The range of marks obtained by the candidates was 0 – 150.

Question 1 – Spreadsheet

This question tested candidates' ability to use various features of a spreadsheet program.

This question was well done by the majority of candidates. Some areas of difficulty were:

- Using absolute cell referencing in a formula
- Advanced filtering of data in a spreadsheet
- Sorting data (use of correct data range)
- Graphing (use of correct data range)
- Formatting:
    - Use of percentage with correct decimal places
    - Use of correct alignment
    - Use of correct font type and size
    - Use of merge and centre
    - Use of borders
- Use of date function
- Printing formula sheets
- Setting up page for printing

Question 2 – Database

This question tested candidates' ability to use various features of a database management program.

This question was satisfactorily done by the majority of candidates. Some areas of difficulty were:

- Tables
    - Use of appropriate data types
    - Deletion of whole record versus deletion of a field
- Queries
    - Use of calculated fields
    - Use of update queries
    - Linking tables
    - Use of logical operator

- Reports

  - Use of footer in the report
  - Grouping and sorting data in a report

Question 3

This question tested candidates' ability to use various features of a word processing program.

This question was well done by the majority of candidates. Some areas of difficulty were:

- Formatting features:

  - Setting the margins
  - Use of columns
  - Inserting page numbers
  - Location of headers and footers
  - Finding and replacing text

- Mail merge:

  - Insertion of merge fields
  - Printing of the required number of merge letters

PAPER 02 – GENERAL PROFICIENCY

This paper consisted of two sections. Section I consists of four questions on Information Processing of which candidates were required to do question 1 and any two other questions. Section II consists of four questions on Programming of which candidates were required to do question 5 and two other questions.

The mean score for this paper was 70.58 out of 150 (approximately 47 percent). The range of marks obtained by the candidates was 2 – 132.

For the optional questions (2, 3, 4, 6, 7 and 8), 81 percent of the candidates did question 2, 70 percent of the candidates did question 3, 48 percent did question 4, 50 percent of the candidates did question 6, 76 percent of the candidates did question 7 and 63 percent of the candidates did question 8.

Questions directly related to programming (4, 5, 6, 7 and 8) continue to be the greatest challenge to candidates. The mean scores for questions 4 – 8 were 8.7 out of 24 (approximately 36 percent); 17.1 out of 27 (approximately 63 percent); 10.7 out of 24 (approximately 45 percent); 8.2 out of 24 (approximately 34 percent) and 6.3 out of 24 (approximately 26 percent), respectively.

SECTION 1 – INFORMATION PROCESSING

Question 1

This question tested candidates' ability to:

- Differentiate between data and information;
- Identify data logging devices used in various situations;
- Describe the application of automatic information processing functions.

The majority of candidates were able to differentiate between data and information. However, some candidates had difficulty explaining how the given data were formatted.

The majority of candidates could not describe an appropriate application to automate the Information Processing functions and provided a description of the sensors.

Identification of data logging devices was poorly done by the majority of candidates. Candidates confused data logging with monitoring and control systems.

Question 2

This question tested candidates' ability to:

- Identify the stages of the system development life cycle;
- State the reasons for specific activities in the system development life cycle;
- Describe the responsibilities of IT personnel in the system development life cycle.

The question was well done. The majority of candidates were able to provide good reasons for specific activities in the system development life cycle; correctly identify the stages of the system development life cycle and describe the responsibilities of IT personnel.

Question 3

This question tested candidates' ability to:

- Draw a data flow diagram and a decision table, based on a given scenario;
- Identify the processing mode suitable for the given scenario;
- Represent data in standard form;
- Manipulate binary data.

The majority of candidates were able to create both the data flow diagram (DFD) and the decision table (DT) on the given scenario. Candidates were also able to identify and describe the type of processing mode suitable for the given scenario.

The majority of candidates were able to represent the given number in standard form. Some candidates incorrectly referred to the mantissa as the decimal portion of the number (.312). The manipulation of the binary data was well done by the majority of candidates.

Question 4

This question tested the candidates' ability to:

- Identify appropriate methods of data capture;
- Identify methods of data validation and verification;
- Trace through a program segment in assembly language;
- Explain the concept of program counters.

The majority of candidates were able to identify appropriate methods of data capture but had difficulty in interpreting the given data in terms of codes. Many candidates provided definitions of data validation and verification instead of providing specific data checks.

The majority of candidates were able to trace through the program segment but some candidates were unable to recognize that the value for AMT was constant throughout the program segment.

The term "program counter" was unfamiliar to the majority of candidates.

SECTION II – PROGRAMMING

Question 5

This question tested the candidates' ability to express an algorithm in code using a familiar programming language.

The majority of candidates were able to write a program based on the given algorithm. A variety of programming languages were used. This demonstrated adequate competency in the skill of translating an algorithm into code.

Question 6

This question tested candidates' ability to use a structured method such as a trace table to calculate the results of a set of values.

This question was not well done. The majority of candidates who attempted this question wrote programming codes instead of demonstrating how the values within variables changed during processing as the calculations were done.

Using trace tables to test the correctness of an algorithm is a significant part of the early stages of problem solving. The performance in this topic suggests that greater emphasis is needed in the area of problem identification and testing.

Question 7

This question tested the candidates' ability to:

- Use a trace table to determine the value of given variables;
- Identify and correct errors in a segment of program code;
- Use logical operators;
- Explain the terms associated with running a program.

The construction and use of a trace table to map out changes in the value of variables in a segment of program code challenged candidates. The majority of them could not compute the final values for "x" and "a".

Most candidates were able to identify and correct the errors in the segment of code provided. Some candidates were unable to represent the conditions correctly.

The majority of candidates seemed unfamiliar with interpretating and writing logical statements.

Most candidates were able to provide adequate definitions of the terms "interpreter" and "compiler".

Question 8

The question tested candidates' ability to:

- Draw a flowchart to represent an algorithm;
- Write a segment of programming code to represent the given algorithm.

This question was poorly done by the majority of candidates. Many candidates were unable to correctly draw the flow chart to represent the given algorithm. Moreover, many candidates did not use standard flow charting symbols and did not complete all of the tests given in the algorithm. Additionally many candidates were unable to code the algorithm.

The performance on this question is consistent with the observations noted in the previous questions (5, 6 and 7). It also validates the earlier point that there must be a greater focus on problem identification and testing.

SCHOOL-BASED ASSESSMENT (SBA)

Technical Proficiency

The Technical SBA component consists of a project prepared and marked by the teacher and consists of three practical assignments testing the application of word processing, spreadsheet and database management skills.

The mean score was 46.51 out of 60 (approximately 78 percent). The range of scores was 0 – 60.

GENERAL COMMENTS

Schools continue to submit samples with projects on different application areas. Many projects submitted had detailed and relevant project descriptions. Some projects also tested skills outside of CXC guidelines.

Samples were generally well presented. There were some however, that lacked organization, were not properly bond and did not clearly indicate where each application solution began and ended.

Samples presented continue to show improved candidates' knowledge of the content of the syllabus.

The submission of detailed marking schemes by teachers, adhering to CXC guidelines, continues to improve. This has lead to more consistent marking by the teachers.

Teachers must ensure the following:

- Diskettes and CDs are not required and should not be submitted. In addition marking should be done from the printed work and not from the diskette /CD.
- Moderation sheets must be included with samples and care must be taken when transcribing and transposing marks. Marks and names on moderation forms must be the same as those on the samples.
- Mark schemes submitted must adhere to CXC guidelines. In particular, specific criteria profiles and weighting must be adhered to.
- Fractional marks are not allowed.
- Detailed project description must be submitted at all times.

SPECIFIC COMMENTS

Word Processing

WP1: Headers, Footers, Footnotes and Endnotes

This was well done in most cases. It should be noted however, that some of the samples submitted used text and graphics that were not legible. In addition, in many samples, marks were assigned by teachers to work where the footer (for example, page number) was not automatically generated by the application but was a performed operation by the candidate.

WP2: Combine Documents

Samples indicate that this section was rarely tested; but marking schemes suggest that candidates had mastered this skill and were awarded full marks.

WP3: Block Operations

This section was rarely tested and few samples made reference to this section on the mark schemes submitted by the teachers.

WP4: Columns

This section was tested in a high percentage of samples presented. Most candidates demonstrated the ability to perform this skill accurately and effectively.

WP5: Tables

Most candidates exhibited the ability to create basic tables in a document. Candidates now need to concentrate on improving the quality of the tables by making use of borders and shading.

WP6: Document Formatting Features

Most candidates did this section very well. However, superscript and subscript features were rarely tested and in a few cases marks were allocated for the automated superscript generated when a date is written.

WP7: Search and Replace formatting

This section was rarely tested. The submission of a project description and marking scheme by the teacher would be useful in demonstrating that this mark was correctly assigned in the marks awarded to the candidates.

WP8: Mail Merge

The majority of candidates were tested in this area using various types of documents (flyers, brochures, envelopes, invitations).

The following were observed:

- Submission – Some candidates did not submit all of the required documents, namely the data source and the primary document.

- Merge – The main document and primary document, in some cases were being used interchangeably. There should be some clear distinction between the two. Some candidates used the greater than sign (>) and the lesser than sign (<) rather than including the actual merge field symbols in the document. Marks were not awarded for incorrect symbols by the moderator, but in many cases, these marks were awarded by the teacher. It should be noted that the **main** document is the **plain** document while the **primary** document is the document containing the **merge** fields.

- Printing – Some candidates printed too many copies of the secondary document (the completed merge document). The first, middle and last documents of the merge would be adequate to award the relevant marks for this section of the SBA.

WP9: Spell check

This section was poorly tested in the samples provided.

WP10: Importing files

This section was frequently tested in the samples submitted. Most candidates demonstrated the ability to execute this skill effectively. However, more attention must be placed on the sizing of the imported objects.

WP11: Page orientation/Margins

Many candidates demonstrated the ability to perform the landscape operation. In some cases marks were awarded by the teacher for portrait orientation, which is the default orientation. Marks should only be awarded for operations being performed by the candidates and not by the computer's default system.

WP12: Overall Presentation

There was an improvement in the samples presented this year. However, the samples should be securely bound and neatly packaged, with each section appropriately labelled.

WP13: Overall application to the Word Processing assignment

Most students demonstrated awareness of the existence of basic word processing features.

Recommendations

Teachers should place more attention on testing and recording features that can be clearly seen on the samples submitted; for example, tables, headers, columns and importing files. The mail merge feature of the syllabus should be taught in greater detail. ALL of the required documents must be printed and submitted consecutively so that marks awarded can be easily identified.

Spreadsheet

- The sum function was the most widely used function. However, in many instances it was not well utilized. Teachers are advised to guide students on the correct use of functions.
- There is a need to differentiate between a formula and a function.
- The majority of students demonstrated an appreciation for most of the spreadsheet features.
- Formulae sheets must be submitted. These should be printed directly from the spreadsheet software application package.
- Columns and rows should be highlighted to indicate insertions and deletions.
- Candidates demonstrated an understanding of most formatting features. In some instances, too many marks were allocated for formatting. Emphasis should be placed on merge and centre for headings.
- Primary fields were well sorted but irregularities occurred when sorting on secondary fields.
- The use of criteria referencing is a major weakness for most candidates. To be awarded marks in this area, candidates must show evidence of the criteria as well as the output range.
- Labelling of chart axes and the selection of non-adjacent ranges need to be emphasized. The creation of charts in projects is encouraged for spreadsheet operations.
- Emphasis must be placed on improving evidence of linking worksheets.
- Page numbering and sections within the spreadsheet should be clearly identified.
- Spreadsheets, especially formulae sheets should be legible.

Database Management

Tables

- Many schools created the required three tables with improvements in joining of tables.
- Some schools went beyond three tables.
- Some tables had too many fields and records.
- Proof of primary keys, relationships and indexing must be shown, that is, print design views of these objects.
- Where there are modifications of fields (such as deletions) proof must be shown, that is, before and after screen shots should be printed.
- Too many marks were allocated to some table development assessment criteria.

Queries

- Many schools created four queries which tested/assessed different skills such as updates, deletions, calculation and selection.
- Some schools had too many queries testing the same skills.
- Each query should be given a specific name.
- Printed evidence should be provided, with care taken to extend the property section, where, for example, calculations are to be assessed, print the design view of queries ensuring visibility of all field sections.

Reports

- Many schools showed a general improvement in reports.
- There was evidence of summary statistics and grouping, in most instances.
- Titles were appropriate for reports, in most instances.
- There were instances in which titles were too short, vague or altogether missing.
- Where columns are to be printed, landscape paper option should be selected or paper of an appropriate size used.

GENERAL PROFICIENCY

The General Proficiency SBA requires candidates to develop a computer solution to a meaningful problem using the knowledge and skills acquired in the Information Processing and Programming profiles.

The mean score was 41.98 out of 60 (approximately 70 percent). The range of scores was 4 – 60.

With the exception of a few cases, the projects submitted this year showed some improvement over the previous year. Samples were generally well organized in terms of their presentation.

Programming techniques continue to improve, expanding beyond the traditional programming languages into concepts where objects are manipulated. In some cases, however, candidates did not display a sufficient range of data structures.

Although the topics selected in this year's projects varied, they still clustered in the area of data storage and retrieval systems. In some cases, these were rather limited in scope. Candidates focused simply on the problem being solved and did not included other file management operations such as additions, deletions and sorting which would have given the project greater depth.

While there were some excellent projects submitted, there were still too many that were not substantive enough and were rather limited in scope. Teachers should ensure that the projects selected are manageable and meet the requirements specified in the syllabus.

SPECIFIC COMMENTS

Problem Definition

- Candidates were generally able to identify a problem but had difficulty expanding on the specifics of the problem. Hence, the description was generally not substantive. It should be noted that the syllabus requires a description of approximately 150 words.

- It is also important than candidates use the specification tools. In some cases where these were used, they did not comply with existing conventions.

- There were still some cases of candidates describing the system being designed rather than the problem they wish to solve.

Problem Solution

- There was a great disparity among the levels of candidates in this area. Some candidates demonstrated a high degree of proficiency in creating appropriate algorithms and flowcharts while many candidates were weak in this area.

- When flowcharts were done, they generally adhered to conventions. In some cases, candidates used the programming languages to represent the algorithms rather than pseudocode.

Working Program

- It is incumbent upon candidates to demonstrate clearly that the programs they have created work. A variety of test data should be used to show the full range of program actions. A sufficiently wide range of screen shots should also be included.

- In some cases, no program was submitted or there was no clear delineation between the problem solution and the working program.

User Documentation

- User documentation in most cases were either inadequate or incomplete. In a number of cases, it was limited to the installation of the program.

- It would be useful to include screen shots and other appropriate diagrams to enhance descriptions given.

Internal Documentation

- Most candidates were able to indent statements within the programs to make them easier to read. However, comments within the program were limited and data dictionaries explaining the use and purpose of the variables were noticeably absent, in most cases.

Presentation

- Candidates continue to satisfy the requirement for submitting projects. The majority of candidates submitted well presented projects.

Creativity

- Most candidates were able to use appropriate solutions to the defined problem. However, some information retrieval systems lacked scope and there was very little manipulation of the data shown.

Evaluation

- Candidates' evaluations of systems created were still rather superficial in nature. Candidates generally did not demonstrate a high degree of proficiency in identifying the strengths and weaknesses of the projects created. In some cases, candidates focussed on evaluating the company for which the system was created rather than the system created to solve the problem.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE JANUARY 2008

INFORMATION TECHNOLOGY

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INFORMATION TECHNOLOGY

GENERAL PROFICIENCY EXAMINATION

JANUARY 2008

GENERAL COMMENTS

In January 2008, 375 candidates from the participating territories entered for the Information Technology Technical Proficiency examinations. This represents a decrease of 37.2 per cent in registration for the Information Technology examination when compared with January 2007.

DETAILED COMMENTS

Paper 01 – Theory

This paper consisted of three sections with 14 compulsory questions testing the theory profile. Section I consists of five questions testing Hardware and Software; Section II consists of five questions testing Applications and Implications while Section III consists of four questions testing Programming.

The mean score was 39.4 out of 90. The range of marks obtained was 0 – 80.

Section III (Programming) continues to challenge candidates. Many candidates lacked the ability to understand concepts associated with programming; follow the logic of an algorithm and write simple code in a programming language to implement the algorithm.

Candidates continue to display an inability to express themselves clearly in their answers. Complete sentences were not used in many cases. Correct spelling and grammar were lacking in many cases.

Section I – Hardware and Software

Question 1

This question tested candidates' ability to identify the basic components of a computer system.

Part (a) of the question posed some difficulty to candidates as they were not able to identify a primary and secondary storage device, from the given specifications of a computer system.

Part (b) of the question was generally well done by the candidates. Candidates correctly identified two peripheral devices found in the computer system.

Part (c) of the question posed a great deal of difficulty to candidates. Few candidates attempted this question and those who did failed to show the computations for their answer. Candidates should be reminded that 1 Kb = 1024 bytes and not 1000 bytes.

Question 2

This question tested candidates' knowledge of the Central Processing Unit (CPU).

Part (a) of the question was generally well done. Some candidates mentioned CU for Control Unit and ALU for Arithmetic and Logic Unit. Candidates should use the full names of the two sub-units of the Central Processing Unit.

Part (b) of the question was generally well done by the candidates. Candidates provided proper responses for the functions of the two sub-units of the CPU.

Part (c) of the question posed some difficulty to candidates. Most candidates specified ROM instead of RAM as the type of memory most closely connected to the CPU. Most candidates did not seem to have a clear understanding of the difference between ROM and RAM.

Part (d) of the question was well done by the majority of the candidates who identified the chip that holds the CPU as the processor or the microprocessor.

Question 3

This question tested candidates' ability to distinguish between the types of user interfaces.

Part (a) of the question was well done. The majority of candidates was able to identify the interfaces but did not use the correct terminology such as "Graphical User Interface" and "Command Line Interface".

Part (b) of the question was well done. Many candidates indicated that the Graphical User Interface was more appropriate for a novice user and provided the reasons for their answer.

Part (c) of the question was well done. Most of the candidates indicated Operating System as the name of the system software.

Part (d) of the question had less than satisfactory responses from the majority of candidates who mentioned a particular version of the Windows operating system rather that providing the name of another operating system software such as Linux or Unix.

Question 4

This question tested candidates' understanding of how data are stored and manipulated within the computer.

Part (a) of the question posed difficulty to candidates. The majority of candidates could not compute the Binary Coded Decimal Representation of -12.

Part (b) of the question was generally well done by the candidates.

Part (c) of the question was well done by the candidates.

Part (d) of the question was well done by the candidates.

Question 5

This question tested candidates' understanding of the concepts associated with data communication.

WAN – Most candidates were able to provide a proper definition of a WAN.

Protocol – The majority of candidates could not provide a proper definition of the term, protocol.

Bandwidth – Most of the candidates could not provide a proper definition of the term bandwidth. Terms such as frequency, amount, speed and capacity were loosely used by the candidates.

Down-load - Most of the candidates seem to have a good understanding of the concept of download.

Point-to-point - Most of the candidates could not provide a proper definition of point-to-point transmission.

Upload – Most of the candidates seem to have a good understanding of the concept of upload.

Section II – Applications and Implications

Question 6

This question tested candidates' understanding of the application and implication of using a computer in a classroom.

Part (a) of the question was generally well done by the candidates. Candidates were able to indicate how the use of a computer in a classroom will enhance the classroom experience.

Part (b) of the question was not satisfactorily done by the candidates. Many candidates indicated keyboard and mouse which are normally part of a computer system rather than devices such as printer and scanner.

Part (c) of the question was well done by the majority of candidates who provided practical ideas to keep the system safe and functional. Use of fire alarms and physically locking the computer in a room were popular responses.

Question 7

This question tested candidates' understanding of the concepts associated with the Internet and intranet.

Part (a) of the question was generally well done by the candidates. Candidates were able to state the difference between the Internet and the intranet.

Part (b) of the question was not satisfactorily done by the candidates. Candidates could not provide a clear statement to indicate how the terms, "web-browser", "web-sites" and "web-pages" differ.

Part (c) of the question was generally well-done by the candidates. Some candidates confused e-commerce with videoconferencing.

Question 8

This question tested candidates' understanding of the measures used to secure data.

Part (a) of the question was well done by the candidates. Candidates were able to provide the two steps such as checking ID and calling the employment agency for verification.

Part (b) of the question was well done by the candidates. Candidates were able to give good reasons for the steps indicated in part (a).

Part (c) of the question was not satisfactorily done by the candidates. Some candidates associated computer fraud with the inability to use a computer.

Part (d) of the question was well done by the majority of candidates who provided good examples such as "working for a competitor" and "placing virus onto the system".

Question 9

This question asked candidates to explain the role of four persons in a setting where computers are used to conduct everyday business.

Part (a) of the question was not satisfactorily done by the candidates. Many candidates deemed a file librarian as one working only with books and not with computers or computer files.

Part (b) of the question was not satisfactorily done by the candidates. Many candidates failed to described the computer consultant as one who is sought for consultation or as one giving professional advice on computer systems.

Part (c) of the question was not satisfactorily done by the candidates. Many candidates described the data communications specialist as one who specializes in ensuring that computer networks are maintained in good working order, as opposed to designing and maintaining communications systems.

Part (d) of the question was satisfactorily done by the candidates. Most of the candidates who attempted this question referred to the systems analyst as one who analyzes the computer systems, and were not specific in mentioning the role of performing system reviews, or the design of new systems.

Question 10

This question tested candidates' understanding of the functions and use of a scanner and barcode reader as computer-related hardware.

Part (a) of the question was well done by the candidates. Some candidates were unable to distinguish between the scanner and the barcode reader.

Part (b) of the question was well done by the candidates. Popular responses include supermarket and retail industry.

Part (c) of the question was not satisfactorily done. Most candidates stated job titles of persons who would most likely use BOTH devices rather than a job title for each of the devices. Also, many candidates did not clearly indicate how the device would make the person's job more efficient. The job title most candidates stated was cashier; one who would use a barcode reader to search the names and prices of items rather than keying in the item codes or manually searching for item names and prices.

Section III - Programming

Question 11

Part (a) of the question required candidates to write a one-line example of code to illustrate the generation of programming language. Many candidates were able to give correct examples for Machine Language and High Level Languages but not for Assembly Language. Some candidates explained the difference among the generations rather than writing the one-line examples.

Part (b) of the question asked candidates to order the generations of programming languages from the earliest to the most recent. Most candidates were able to provide satisfactory responses. Some candidates also wrote '1st generation, 2nd generation, 3rd generation' instead of machine, assembly and high-level language.

Question 12

This question tested the candidate's ability to write program code to implement a given algorithm and to trace the execution of the statements.

Part (a) of the question was not satisfactorily done. Most candidates wrote in a pseudocode format rather than the actual code of a programming language.

Candidates wrote statements such as:

(a) "User inputs two numbers" as opposed to **Read Num1, Num2:**
(or similar structure)
(b) "Input 1, 2;" where the values 1 and 2 represented variables

Many candidates also did not seem to be aware of the importance of assigning value to variables from right to left. As a result candidates wrote:

num1 = temp; when they meant, **temp = num1;**

Part (b) of the question required candidates to complete the trace table. Many candidates did not attempt this part of the question. Following the logic of the question proved difficult for most candidates who attempted this question and they were only able to accurately calculate one of the required values.

Question 13

This question asked candidates to match various types of errors which occurred during processing with the appropriate description of that error.

Part (a) of the question was attempted by the majority of the candidates who were able to match the example given with the error described.

Part (b) of the question required candidates to match the correct error term with the specific type of error. Many candidates did not attempt this part of the questions. Of the candidates who attempted this part, most of them were able to provide two out of four satisfactory responses.

Question 14

This question asked candidates to explain the meaning of four terms associated with running a program.

The majority of candidates did not know what the terms, object code, compiling, executing and interpreting meant. The process and steps involved in writing and executing a piece of code were not understood, as well as the difference between compiling and interpreting. Some incorrect answers included "transferring data from one place to the other", "bringing all the data together in one place", and "translating the program so humans could understand it".

Paper 02 – Practical

Paper 02 is a practical paper consisting of three questions testing Word Processing, Spreadsheet and Database Management profiles.

The mean score for paper 02 was 84.4 out of 150. The range of marks obtained by the candidates was 5 – 148.

Candidates' performance in the Database Management profile was satisfactory however their performance was notably better in the word processing and spreadsheets profiles.

Question 1

This question tested candidates' ability to use the various features of a word processing program. The majority of candidates gave satisfactory responses.

Part (b) of the question was generally well done by the majority of candidates.

Part (c) of the question was satisfactorily done by the candidates but some candidates could not use column break and were unable to place the required paragraphs in the correct columns.

Part (d) of the question was generally well done by the majority of candidates. Some candidates changed the headings of the two paragraphs to the text 'uppercase' and 'italicize' rather than formatting the headings to uppercase and italics.

Part (e) of the question was generally well done by the majority of candidates. However, some candidates only fully justified the text in one of the two paragraphs rather than both.

Part (f) of the question was generally well done by the candidates but some candidates changed the line spacing of both paragraphs rather than the second paragraph only. Some candidates also used double line spacing rather than 1.5 line spacing.

Part (g) of the question was generally well done by the candidates but some candidates indented the bodies of the paragraphs rather than the headings only.

Part (h) of the question was well done by the candidates but some candidates inserted the title at the centre of the first column rather than the centre of the page.

Part (i) of the question was well done by the candidates. Some candidates used Times New Roman font rather than Arial font.

Part (j) of the question was satisfactorily done by the candidates. Some candidates format the '2' as subscript rather than superscript or did not apply any formatting on the '2'.

Part (k) of the question was well done by the candidates. Some candidates applied the bullets to the wrong text.

Part (m) of the question was well done by the candidates but some of them placed the footer in the wrong location.

Part (o) of the question was well done by the candidates. Some candidates incorrectly exchanged the bodies of the paragraphs and left the headings of the paragraphs unchanged.

Part (p) of the question was satisfactorily done by the candidates. Some candidates had typographical errors in the data source file while other candidates did not print out the data source file.

Part (q) of the question was satisfactorily done by the candidates. Some candidates inserted the merge fields and did not remove the place holders for the merge fields while others did not place a space between the merge fields.

Part (r) of the question was satisfactorily done by the candidates. Some candidates did not print both merge letters while some candidates edited the letters after merging.

Question 2 – Spreadsheet

This question tested candidates' ability to use the various features of a spreadsheet program. The majority of candidates gave satisfactory responses.

Part (b) of the question was generally well done by the candidates but some of them used the incorrect formula to add the values in the two required rows.

Part (c) of the question was well done by the candidates.

Part (d) of the question was well done by the candidates as they were able to add a new column and a new row with the required headings.

Part (e) of the question was well done by the majority of the candidates. Some candidates did not use the correct range to perform the SUM function.

Part (f) of the question was generally well done by the candidates.

Part (g) of the question was well done by the candidates.

Part (h) of the question was well done by the candidates. Candidates were able to insert a footer with their candidates number at the right of the worksheet.

Part (i) of the question posed great difficulty to the majority of candidates. Some candidates sorted the data on the Region column instead of the REGTOT column while others sorted in a single column rather that all the columns.

Part (j) of the question was well done by the majority of candidates but some candidates forgot to insert the blank row between the title row and the worksheet data.

Part (k) of the question posed some difficulty to the candidates. Most of the candidates did not use the correct formula to calculate the Total Government Fees. The Average and the Maximum functions were used correctly by the majority of candidates but some candidates did not use the correct format for the date function.

Part (l) of the question posed great difficulty to the candidates. The majority of candidates did not attempt the filtering of data in the worksheet. The candidates who attempted this question provided satisfactory responses. Some candidates perform separate filters, one for each condition rather than one filter for the combined conditions.

Part (m) of the question was generally well done by the majority of candidates but some candidates did not use proper labelling.

Part (n) of the question was generally well done by the majority of candidates but some candidates did not use the required labelling.

Question 3– Database Management

This question tested the candidates' ability to use the various features of a Database Management program.

Many candidates provided satisfactory responses but some candidates found the components related to querying the database challenging.

Part (b) of the question was generally well done by the candidates as they were able to add a new field called Cost.

Part (c) of the question was well done by the candidates as they were able to insert the correct data in the Type and Cost fields.

Part (d) of the question was well done by the candidates but some of them sorted the table in descending order rather than in ascending order.

Part (e) of the question posed some difficulty to candidates. Many candidates could not sort the table on the two required fields and sorted on one of the two required fields.

Part (f) of the question posed some difficulty to candidates. Most of the candidates searched the table on one condition, Registrar = "Redspider" and ignore the other condition, Billing = "Chase Bank".

Part (g) of the question posed some difficulty to candidates. Many candidates used the correct criterion but could not display the required fields since they did not join the two relevant tables.

Part (h) of the question posed great difficulty. Many candidates did not attempt this question but for those who attempted it, while they were able to create the calculated field they could not compute the total VAT paid.

Part (i) of the question was not attempted by the majority of candidates. Of those candidates who attempted it, all the required queries were not copied to the word processing document.

Part (j) of the question was generally well done by the majority of candidates who created the basic report.

Part (k) of the question posed some difficulty to candidates. Many candidates did not use grouping in the report and did not sort on the required field. Many candidates also did not include the total cost in their reports and did not insert their candidate numbers as a footer.

Paper 03/2 – Alternative to the SBA

Paper 03/2 is the theoretical alternative to the practical School-Based Assessment (SBA) and consists of three questions testing the Word Processing, Spreadsheet and Database Management profiles.

The mean score for this paper was 31.6 out of 60. The range of marks obtained by the candidates was 4 - 54.

Question 1 – Spreadsheets

This question tested candidates' understanding of the features of a spreadsheet Package.

Candidates who scored highly on this question displayed the ability to answer the question succinctly, and not give details on how to achieve the answer; in addition functions and formulas were correctly written, including the use of brackets and the equal sign.

Part (a) of the question was generally well done by the candidates. Some responses incorrectly stated the column letter instead of the field name.

Part (b) of the question required candidates to write functions to calculate the minimum, average and total values of some ranges. Many candidates wrote the incorrect format of a function. Some incorrect responses for the sum function included:

- =sum F2:F12
- Total(F2:f12)
- F2*F12(Sum)

Many candidates also include the word SUM before formulas. For example, if a correct formula is =B3*C15, candidates wrote =Sum(B3*C15), which is incorrect.

Part (c) of the question asked the candidate to STATE the minimum value in a column. Most of the candidates responded with the correct answer. However, there were some candidates who wrote the cell location instead of the value, or stated the minimum value of another range.

Part (d) of the question asked for a formula such as =F15-G15. Some candidates incorrectly wrote the formula as =Total Balance Owed – Total YTD Sales.

Part (e) of the question required the response to the currency formatting feature for a range of numbers. Some candidates wrote bold, underline and other features from a word processing perspective instead of the currency or comma feature.

Part (f) of the question asked for the criteria that would be used in a query to produce customers with type P. Although the correct response was TYPE= 'P', many candidates wrote TYPE P or wrote in words, what they would have used to obtain the result. There were a few candidates who sketched where the criteria would be placed if they were using Microsoft Access, which was also acceptable.

Part (g) of the question asked for the number of records that would be produced by the query given in part (f). Most of the candidates provided the correct results, a few candidates wrote the records out, which was also acceptable.

Part (h) of the question asked the candidate to write the ranges that would have been used from the worksheet to produce a chart. Two ranges were required, but many candidates wrote only one range of data and omitted the range for the corresponding customers. Other candidates explained how they would produce the chart, but did not indicate the ranges involved.

Question 2 – Word Processing

Question 2 tested the candidate's recognition of the features of a word processing package that would be fairly common and rehearsed in a practical setting.

This question was generally well done by the majority of candidates.

Part (a) of the question tested the candidate's ability to identify formatting features used in word processing document. The majority of candidates were able to identify two formatting features used in the given document.

Part (b) of the question asked candidates to identify the mail merge as a word processing feature used to create customized copies of a standard document. Many candidates were able to identify the feature and to provide an advantage of using it. Some candidates identified email as the feature being requested.

Part (c) of the question asked candidates to identify the merge fields that would be used in a mail merge from the data given in the spreadsheet. Most candidates were able to identify the merge fields used but some candidates selected all the fields.

Part (d) of the question tested the candidate's ability to name the file used to hold data in a mail merge (data source). Most of the candidates provided satisfactory responses while some provided incorrect responses.

Part (e) of the question tested the candidate's knowledge of the placement of a footnote and a header. Most of the candidates confused footer with footnote and footnote with endnote and provided incorrect responses.

Part (f) of the question asked candidates to identify whether a footer or endnote is found in the letter and to state its text. Many candidates provided unsatisfactory responses as they confused footer with footnote and footnote with endnote.

Part (g) of the question tested candidates on the function of the spell-check feature of the word processor. To answer this question properly a candidate would need to know when a word is misspelled. This proved interesting as some words that were correctly spelt were deemed incorrect because the student did not know the correct spelling or was not familiar with the word (Bristol, disregard, Accountant General, pharmaceuticals). Overall, the candidates demonstrated that they knew what the spell-check feature was intended to do and their role in deciding how to treat a spell-check notification.

Part (h) of the question asked candidate to identify the item at the top of the document. Many candidates treated the item as the entire letterhead rather than the logo or picture used in the letterhead. Over half of the candidates provided satisfactory responses.

Part (i) of the question asked candidates to identify the feature used to record the names and telephone numbers and to explain the layout. Most of the candidates correctly indicated that a table was used to record the names and telephone numbers in the letter but many of them could not identify that each table was in a separate column.

Question 3

This question tested candidates' understanding of the various features of a Database Management program.

The majority of candidates provided satisfactory responses. Some responses however indicated that candidates did not have a good understanding of Database Management concepts.

Part (a) of the question tested candidates' ability to identify the number of fields and records in a database table. Most of the candidates provided unsatisfactory responses as they included the row with the field names, as a record and mentioned 13 instead of 12 records. Some candidates mentioned 6 fields instead of 7 fields as they did not count the "CustNo" field.

Part (b) of the question asked candidates to identify the data type for the Type and Rep fields. Most of the candidates provided unsatisfactory responses.

Part (c) of the question was generally well done by the majority of candidates. Some candidates could not identify appropriate primary keys for each of the table.

Part (d) of the question asked candidates to write simple queries. The majority of candidates could not give the correct queries for part (i) to part (iii). Part (iv) required the candidates to do a calculated field. Again, the majority of candidates could not state the correct formula for the calculated field.

Part (e) of the question asked candidates to write the result of the query in part d (ii). The majority of candidates could not write the result of the query.

Part (f) of the question requires candidates to analyze a report and identify the fields used for grouping, sorting as well as the table from which the field originated. The majority of candidates provided unsatisfactory responses. Some candidates seem unfamiliar with the concept of grouping.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

HEADQUARTERS

REPORTS ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

MAY/JUNE 2008

INFORMATION TECHNOLOGY

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INFORMATION TECHNOLOGY

MAY/JUNE 2008

GENERAL COMMENTS

In June 2008, 23298 candidates from the participating territories entered for the Information Technology examination; 1079 entered for General Proficiency and 22219 for Technical Proficiency. This represents an increase of 11.84 per cent in registration for the Information Technology examination when compared with June 2007.

DETAILED COMMENTS

PAPER 01 –THEORY

This paper consisted of four sections. Sections I and II consisted of ten compulsory short-answer questions testing the theory profile and is common to both the Technical and General Proficiencies. Section III is the Programming section for Technical Proficiency candidates and Section IV is the Productivity Tools section for the General Proficiency candidates. The mean scores for General and Technical Proficiencies were 48.2 out of 90 and 38.6 out of 90 respectively. The range of marks obtained by the General and Technical Proficiencies candidates were 0 - 76 and 0 - 78 respectively.

SECTION I

Question 1

This question tested candidates' ability to classify and state the names of the pictures representing input, output and storage devices.

The majority of candidates were able to classify and state the names of the pictures representing input, output and storage devices. However, some candidates had difficulty classifying Figure A and stating its correct name (Hard Drive).

Question 2

This question tested candidates' knowledge of various application packages and their ability to classify them.

The majority of candidates were able to correctly classify the application packages. However, many candidates were unable to differentiate among them.

Question 3

This question tested candidates' ability to identify and solve basic problems related to printers.

The majority of candidates were able to identify and provide solutions to basic problems with printers. However, some candidates were unfamiliar with the term, 'multi-part form'. In addition, some candidates were unclear about the differences between the terms 'hardcopy' and 'softcopy'.

Question 4

This question tested candidates' ability to identify files and folders in an MS-DOS directory structure.

The majority of candidates were able to correctly identify the type of user interface and to identify the files and folders in a directory structure. However, some candidates provided the path of the folder rather than the name of the folder.

Question 5

This question tested candidates' knowledge of the various types of processing methods.

This question was satisfactorily done by the majority of candidates. Some candidates however, could not relate the type of processing to a data transmission method.

SECTION II

Question 6

This question tested candidates' knowledge of the term 'Electronic Eavesdropping' and measures used to secure data.

The majority of candidates could explain the term 'Electronic Eavesdropping' however, some candidates did not include unauthorized access in their explanation.

The access methods posed some difficulty to candidates. Some candidates could not identify any physical access method used to secure data. Most candidates could not provide a good reason for having sharing restrictions on a document.

Question 7

This question tested candidates' knowledge of the application of telecommunication systems (Teleconferencing, Telemarketing and Telecommuting) and current technological trends (CADD, CAE and CAM).

The majority of candidates displayed knowledge of the application of telecommunication systems as well as current technological trends. Many candidates however, did not specify the differences among 'Teleconferencing', 'Telemarketing and Telecommuting'.

Question 8

This question tested candidates' knowledge of e-commerce activity on the Internet.

The majority of candidates displayed some knowledge of e-commerce activity on the Internet. However, some candidates were unfamiliar with the use of credit cards in purchasing items on the Internet.

Question 9

This question tested candidates' ability to identify and explain concepts associated with the World Wide Web (WWW).

Most candidates were not familiar with some of the concepts associated with the WWW. Some candidates could not distinguish between the website and the webpage in a given URL.

Question 10

This question tested candidates' ability to state the characteristics and uses of MICR and to differentiate the roles of a system analyst and a network manager according to the tasks given.

The majority of candidates were unfamiliar with the use of MICR to process check in Banks. Candidates were able to assign the given tasks to the System Analyst and the Network Manager but did not explain why the tasks were assigned to the two positions.

SECTION III - PROGRAMMING

Question 11

This question tested candidates' ability to match given program statements with levels of programming languages and to identify the different generations of programming languages used.

This question was satisfactorily done by the majority of candidates. However, some candidates did not identify the generations of programming languages used.

Question 12

This question tested candidates' ability to classify a given set of tasks as input, output, processing or storage and to place the tasks in the correct sequence.

The majority of candidates were able to correctly classify processing and storage tasks but many confused the input with the output tasks. Most candidates were able to place the first and second steps in the correct sequence. However, the third, fourth and fifth steps were sequenced incorrectly.

Question 13

This question tested candidates' knowledge of given logical operators and their ability to trace program segments to determine the outputs.

The majority of candidates were able to state the name of the logical operators. However, some candidates were unfamiliar with the 'not equal to' operator (< >).

Many candidates were not able to provide the correct outputs for the program segments. In many cases, the conditional statements in the program segments were ignored.

Question 14

This question tested candidates' ability to, trace a segment of a program to identify assignment, loop and output statements, complete a trace table, and state the result of the algorithm.

Many candidates were able to identify the assignment, loop and output statements, however, the majority of candidates could not complete the trace table and hence, indicate the result of the algorithm.

SECTION IV

Question 15

This question tested candidates' knowledge of basic features of a word processing program.

This question was well done by the majority of candidates. Some candidates could not describe the steps involved in moving text and changing line spacing.

Question 16

This question tested candidates' knowledge of basic features of a spreadsheet program.

This question was satisfactorily done by the majority of candidates. Some candidates could not explain how to merge and centre.

Question 17

This question tested candidates' knowledge of basic features of a database management program.

The question was poorly done by the majority of candidates. Some candidates had difficulty in determining the field size and the features used in generating a report.

PAPER 02 & 02/2 – TECHNICAL PROFICIENCY

Paper 02 consisted of three questions testing Word Processing, Spreadsheet and Database Management.

Paper 02/2 is the alternative to Paper 02 and consisted of three questions testing Word Processing, Spreadsheet and Database Management.

The mean score for Paper 02 was 94.3 out of 150. The range of marks obtained by the candidates was 0 - 150

The mean score for Paper 02/2 was 92.8 out of 150. The range of marks obtained by the candidates was 0 - 150

Word Processing - Question 1 of Paper 02 / Question 3 of Paper 02/2

This questions tested candidates' ability to use various features of a Word Processing program.

This question was generally well done by the majority of candidates but there were some areas of difficulty. There were as follows:

Formatting features:

- Setting the margins
- Setting the line spacing
- Use of columns
- Location of headers and footers
- Use of subscript format

Mail Merge:

- Printing the primary document with the merge fields inserted correctly
- Printing the merge letters without any post-merge modifications

Spreadsheet – Question 2 of Paper 02/ Question 1 of Paper 2/02

This question tested candidates' ability to use various features of a spreadsheet program.

This question was well done by the majority of candidates. Some areas of difficulty were as follows:

- Advanced filtering of data:
  - Setting up the criteria and extraction ranges
  - Use of correct criteria
- Sorting data:
  - Selecting the correct data range
  - Selecting the correct column and order for the sort
- Graphing:
  - Selecting the correct data range
  - Labelling the pie chart and labelling the axes of column chart
- Formatting:
  - Use of percentage with correct decimal places
  - Use of correct alignment – right align numeric columns
  - Use of merge and centre
  - Use of ALL borders
- Formulae and Functions:
  - Use of formula to calculate percentages
  - Use of function to compute the average
- Printing the spreadsheet:
  - Selecting the worksheet and the chart for printing

Database Management – Question 3 of Paper 02 / Question 2 of Paper 2/02

This question tested candidates' ability to use various features of a database management system.

Candidates continue to print unnecessary documents for example SQL codes and design view of tables. In addition, candidates displayed a lack of keenness in organizing their printouts in the question sequence.

This question was satisfactorily done by the majority of candidates. However, some areas of difficulties were as follows:

- Table:
  - Use of appropriate data types
- Sorting:
  - Selecting the correct order of sort in a table
  - Using multiple search fields
- Queries:
  - Use of calculated fields
  - Linking tables
  - Use of summary features – SUM, AVERAGE
  - Use of correct criteria
  - Creating a Word Processing document with all the queries
- Reports:
  - Use of footer in the report
  - Inserting title
  - Grouping and sorting data in a report
  - Use of summary feature – SUM, AVERAGE

PAPER 02 - GENERAL PROFICIENCY

This paper consisted of two sections. Section I consists of four questions on Information Processing of which candidates are required to do Question 1 and any two other questions. Section II consists of four questions on Programming of which candidates are required to do Question 5 and any two other questions.

The mean score for this paper was 73.2 out of 150. The range of marks obtained by the candidates was 0 – 137.

In section 1, candidates were able to choose from the three optional Questions (2, 3 & 4) with Questions 2 and 3 being the popular choices. In section 2, candidates were able to choose from the optional Questions (6, 7 & 8) with Questions 6 and 7 being the popular choices.

SECTION 1 – INFORMATION PROCESSING

Question 1

This question tested candidates' ability to

- State the advantages and disadvantages of Information Processing
- Describe the use of control systems that use sensors
- State the reasons for creating and modifying information systems
- Differentiate between quantitative and qualitative data collection methods
- Explain the importance of the different phases of the System Development Life Cycle.

The majority of candidates were able to provide the advantages and disadvantages of Information Processing.

Many candidates provided satisfactory description and examples of Control Systems, however, a number of candidates were not familiar with pressure Pad Sensors and Light Sensors.

The majority of candidates were able to provide two reasons for creating or modifying an information system.

The majority of candidates could not differentiate between qualitative and quantitative data collecting methods.

Most of the candidate could identify the stages of the System Development Life Cycle, however, candidates were uncertain about the importance of the stages in the System Development Life Cycle.

Question 2

This question tested candidates' ability to

- State the purpose and advantage of keeping a data dictionary
- Identify the features of a given database table
- Draw and explain the symbols used in a data flow diagram
- Create a decision table based on a given scenario.

The majority of candidates confused data dictionary with a spell checker.

The majority of candidates were able to provide the name of the table and the primary key, however, the majority of candidates could not distinguish between fields and properties of a given field.

The majority of candidates were able to draw and explain the symbols used in a Data Flow Diagram. Some candidates however, provided symbols used in a flowchart.

Most of the candidates were able to provide the conditions and actions for the given scenario but were unable to create the complete Decision Table. The majority of candidates provided 3 instead of the 4 rules in their Decision Tables.

Question 3

This question tested candidates' ability to

- Update a master file using a transaction file
- Differentiate among the type of processing – batch, interactive and online
- Explain the purpose of validation and verification of data
- Explain and provide an example of range check and data type check
- Represent number in floating point format
- Identify errors when representing numbers in a computer system

The majority of candidates were able to update a master file using a transaction file. However, some candidates were unable to state the name of the new master file as the son file.

The majority of candidates were able to state that the type of processing in the given scenario was Batch Processing. However, candidates were unable to explain why it was Batch Processing.

The majority of candidates were able to state the purpose of validation and verification of data.

The majority of candidates were able to explain and illustrate a range check but were unfamiliar with data type check.

The majority of candidates were able to identify the parts of a floating point representation.

Candidates provided a variety of errors but errors such as overflow, underflow and truncation were not common.

Question 4

This question tested the candidates' ability to

- Describe various methods of file organization and access
- Explain how machine instructions are represented in a computer

The majority of candidates could not differentiate among the three types of file organization. Candidates were unfamiliar with Index Sequential file organization.

The majority of candidates were unfamiliar with 'machine instructions' and could not answer the various parts of the questions relating to 'machine instructions'.

SECTION II – PROGRAMMING

Question 5

This question tested the candidates' ability to write a program based on a given algorithm using a programming language. The majority of candidates were able to write a program based on the algorithm. A variety of programming languages were used with Pascal programming language being the most popular. Some candidates declared the variables as integer instead of real numbers. Some candidates were also unable to write correct IF-THEN statements.

Question 6

This question tested the candidates' ability to complete a trace table for a given program segment and determine the outputs. The majority of candidates demonstrated the ability to trace the program segments and indicate the outputs. In part (b), some candidates could not use the given operators (%, *, /).

Question 7

The question tested candidates' ability to draw a flowchart to represent a given algorithm and to write the program to implement the algorithm. The majority of candidates were able to write the program to implement the algorithm but only a few candidates provided the appropriate flowchart with correct symbols and labels. Some candidates used the Data Flow Symbols instead of the flowchart symbols.

Question 8

This question tested the candidates' ability to trace a selection sort program segment, to identify error and to produce a trace table. The candidates who attempted this question could not identify the error and were not able to produce a complete trace table. Many steps in the candidates' trace tables were missing.

SCHOOL-BASED ASSESSMENT (SBA)
TECHNICAL PROFICIENCY

The Technical SBA component consists of a project prepared and marked by the teacher. It consists of three practical assignments testing skills associated with Word Processing, Spreadsheet and Database Management.

The level and variety of projects submitted by schools continue to be of a high standard. Many projects seen had detailed project descriptions that met the guidelines as described in the syllabus. Samples were generally well presented. However, there were a few samples that lacked organization, and were not properly bounded or demarcated.

The provision of mark schemes adhering to CXC guidelines continues to improve, however, some centres were negligent in this area and this impacted negatively on the performance of some candidates. Each sample submitted should have an accompanying detailed mark scheme clearly showing how the marks were allocated and awarded for skills' set under consideration. The difficulties experienced in this area were sufficiently large to warrant concern.

Although most centres submitted the same project and mark scheme for all candidates in the sample, there were some instances where within one sample there was more than one type of project and associated mark scheme represented. It is recommended that a centre create a single project. The candidate's work should be centre moderated and a sample submitted to CXC for further moderation.

Candidates continue to demonstrate improved levels of knowledge of syllabus content. However, Teachers should take note the following:

- **All submission of samples should be in hard copy (printed format). Diskettes and CDs are not required and should not be submitted**. In addition, marking should be done using the printed work rather than from the softcopy on diskette /CD. If the latter is done, then teachers should ensure that all work for which marks were awarded is printed. There were far too many samples in which marks were allocated for work supposedly done that could not be verified.

- Moderation sheets must be included with samples and care must be taken when transcribing and transposing marks. Names and marks on the accompanying moderation forms should match those in the sample.

- Mark schemes submitted must adhere to CXC guidelines. In particular, specific criteria profiles and weighting must be adhered to. Fractional marks are not allowed. Further, there is a maximum of 20 marks allocated for each component (Word processing, Spreadsheet, Database Management).

- A project description and detailed mark scheme **must** be submitted with each sample.

- Candidates must enter **all registration** details on their project and submit it in order, with the parts appropriately labelled and pages numbered. All parts of the project should also be attached neatly and securely. The better candidates used table of content and page numbering.

Specific Comments

The following gives a more detailed description of the issues associated with each of the productivity tools under consideration:

Word Processing

The following outlines the positive as well as the negative factors in relation to the marking of the Word Processing component. In general there was some improvement in the quality and variety of the assignments. For most candidates, there was great improvement in the creativity and use of Word Processing features. A wide range of documents were produced. These included brochures, flyers, invitations, programs, tables and newspaper articles. However, some schools submitted samples that were unacceptable and improperly bounded. In addition, sections were not clearly labelled or clearly demarcated and this presented a challenge for the moderators. Some suggestions for further improvement of SBA samples are listed below.

Teachers should ensure that:

- They are knowledgeable about the mark scheme in order to guide the candidates in the correct direction

- Individual mark schemes submitted conform to the syllabus guidelines, assessment criteria and mark allocation

- Assignments or tasks are marked according to the syllabus (there were some inconsistencies with the mark schemes used)

- The **primary document**, **data source** and **merged documents** in a mail merge are prepared and printed. If a table is used from the Spreadsheet or Database Management section as the data source for a mail merge, it should be included in the Word Processing section of the SBA. A significant number of candidates did not print the main/primary document showing the merge fields in the mail merge, instead they submitted a document showing field names bounded by less than or greater symbols (e.g. <<FirstName>>) for merges fields. This is unacceptable.

It can be concluded that there was a general improvement in the assignments submitted and that candidates' creativity were demonstrated in the creation of mail merged brochures, flyers and invitations.

Spreadsheet

Overall, this component was generally well attempted and demonstrated good creativity.

The majority of candidates were able to perform the spreadsheet formatting tasks such as font changes, bold and centre. However, there was limited evidence of advanced formatting skills – merging cells, text wrapping. **(SS8)**.

Sorting was very well done. Most candidates were able to sort correctly on both the primary and secondary fields (**SS9**). This is commendable.

Insertions/deletions (**SS7**) are not evident and the skill cannot be verified as having been achieved when candidates do not print the data **before** and **after** the insertions/deletions. It would also simplify the process if candidates would use labelling or high lighting effectively to illustrate what they have done. It is unfortunate that some candidates were penalized for failure to produce the necessary documentation to prove that they had achieved the competency under consideration.

A clear differentiation between formulas and functions must be made. Formula sheets must be submitted to provide the necessary evidence of the functions used, replication of formula, use of absolute cell referencing and criteria referencing (**SS1,2,5,10**).

In many of the samples there was some level of graphical representations used but it was not always assessed by the teacher. In most cases, candidates demonstrated a high degree of proficiency in this area, however, some attention should still be given to the appropriate labelling of chart axes and the procedures for selecting non-adjacent ranges (**SS11,12**).

Database Management

The following observations were made after moderating the samples for the Database Management profile of the Technical proficiency:

- **DB1** Generally this was done well. However, there were some instances where the currency data type was not used correctly; also decimal places were not rounded off correctly. The queries given in some instances were not very challenging.

- **DB2** Overall this area was handled well. There were few instances though, where results were incorrect due to incorrect relationships being created. There were also cases where there were no record to match the stated criteria.

- **DB3** This was generally handled well. There were instances however where candidates failed to follow the specific instruction as given in the SBA assignment. For example, students might have been asked to sort in ascending order, but did so in descending order instead.

- **DB4** This criterion was not popular among the SBAs given. Where it was assessed, however, some candidates did not provide SQLs to prove their ability to remove the indexing facility.

- **DB5** This criterion was handled relatively well by some candidates. In many instances, candidates did not demonstrate effective use of grouping of required fields or statistical and summary features.

  A minority of assignments required exporting a report to MS-Word. In some instances, this proved advantageous to candidates because this was the only evidence of them having done a report.

- **DB6** In the majority of instances candidates did not provide evidence of modifications made (e.g. delete a record, modify a field). Candidates needed to provide a ***before*** and ***after*** table to show that the operations were performed.

- **DB7** This was handled relatively well. There were only a few cases where assignments did not require calculated fields.

- **DB8** This criterion was handled well. Evidence in the form of screen shots and entity relationships were seen in many instances.

- **DB9** Not many assignments required operations requiring importing graphics and sizing them appropriately. However, the importing of tables (correct importing/conversion) was generally handled well.

- **DB10** This was generally well done.

- **DB11** Although in most instances the required printouts were submitted, the level of detail presented was unnecessary. Candidates should be encouraged to present just SQLs for the query definitions and the field names, data types, field sizes and indexes for the table structures.

  In terms of presentation, candidates should be encouraged to group the different sections of the database properly – tables together, queries together.

GENERAL PROFICIENCY

The General Proficiency SBA requires candidates to develop a computer solution to a meaningful problem using the knowledge and skills acquired in the Information Processing and Programming profiles.

GENERAL COMMENTS

Candidates continue to submit work that is of a high standard. The level of presentation of the samples can be described as commendable. CXC guidelines were followed and candidates were awarded the majority of marks. On average ninety percent of the marks was allocated to this section.

There seems to be some difficulty with the approach to Problem Solving and Programming this year. Candidates seem to be coding a solution to the problem defined before creating a viable working solution first. As a consequence, there were clear weaknesses demonstrated in the use of tools such as algorithms, flowcharts and Data Flow Diagrams. There were also significant weaknesses in the level and range of Data Structures used.

Although there was variation in the range of topics selected, candidates still favoured data storage and retrieval systems. Some of them were not adequately developed and the results were very limited in scope. Teachers should ensure that the projects selected are substantive yet manageable.

SPECIFIC COMMENTS

Problem Definition

Candidates listed problems but did not explain the objectives of the system they were creating. Some candidates seemed confused about the distinction between Data Flow Diagrams and Flowcharts. Most Data Flow Diagrams seen were done incorrectly. Urgent attention is needed in this area.

User Documentation

Adequate screen shots must be used as proof of a working program. Most candidates were able to describe the installation of the system under development but failed to go beyond this into explaining and giving examples of how the system worked. Installation is important but there is a need for more steps – from installation to exiting the program.

Creativity

Problem selection should be more imaginative. Candidates should explore more than one method of solving the problem before settling on the best way forward. Time spent in this area is reflected in the comments made in the evaluation of the system.

Evaluation

Most candidates show substantial weakness in providing a substantive evaluation of their system. There was often no critical analysis of the program. Recommendations should also be thorough. Many candidates demonstrated weaknesses in this area. It is important to note that the length of this section as specified in the syllabus is approximately 1 to 2 pages (300 words).

Problem solution

Algorithms need to be strict algorithms and not edited programs. In other words, it was evident that a significant number of candidates coded first and then produced an algorithm from the working program. In some cases, the only difference seen between the algorithm and the program code was the non-declaration of variables. Flowcharts were fairly well utilized and some candidates tried to use Structure Charts with some degree of success.

Working Program

There was a reasonably good attempt at using program features and program structures. There should be a greater use of text files and arrays in some programs. In most cases, very little evidence was given to support a working program using the test data provided. Proof of this should include screen shots clearly showing how the program handles correct and incorrect data.

Internal Documentation

Most candidates gave comments to indicate the functioning of the major structures such as subprograms or loops. Not enough comments were present to explain the purpose of the variables used and some of the other minor program structures.

CARIBBEAN EXAMINATIONS COUNCIL
HEADQUARTERS

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

JANUARY 2010

INFORMATION TECHNOLOGY
TECHNICAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

In January 2010, 626 candidates from the participating territories registered for the Information Technology (Technical) examination. This represented an increase in registration of 54.19 per cent when compared with January 2009.

DETAILED COMMENTS

Paper 01 – Theory

This paper consisted of three sections with 14 compulsory questions testing the theory profile. Section 1 consisted of 6 questions testing Hardware and Software; Section 2 consisted of 5 questions testing Applications and Implications and Section 3 consisted of 3 questions testing programming.

Section I

Question 1

This question tested candidates' knowledge of computer acronyms and their ability to provide one task that is performed by each of the components represented by the given acronyms.

The majority of candidates were able to give the meaning of the acronyms, CU, ALU and ROM but not RAM (Random Access Memory). In addition, about half the number of candidates were unable to correctly provide one task that is performed by each of the given components.

Question 2

This question tested candidates' ability to state the types of optical disk best suitable for the three given situations.

This question was well done by the majority of candidates. Some candidates provided magnetic storage media (floppy disk and hard drive) instead of the types of optical disk.

Question 3

This question tested candidates' knowledge of data capture methods.

This question was well done by the majority of candidates. However, some candidates confused OMR, OCR and MICR.

Question 4

This question provided candidates with pictures of four types of printers and tested their ability to match the type of printer with their best uses, and required them to state the general name of the devices indicated by the pictures.

This question was poorly done by the majority of candidates. Most of the candidates were able to supply the best use for Figure 2 (inkjet printer) but were unable to do so for the other types of printers. In addition, most of the candidates did not provide printer as the general name of the devices, instead they provided the name for each printer and in some cases they mentioned output devices.

Question 5

This question tested candidates' ability to

- convert decimal number to binary using eight-bit binary representation
- find the decimal equivalent for a binary coded decimal number
- perform subtraction in binary using two's complement representation.

This question was poorly done by the majority of candidates. Most of the candidates experienced difficulty in performing subtraction in binary using two's complement representation. Some candidates were able to find the decimal equivalent of binary coded decimal number and to convert from decimal to binary for both positive and negative integers.

Question 6

This question tested candidates' knowledge of user interfaces.

This question was poorly done by the majority of candidates. Most of the candidates were not familiar with the command line and menu-driven user interfaces.

Section II

Question 7

This question tested candidates' knowledge of the use of computers in the music industry.

This question was well done by the majority of candidates. Some candidates mentioned computer devices that can connect to the computer but failed to link them to the music industry.

Question 8

This question tested candidates' knowledge of concepts associated with the Internet.

The majority of candidates were able to state the differences among the .edu, .org and .gov extensions found on websites. Most candidates were also able to provide the name of a well-known search engine and to indicate where they would type the name of the website to access it. Although there were few variations, the majority of candidates indicated correctly what the terms http and www represent.

Question 9

This question tested candidates' knowledge of Internet, Intranet and Extranet.

This question was well done by the majority of candidates who were able to match the terms Internet, Intranet and Extranet with the types of network provided. Some candidates confused Internet with Extranet.

Question 10

This question tested candidates' knowledge of the illegal use of computers and the misuse of personal information.

This question was poorly done by the majority of candidates who were unable to describe two ways a computer can be used illegally and to provide one example of how an organization can misuse its customers' personal data.

Question 11

This question tested candidates' knowledge of the use of credit or debit cards to purchase items; health problems associated with the use of computers for prolonged periods and the impact of the increased use of cell phones in the workplace.

This question was well done by the majority of candidates. Most of the candidates were familiar with the use of credit or debit cards to make purchases and the impact of the increased use of cell phones in the workplace. However, some candidates listed health problems associated with the prolonged use of computers without providing explanations of how the health problems could develop.

Section III

Question 12

This question tested candidates' ability to

- differentiate between syntax and logic errors (Part a)
- analyse two line of codes and indicate the results when the codes are executed (Part b)
- trace programme segments and indicate the results, given the value of the variable (Part c).

Part (a) of the question was poorly done as the majority of candidates could not explain the difference between syntax and logic errors.

Part (b) of the question was well done. The majority of candidates provided the correct results when the codes are executed. Some candidates misinterpreted the sign as 'lesser than or equal to' instead of 'greater than or equal to'.

Part (c) of the question was well done as the majority of candidates was able to perform the programme trace and provide the correct results.

Question 13

This question tested candidates' ability to analyse a programme segment to

- identify input, declaration and output statements (Part a)
- identify errors and to provide the corrected codes (Part b)
- identify a variable, a conditional statement and a data type (Part c)
- explain the purpose of the programme segment (Part d)
- state the results of the programme segment, given the value of the variables (Part e).

Part (a) of the question was poorly done by the majority of candidates who were unable to identify the correct line numbers containing input, declaration and output statements. Part (b) was also poorly done. The majority of candidates could not identify the errors in the programme segment and hence, could not provide the corrected codes. Candidates did badly on Part (c) as well. The majority of them seemed unfamiliar with the concepts of variable, data type and conditional statement.

Performance on Part (d) was also poor. The majority of candidates provided a definition of the term, 'programme segment' rather than the purpose of *the* programme segment.

Part (e) of the question was poorly done. The majority of candidates failed to apply the logic to the given programme segment to compute the correct results.

Question 14

This question tested candidates' ability to analyse logical statements and to indicate whether they are true or false based on the given values of the variables. This question was well done by the majority of candidates who obtained full marks.

Paper 02 – Practical Exercises

Paper 02 is a practical paper consisting of three questions testing Word Processing, Spreadsheet and Database Management profiles.

Question 1 – Word Processing

This question tested candidates' ability to use the various features of Word Processing software.

This question was well done by the majority of candidates. Some areas of difficulty were:

- Inserting footer. Many candidates inserted header instead of footer (Part i).
- Justifying text. Many candidates confused fully justified with centring text (Part j).
- Use of spell check feature. Many candidates did not use the spell check feature to correct the spelling of all misspelt words (Part l).
- Centring a table in a document. Most candidates centred the table in the column rather than in the centre of the document when the column settings were discontinued (Part m).
- Mail-merge. Many candidates printed out the merge letters but failed to print out the form letter with the merge fields inserted (Part o).

Question 2 – Spreadsheet

This question tested candidates' ability to use the various features of spreadsheet software.

This question was satisfactorily done by the majority of candidates. Some areas of difficulty were as follows:

- Calculating totals. Some candidates selected the incorrect range while others used the COUNT function instead of the SUM function (Part c).
- Inserting footer. Many candidates did not follow the instructions to insert the footer on the left (Part g).
- Merge and centre feature. Many candidates did not use the merge and centre feature to centre the title rows across the columns used by the worksheet (Part j).

- Sorting data. Many candidates had difficulty sorting the data on the required column (Part k).

- Totalling non-adjacent ranges. Many candidates could not find the total population for 2010 and 2011 and hence, the difference between the total populations for 2010 and 20100 (Part l [i and ii]).

- Advanced filtering of data. Many candidates seemed unsure of how to perform the advanced filter, and thus this part was poorly done. Those who attempted it, did not include the correct criteria and in most cases the output/extraction range was not seen (Part m).

- Creating charts. Many candidates did not select the correct data as it was in non-adjacent cells (Part n).

Question 3 – Database Management

This question tested candidates' ability to use the various features of Database Management software.

This question was satisfactorily done by the majority of candidates. Some areas of difficulty were as follows:

- Performing queries. Most of the candidates could not complete the required queries. Creating calculated fields and joining tables proved challenging to many candidates (Parts f and g).

- Reports. Grouping, totals per group and inserting candidate number as a footer seemed to be challenging for some candidates (Part j).

Paper 03/2 – Alternative to School-Based Assessment (SBA)

This paper is the alternative to the SBA and consisted of three questions testing Word Processing, Spreadsheet and Database Management profiles.

Question 1 – Word Processing

This question tested candidates' knowledge of the features of a word processing programme.

This question was well done by the majority of candidates. Some areas of difficulty were as follows:

- Justification. Most candidates were able to identify the line spacing used but were unable to recognize that full justification was used in the paragraph (Part c).

- Header, footer, footnote and endnote. The majority of candidates was unable to recognize that the footnote was used in the given document (Part d).

- Mail merge. The majority of candidates could not provide the correct names of the two documents (data source and primary document) (Part e).

- Formatting. Many candidates could not identify that the subscript format had been applied to the '2' in the text 'H_2O' (Part i).

Question 2 – Spreadsheets

This question tested candidates' knowledge of the features of a spreadsheet programme.

It was satisfactorily done by the majority of candidates. Some areas of difficulty were:

- COUNT function. Many candidates were unfamiliar with the COUNT function (Part c (ii)).
- Row/column title locking. The majority of candidates were not familiar with this feature and did not attempt this part of the question (Part d).

Question 3 – Database Management

This question tested candidates' knowledge of the features of a Database Management programme.

This question was satisfactorily done by the majority of candidates. Some areas of difficulty were as follows:

- Primary keys. Many candidates could not identify the primary keys for the three tables provided (Part a).
- Joining tables. The majority of candidates did not demonstrate an understanding of the concept of relationships among tables and therefore could not create the relationships among the three given tables (Part d).

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATIONS

MAY/JUNE 2010

INFORMATION TECHNOLOGY

GENERAL PROFICIENCY

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GENERAL COMMENTS

May/June 2010 was the first year of examination for the revised CSEC Information Technology syllabus and 25,591 candidates from the participating territories wrote the Information Technology examination. Eighty-one per cent of the candidates achieved grades I–III.

DETAILED COMMENTS

Paper 01 – Multiple-Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. This paper was fairly well done with an average of 30.44 out of 60.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured questions. Section I which tested the Theory Profile consisted of six short-answer questions worth 60 marks. Section II contained two structured questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four structured questions worth 45 marks; it tested the Problem-solving and Programming profile.

Section I - Theory

Question 1

This question tested candidates' ability to explain the functions of the major hardware components of a computer system. It was satisfactorily done by the majority of candidates. However, some candidates did not use the names of the components as indicated in the diagram provided. For example, candidates used terms such as "primary storage' and "RAM' instead of "main memory' as indicated in the diagram. For Part (c), candidates provided a variety of responses including PC, CPU, computer hardware and computer cycle instead of "computer system'.

Question 2

This question tested candidates' ability to distinguish between the types of user interfaces.

The question was well done by the majority of candidates. Some candidates found it difficult to provide another user interface other than those indicated in the two given figures, such as a menu-driven interface. Figure 2 showed, a command driven interface and Figure 3 displayed a graphical user interface. In addition, some candidates did not mention operating system as the name of the system software providing the user interface but gave the names of some operating system software such as Windows, Linux and DOS. Most candidates were able to provide the steps to change the name of a file using the different interfaces.

Question 3

This question tested candidates' ability to match input devices with their appropriate uses and to identify one organization where each of the given input devices was most likely to be used. It was well done by the majority of candidates. However, some candidates were unfamiliar with the usage of Optical Mark Reader (OMR) and Magnetic Ink Character Recognition (MICR) devices. In addition, some candidates had difficulty providing an organization that uses a sensor.

Question 4

This question tested candidates' ability to describe measures to secure data and maintain data integrity. It was satisfactorily done by the majority of candidates. Many candidates did not relate Part (b) of the question with the scenario provided and as such did not mention "hard drive' and "important files were missing' as examples of deliberate theft (Part b (i)) and "water damage to files left on employees' "desks' and "power damage to computer equipment' as examples of accidental damage (Part b (ii)). In addition, some candidates did not know what a physical file was.

Question 5

This question tested candidates' ability to explain concepts associated with the Internet. It was well done by the majority of candidates. However, some candidates found it challenging to explain the difference between the terms "e-learning' and "e-commerce'.

Question 6

This question tested candidates' ability to explain the characteristics and functions of information processing and to describe various methods of file organization and access.

The majority of candidates performed satisfactorily on the question. However, many candidates could not explain what data was contained in a master file and a transaction file. In addition, many candidates could not state the difference between the serial and sequential methods of file organization.

Section II – Productivity Tools

Question 7

This question tested candidates' knowledge of the basic features of a database management program. It was satisfactorily done by the majority of candidates. Some candidates provided two data types rather than the properties of a field (name, data type, size). In addition, some candidates did not mention the design view or datasheet view when deleting a field from a table. Many candidates were able to provide only one condition for the query (YTD SALES >50000) but the other condition (Type = "D") was missing.

Question 8

This question tested candidates' knowledge of the basic features of a spreadsheet program and was satisfactorily done by the majority of candidates. Some candidates found it difficult to provide the correct formula such as (=SUM(B2:B6) for Part (b) and the correct IF function (=IF(B2<100000.00, "POOR", "GOOD") for Part (d). In addition, for Part (c), some candidates could not indicate that the comma format with two decimal places was used in the spreadsheet provided.

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to arrange the five given steps in problem solving in the correct sequence; to identify the input in the given scenario; to compute the average number of storms and to develop an algorithm to solve a problem based on a given scenario.

The question was satisfactorily done by the majority of candidates. Most of the candidates were able to identify the first step in problem solving but were not able to list the remaining steps in order. Some candidates used four years in computing the average number of storms instead of three years. In addition, some candidates provided flowcharts and IPO tables rather than pseudocodes. In some cases, candidates used the actual data rather than the variables in writing the pseudocodes.

Question 10

This question tested candidates' ability to identify and correct errors in three given programming statements; to explain the difference between a variable and a constant; to provide an example of a constant using a PASCAL statement; and to provide an example of each given type of variable.

The question was poorly done by the majority of candidates. Many candidates could not identify and correct the errors in the programming statements given in Part (a). The correct responses are as follows:

(i) IF (X = 3) THEN Y := 8;

(ii) WHILE (X = 3) DO Y := Y + 1; (iii) FOR X := 1 TO 10 DO Writeln(X);

For Part (b), while most candidates provided the difference between a constant and a variable, they could not provide an example of a constant using a PASCAL statement. Most candidates provided assignment statements for the declaration of a constant in PASCAL.

In Part (c), most candidates provided accepted values of an integer and a real variable. However, they could not differentiate between a character and a string variable. Some candidates confused string with arrays data type.

Question 11

This question tested candidates' ability to use control structures and their knowledge of terms and concepts associated with programming. It was poorly done by the majority of candidates. For Part (a), most candidates seemed unfamiliar with the looping constructs of FOR and REPEAT and could not rewrite the given segments of the code using the FOR and REPEAT loops. The correct responses to this part are as follows:

(i) FOR Mark := 1 TO 40 DO Writeln(Mark);

(ii) Mark :=1; REPEAT Writeln(Mark); Mark := Mark + 1; UNTIL Mark = 40;

For Part (b), many candidates were unable to provide the correct terms for the letters A, B, C and D. The correct responses are as follows:

A – Compiler
B – Syntax errors
C – Logic errors
D – Debugging

For Part (c), candidates seemed unfamiliar with program documentation and its purpose. Most candidates mentioned that system documentation was produced by the system while user documentation was produced by the user which is incorrect.

Question 12

This question tested candidates' knowledge of arrays. It was satisfactorily done by the majority of candidates who were able to provide the name of the program, the name of the array and the size of the array. However, many candidates were unable to indicate that the purpose of the array, CSEC, is to store eight integers or to store the value zero in each location of the array.

Paper 03/1 – School-Based Assessment (SBA)

COMMENTS/RECOMMENDATIONS FOR TEACHERS

Generally, the presentation of the SBAs have improved. The following should however be borne in mind.

1. Some teachers failed to adhere to the CXC guidelines and mark scheme.

2. Most projects were well presented however, there were some exceptions in that the organization of printouts were poor.

3. Appropriate paper sizes were not used for letters which should be A4/letter size paper.

4. In a few instances, teachers submitted only soft copies and did not submit hard copy printouts which were required.

5. An individual detailed mark scheme was missing from a number of samples.

6. In some cases there was a lack of uniqueness among SBAs from the same centre.

7. Some projects were not properly or securely bound and sectionalized.

8. In most cases, the description of the project was not submitted.

9. Schools that have more than one teacher did not work cohesively to produce one project and one mark scheme.

10. Computer-generated printouts must match the marks and students on the moderation sheet and samples submitted.

11. It is recommended that teachers familiarize themselves with the CXC mark scheme so that students are allowed a better chance of gaining marks for the tasks.

12. Half marks should not be awarded for tasks.

13. Each project component should be strictly separated and labelled.

14. The sample sent by the school should match that generated by the CXC SIRS system.

Word Processing

1. Most students used headers and footers. No footnotes and endnotes were used.

2. Too few students used columns.

3. Most students inserted tables, however, they seldom used the formatting features for the tables.

4. Most of the formatting features were used by all candidates. However, superscript/subscript, single and double line spacing and page numbers were rarely used.

5. There was evidence that mail merge was done, however, most candidates failed to print the data source and primary document.

6. The majority of students were familiar with and used the spell-check feature.

7. Students imported well, however, graphics/charts were inserted in the wrong position. The size of graphics and charts were sometimes inappropriate.

Spreadsheets

1. About 70 per cent of candidates scored 50 per cent or more of the available marks for the spreadsheet.

2. Overall, the quality of candidates‘ submissions was good.

3. Widespread lack of formulae sheets worked to the disadvantage of a number of students, leading to a reduction in the marks awarded. Teachers should insist that students submit formulae sheets.

4. Formulae sheets must be legible, printouts should be at default font size or 100 per cent zoom.

5. In some instances, graphs were not printed or where they were printed, axes were not labelled and had no titles.

6. Students need to place greater effort in formatting the spreadsheet in order to limit printouts.

7. Teachers and students need to concentrate more on the quality of work done which are specific to the tasks, rather than on copious quantities of unnecessary printouts.

8. Sorted records should be clearly identified by highlighting or labelling the sorted range.

9. In the event of an insertion or deletion of records, records should be highlighted for easy identification.

10. Many students failed to successfully perform advanced filtering.

11. Students must pay closer attention to the colour scheme of charts which would make charts more legible, especially if printed in black and white.

12. Students need to be able to demonstrate the correct use of absolute cell referencing.

Database Management

General Comments

1. Records should be kept at the recommended amount stipulated by syllabus.

2. Teachers should ensure that structures (design views of tables and queries) are submitted.

3 Every effort should be made to fit tables/queries on one page.

4 Formatting should be properly done in Spreadsheet if data is to be exported to Database.

Specific Comments

Developing Tables

Most samples showed evidence of two or more database tables. Students should provide hard copy evidence of primary keys.

Simultaneous use of Two or More Tables/Files

This was not done as well as was required. Hard copy proof of relationship diagram was not provided by many students.

Modifying Database Tables/Files

There was not much hard copy evidence of addition/deletion/modification of fields or records. Evidence of this activity should be in the form of printed copies of the *before* and *after* modification to table/records. Printing of the structure that initiated the modification can also be done. An example here is the *Delete Query* or the *Make Table action*.

Queries

Simple queries were well done and the majority of students were able to perform at lease one complex query. Additionally, most students were able to comfortably do at least one calculated field. In some instances, an Update Query was seen instead of a Calculated field.

The design views of **all** queries should be included to provide evidence of activities performed.

Sorting a Database File

This activity was performed well by most students.

Generating Reports

This section of the syllabus was done very well by many of the students, with a few samples not showing statistical and/or summary features.

Programming

General Comments

1. In a number of cases, students responses showed an extremely high degree of similarity.

2. Teachers are encouraged to provide sufficient guidance to allow students to complete their assignments and should resist giving them the solution.

3. Many problems were trivial and thus provided little scope for students creativity.

4. Teachers should ensure that the project description fits the requirements detailed in the mark scheme as indicated in pages 27–29 of the syllabus.

5. Program solutions should be confined to the program language specified in the syllabus (Pascal.)

Specific Comments

Problem Statement/Definition

The problem statement was not generally submitted along with the assignment. Students must follow the requirements given in the syllabus as stated on page 29. Some candidates used the IPO chart as a replacement for the problem statement/definition. This should not be done.

Representing the Solution in a Flowchart or Pseudocode

Generally, this area was fairly well done. However, improvements can be made, hence the following areas should be given focus:

1. The start of pseudocode should be clearly indicated with the word START.

2. Variables must be clearly identified, declared and initialized. It would be helpful for students to create a data (variables) dictionary prior to the algorithm. An IPO chart would be useful with this. Some candidates did not declare arrays. The project should be substantive enough to accommodate arrays.

In the processing section, students must clearly indicate where looping and selection controls will be implemented. Control structures in flowcharts were not properly done. For example, Yes/No options were not labelled; there were three or more flow lines going away from the decision box; there was a lack of connectors and the use of inappropriate shapes; the processing box and input/output box; were used interchangeably. There was little difference seen between the pseudocode, and the programming code.

Students showed high proficiency in requesting data for storage and the output of information.

Trace Tables

This section was very poorly done or in some cases not attempted. The following were observed:

1. The variable names used in the algorithm were not identified in the Trace Table. In some cases, the variable names used were not in the algorithm at all.

2. Some projects did not require the creation of trace tables.

3. Students did not correctly show the data flow changes in the table as sequentially defined by the algorithm.

Programme Working to Specification

The effectiveness with which the programme achieved the objective

Generally, this section was fairly well done. Most candidates were able to produce the Pascal code but the majority of candidates did not produce evidence of the program actually running in the form of screen shots — working program and compilation which should be submitted.

Language features used to achieve a working program

This section was generally well done.

Teachers must ensure that the problem design facilitates the use of the IF THEN ELSE construct. Also, teachers must design the problem to facilitate a variety of looping control structures especially with the use and manipulation of arrays.

Most students used two or more data types; however, greater attention must be paid to variable declaration and initialization. In some projects, students used the actual data as variable names: for example, 4407: integer.

Most students performed the IF THEN control appropriately but limited the use of the IF THEN ELSE construct. Some students used many IF THEN and not an ELSE some did not put these IF controls within a looping construct.

Looping controls were moderately done. Students need to properly initialize the looping controls. The following is an example where a student started a WHILE loop without initializing it:

WHILE NAME, <> ‗END‘ DO

READLN NAME

And the NAME variable is not declared before the WHILE or

READLN SCOUNT, NAME

WHILE ID <> 0 DO

Clarity of the program

This section was generally well done. However, the following observations were made:

1. Students in some cases, did not put in the Pascal code, the author of the program, the date created and a simple statement of the task the programme sought to solve.

2. Students did not use indentation of the program code well. Too many students had everything in one margin and no indentation for looping and selection controls.

Most students were awarded the mark for user friendliness, however, some programs did not indicate to the user how and when to input data by messages or prompts and there were no labels to indicate what information was being displayed.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE

JANUARY 2011

INFORMATION TECHNOLOGY
GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

January 2011 was the second examination based on the revised syllabus which was examined for the first time in May/June 2010.

The revised syllabus is a combination of the former General and Technical proficiencies. Eight hundred and seven candidates wrote the examination and approximately 32 per cent obtained Grades I–III.

DETAILED COMMENTS

Paper 01 – Multiple-Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested the Theory profile; 15 questions tested the Productivity Tools profile and 15 questions tested the Problem Solving and Programming profile. Candidates' mean performance was just above half of the maximum attainable mark. Areas of weakness which teachers must focus on are Problem Solving and Programming; Database Management and concepts associated with the Internet.

Paper 02 – Structured Responses Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks, testing the Theory profile. Section II consisted of two questions worth 15 marks and which tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks, testing the Problem Solving and Programming profile.

Section 1 – Theory

Question 1

Part (a) of the question tested candidates' ability to distinguish between the types of user interfaces. The majority of candidates were familiar with software user interface but were unfamiliar with hardware user interface. The majority of candidates were unable to state the name of one hardware interface such as touch screen and to provide an example such as a supermarket or automatic teller where it could be used.

Part (b) of the question tested candidates' knowledge of the types of processing modes. The majority of candidates were able to provide an advantage of real-time processing such as the information being up-to-date but were unable to provide a suitable disadvantage. One such disadvantage is that the computer must be online or solely dedicated to the task.

Part (c) of the question tested candidates' ability to distinguish between systems programs and application programs. Performance here was very encouraging. The majority of candidates were able to match the applications given with the types of software provided.

The mean score on this question was 3.81 which was 38.10 per cent of the total mark available.

Question 2

Part (a) of this question tested candidates' ability to convert numbers from binary to hexadecimal; find the two's complement representation of a negative number and find the ASCII code for a given character. This question was poorly done by the majority of candidates. Most of the candidates seemed unfamiliar with ASCII code as this is a new inclusion in the syllabus. For the hexadecimal, some candidates were able to get the answer **5 14** but did not convert the **14** to letter **E** as used in hexadecimal numbers. Two's complement continues to challenge candidates. While some candidates could convert 72 to binary (01001000), they could not find the one's complement of 72 (10110111) and add 1 to it to get the required answer (10111000).

Part (b) of the question tested candidates' ability to manipulate units of storage. It was satisfactorily done. Many candidates used 1 TB = 1000 GB instead of 1024 GB. The required answer was obtained by dividing 1024 by 16 = 64

Part (c) of the question tested candidates' ability to distinguish between primary and secondary storage media. The majority of candidates were able to identify the given storage media as primary or secondary storage media

The mean score on this question was 1.77 amounting to 17.7 per cent of the total attainable.

Question 3

This question tested candidates' ability to match input and output devices to given tasks. The majority of candidates scored high marks in this question. A few candidates could not recognize that plotters are used for printing of large building plans while Pads and Tablets are used for preparing architectural drawings.

This question produced the highest mean score (7.77 out of 10). Two hundred and ninety-one candidates scored the maximum mark.

Question 4

This question tested candidates' knowledge of terms associated with data communications and networks. Part (a) of the question was poorly done. The majority of candidates could not identify wireless as the type of transmission media used in the given scenario. Many candidates incorrectly provided responses such as e-commerce, Internet banking and telemarketing as the type of transmission media used in the given scenario.

Part (b) was satisfactorily done. Many candidates were able to explain that a hotspot is a public place where Internet access is provided via wireless. A variety of responses was

provided for the disadvantages of having access to a hotspot such as a place you could get robbed. Non-availability of secure access or having to pay for the access would also be suitable responses.

Part (c) of the question was well done. The majority of candidates were able to identify two devices that can be connected to a WI-FI such as a notebook computer, a cell phone, game console, MP3 player and PDA.

Part (d) was rather challenging for candidates. The majority of candidates were not familiar with the concept of „line-of-sight' and „scattered infrared' communication. Line of sight communication refers to a point-to-point communication between two devices whereas scattered infrared communication refers to a broadcast of infrared transmission in multiple directions.

Part (e) was equally challenging as candidates were not familiar with the terms as indicated in Part (d).

The mean mark for this question was 3.16 out of a maximum of 10.

Question 5

This question tested candidates' ability to provide advantages and disadvantages for given scenarios on current technological trends and the impact of Information Technology in the various areas of work. General performance on this question was just above average.

Part (a) of the question was poorly done as the majority of candidates were not familiar with the operation of an automatic voice mail system. Part (b) was well done. Most candidates were able to provide suitable advantages and disadvantages.

Part (c) was also well done. The majority of candidates were familiar with the use of credit and debit cards for transactions and were able to provide one advantage such as ease of payment and the ability to travel without cash. For the disadvantages, candidates mentioned that cards could get lost or stolen and the machines could malfunction. These were acceptable responses.

Part (d) of the question was satisfactorily done. The majority of candidates provided suitable advantages such as storage, retrieval of large amounts of information, and increased productivity. Finding suitable disadvantages proved challenging to candidates. Some candidates mentioned workers wasting time on Facebook or becoming lazy. A suitable disadvantage could be the need for workers to be retrained or keep themselves up-to-date with technology.

Part (e) was satisfactorily done. The majority of candidates were able to provide advantages such as tasks get completed accurately and on time. While most candidates provided health problems as disadvantages of using computers for a long period, others stated that the computer could get heated and burn up.

Question 6

This question tested candidates' knowledge of the various methods of file organization and files that are used with applications. Part (a) was satisfactorily answered but some candidates seemed unclear about the difference between ordered and unordered file structure.

Part (b) of the question was well done by the majority of candidates. Most of the candidates were able to correctly indicate whether the given files were temporary or permanent.

Section 2 – Productivity Tools

Question 7

This question tested candidates' knowledge of the basic features of a spreadsheet program. The majority of candidates were unfamiliar with concepts associated with spreadsheet such as range, function and chart. More practical work using a spreadsheet program is needed to correct this problem.

Although overall performance on this question was above average; only five candidates obtained the maximum marks for the question.

For Part (a), most candidates were able to indicate A3:A7 as the range of cells.

In Part (b), the majority of candidates could not identify the comma (,) format as the data format applied to the number of accounts.

For Part (c), most candidates did not recognize that the data was sorted on the Bank field.

In Part (d), the majority of candidates could not provide MAX(D3:D7) as the correct function

The majority of candidates could not provide the correct ranges (A3:A7 and E3:E7) used to create the pie chart for Part (e).

Question 8

The question tested candidates' knowledge of the basic features of a database management program. The majority of candidates found it difficult to provide suitable responses for the various parts of the question. More practical work using a Database Management program is needed to correct the difficulties experienced by candidates.

The majority of candidates could not determine that the Credits field was used to sort the COURSE table for Part (a).

In Part (b), many candidates were unfamiliar with the concept of a primary key and were unable to identify Cid as the primary key for the COURSE table.

The majority of candidates were able to join the table and identify Scott as the Dean of the Faculty offering the course ECN 100 for Part (c).

In Part (d), most of the candidates were unable to provide the correct query. A correct response would be Faculty = "NS" AND Credits > 5.

Most of the candidates could not provide the correct formula for the calculated field FEE. The expected response for Part (e) is as follows:

FEE: [Credits] * 250

In Part (f), the majority of candidates could not identify Faculty as the most appropriate field used to group the data in the COURSE table.

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to manipulate data in an array.

Part (a) of the question was poorly done by the majority of candidates. Candidates were unable to correctly write the PASCAL code to declare the array List1. The correct response is as follows:

VAR List1: ARRAY[1..4] of integer;

Part (b) was poorly done as the majority of candidates could not write the correct contents of the two arrays after the execution of the segment of code provided. The correct response is as follows:

List 1:	**1**	**1**	**0**	**1**
List 2:	**1**	**3**	**5**	**7**

The contents of List2 are unchanged while the new contents of List1 are obtained by subtracting the elements of List2 from the elements of List1.

The mean score on this question was less than two out of a total of ten, with scores ranging from zero to ten. This area proved very challenging to candidates. Teachers are advised to devote as much time as possible to this area of the syllabus.

Question 10

This question tested candidates' ability to manipulate data in an array. The majority of candidates could not provide correct responses for the various parts of the question and seemed unfamiliar with the concepts tested. The correct responses are as follows:

(a)
```
FOR index := 1 TO 4 DO
        TEST[index] := "";
```

(b)
```
FOR index := 1 TO 4 DO
        IF TEST[index]  = "*"
        THEN count := count + 1 ;
WRITELN (count);
```

(c)
```
FOR index  := 1 TO 4 DO
        IF (TEST[index] ) <> "*" OR  (TEST[index] ) <> "#"
        THEN WRITELN("NO");
```

Performance on this question was also poor with scores ranging from zero to 15. The majority of candidates hardly scored on this question.

Question 11

This question tested candidates' ability to complete a trace table for a given algorithm. The majority of candidates were able to complete the trace table correctly for Part (a). For Part (b), the majority of candidates were able to identify LOOP as the control structure used in the given algorithm.

Question 12

This question tested candidates' knowledge of concepts associated with problem solving and programming. Many candidates did not have a clear understanding of the concepts required to answer the various parts of the question. Parts (a), (g) and (f) proved challenging to candidates but suitable responses were provided for the other parts of the question.

Paper 03/2 – Alternative to School-Based Assessment (SBA)

This paper is the alternative to the SBA and consisted of four questions testing the Productivity Tools and Problem Solving and Programming profiles.

Question 1 – Word Processing

This question tested candidates' knowledge of the various features of a word-processing application. The question was based on a memo provided.

Overall, word processing was poorly done. Candidates misinterpreted the question. They used actual information from the memo in their responses instead of explaining how they would arrive at the various features illustrated in the memo.

The average score on this question was below 5 per cent with performance ranging from 0 to 20.

For Part (a), many candidates stated that the justification was left instead of full justification.

Candidates were not able to recognize the various types of line spacing used in the memo on Part (b). Teachers need to practice using 1.5 and double spacing with their students.

In Part (c), formatting features were easily identified by candidates and was well done.

For Part (d), candidates were able to recognize the use of spell check and search and replace, although some were unable to state *how many* spelling corrections were made in the memo.

Part (e) required candidates to explain how they would modify the memo to ensure that the date would be the same as the computer date. This part was poorly answered as candidates stated that they would type in the date, instead of inserting a date field that would automatically update. Many candidates received no marks for this part.

For Part (f), candidates were required to indicate whether four features (header, footer, footnote, or endnote) were found in the memo. Candidates tried to justify where each of the features were found in the memo or defined the four features, instead of just selecting the correct answer.

Part (g) was well done as candidates were able to explain how they would remove the underline from a title.

In Part (h), candidates were unable to identify two documents that would be necessary to perform a merge for the memo. In many cases, they listed applications such as word processors, databases for the addresses, instead of stating the formal names of the document (for example, primary or main, secondary or data source).

Part (i) asked candidates to indicate the text in the memo that was appropriate for merge fields. The majority of candidates were unable to identify these. Some candidates simply ignored this part of the question.

For Part (j), candidates were unable to indicate how many merge fields (the recipient of the memo and his job title) would be used in the memo. They instead gave the number of records that would be obtained after the merge.

Question 2 – Spreadsheet

This question tested candidates' knowledge of the various features of a spreadsheet application. The question was based on the chart provided.

The mean score on this question was just above half of the maximum attainable. This signals good performance.

The majority of candidates were able to name the type of chart illustrated in Part (a).

In Part (b), candidates were able to name other types of charts that were appropriate for representing the data.

Many candidates misinterpreted Part (c) which asked for the purpose of the given chart, by giving a general statement about charts.

For Part (d), many candidates were able to identify the chart and x-axis titles, although a few wrote the actual names of the countries instead of the required label.

The majority of candidates were able to write the data that was used to create the chart for Part (e).

In Part (f), most of the candidates were able to state the numeric format that was appropriate for the data in the table.

Performance on Part (g) was fair, although some candidates only selected column B for the sort.

Part (h) was fairly well done, however, some candidates wrote the number instead of the country that would be at the top of the list.

For Part (i), many candidates wrote formulas instead of functions. They need to understand the difference between the two.

Many candidates had difficulty writing down the requirements of a criterion for filtering data in Part (j). Some attention should be paid to teaching this topic. Many candidates wrote the results instead of the criteria.

For Part (k), some candidates demonstrated an understanding of obtaining the results of the criterion, and answered appropriately, although the majority did not understand the concept.

Many candidates did not display adequate knowledge of the difference between justification and merging of cells in Part (l). Many candidates either indicated that they would centre the text or merge the cells; neither of these is correct.

Question 3 – Database Management

This question tested candidates' knowledge of the various features of a Database Management application. The question was based on a database with two tables and a report generated from the data in the database.

The mean score on this question was below half of the maximum attainable marks, scores ranged between 0 and 20.

In Part (a), some candidates were unable to differentiate between field names and data types.

For Part (b), some candidates confused fields with records

Candidates were able to explain why some fields are not suitable for a primary key for Part (c).

In Part (d), some candidates were able to identify that the arrangement of the records was a sort.

For Part (e), candidates were able to indicate the number of diplomats from Africa who visited the country.

Some candidates were able to state the fields which grouped, sorted and summarized the data in the report for Part (f).

In Part (g), candidates understood what was required for the calculation in the query, but could not formalize the correct syntax.

For Part (h), the majority of candidates were able to indicate which table was used to perform the stated query and what the 6430 represented.

In Part (i), candidates were able to state what the required query was asking for and also the result of the execution of the query.

Question 4 – Programming and Problem Solving

This question tested candidates' knowledge of concepts associated with problem solving and programming.

The mean score on this question was less than 10 out of a maximum of 30. Similar to Paper 02, Programming and Problem Solving continue to be a very challenging area for students. Teachers need to address this problem.

Most candidates attempted this question and were able to identify at least one of the variables. However, a small percentage of candidates listed the contents of the line where the variable was located. This was not required.

Part (b) was poorly done. Most candidates were unable to properly write their responses while others had their order written backwards.

The majority of candidates attempted Part (c), however, they failed to set down the declaration in the correct order or format

Many candidates attempted Part (d), however, their results suggested that they had difficulty tracing the code

Most candidates attempted Part (e), however, some candidates had difficulty identifying the correct line number.

In Part (f), candidates gave the general definition of an algorithm but did not understand what the given algorithm was intended to do.

Many candidates attempted Part (g) but it was poorly done. A small percentage of candidates received very good marks for this part question.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

MAY/JUNE 2011

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

In May/June 2011, 24,355 candidates from the participating territories wrote the Information Technology Examinations. Performance declined slightly with 79% of the candidates obtaining acceptable grades as compared to 84% in 2010.

DETAILED COMMENTS

Paper 01 – Multiple-Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Candidates' performance showed that much more needs to be done by teachers in terms of syllabus coverage.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured questions. Section I consisted of six short-answer questions worth 60 marks and tested the Theory profile. Section II consisted of two structured questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four structured questions worth 45 marks and tested the Problem-solving and Programming profile.

Section I - Theory

Question 1

Part (a) of the question tested candidates' ability to identify and name the hardware components of a computer that performs three given functions. This part of the question was satisfactorily done by the majority of candidates. However, in Part (a) (iii), many candidates did not state Read Only Memory (ROM) as the hardware component which contains instructions that are used during the booting of the computer.

Part (b) tested candidates' ability to interpret the hardware specifications of a given computer system. This part of the question posed difficulty for the majority of candidates. For the hard drive in Part (b) (i), candidates did identify SATA as the type, 160GB as the capacity and 5400 RPM as the speed. For the memory capacity in Part (b) (ii), candidates did not identify 1GB as the memory capacity. For the resolution of the display in Part (b) (iii), candidates did not identify 1024 x 600 as the resolution.

Part (c) tested candidates' ability to identify the type of data access method used for two given storage devices. This part of the question proved challenging to candidates. They were unable to identify direct access as the method used to access data from a hard drive and sequential access as the method used to access data from a magnetic tape.

Question 2

Part (a) tested candidates' ability to match applications with the most appropriate devices used in the given applications. This part of the question was well done by the majority of candidates.

Part (b) tested candidates' ability to distinguish between types of user interface. This part of the question was satisfactorily done. Many candidates did not identify Operating System software as the type of program that provides the user interface. Some candidates provided the name of the operating system such as Windows XP and Windows 7.

Question 3

Part (a) tested candidates' ability to identify the type of software package used in the given scenario and to provide an advantage and a disadvantage of the software package. This part of the question was poorly done. The majority of candidates could not identify Integrated Software package as the type of software used.

Part (b) tested candidates' ability to indicate the type of processing modes best suited for two given tasks. This part was well done by the majority of candidate who correctly indicated *batch processing* for Part (b) (i) and real-time processing for Part (b) (ii).

Part (c) tested candidates' ability to find the decimal, binary and hexadecimal equivalent of an octal number and to convert a negative integer to Binary Coded Decimal (BCD). This part of the question was poorly done by the majority of candidates who could not provide the correct conversion. An example of a correct response is as follows:

Octal 243 = 163 in the decimal number system
Octal 243 = 10100011 in the binary number system
Octal 243 = A3 in the hexadecimal number system
BCD of -856 = 1011 1000 0101 0110 or 1111 1000 0101 0110
(the negative sign is indicated by 1011 or 1111)

Question 4

This question tested candidates' knowledge of networks, measures to secure data and equipment, and methods of data communication.

This question was satisfactorily done by the majority of candidates. However, some candidates confused network with Internet. Many candidates were able to explain that the benefits of a network were to share equipment such as printers and files and data. Many candidates correctly identified the network as an intranet since it was a private network used within the company/organization. Most candidates described password and encryption as two security measures used to protect data and equipment. Most candidates also identified use of cell phones and sending of text messages as the two ways in which the office could communicate with the gardener.

Question 5

Part (a) tested candidates' understanding of the use of communications technology and the Internet. This part of the question was well done by the majority of candidates. Candidates provided a variety of methods to get the completed order to the agent as well as the disadvantage of each method. Some correct responses are as follows:

- Order made by Email. Disadvantage—email may be tagged as junk mail or sent to the wrong email address or not read by the agent
- Order made by fax. Disadvantage—fax may be faded or sent to the wrong fax number
- Order made by telephone. Disadvantage—typographical or transcription error
- Order collected by the agent personally. Disadvantage—time consuming

Part (b) tested candidates' ability to describe methods of verification and validation of the order. This part of the question was poorly answered by the majority of candidates who were unable to distinguish between verification and validation. A suggested response is as follows:

Verification of the order:

Comparing the order entered at the head office with the original order sheet, or checking the order with the agent, or checking the order with the home owner who made the order.

Validation checks:

- Data type check—check if the correct type of data is entered. For example, numeric data should be entered in the quantity field
- Range check—check if data is within a given range. For example, the quantity should not be less than 1 and not more than 100
- Inconsistency check—check to see if the data on the order are consistent. For example, if the title is Mr then the gender should be Male
- Reasonableness check – check the order to see if it is reasonable. For example, the pattern of previous orders for a home owner can be used to determine if the current order is within the usual order pattern.

Question 6

This question tested candidates' ability to identify the types of file organization and access methods used in a given scenario. This question was satisfactorily done by the majority of candidates. However, the majority of candidates had difficulty in Part (c) which required them to explain the process of deleting the 39-minute interview. Some candidates seemed unfamiliar with the various methods of file organization and access. An example of a correct response is as follows:

Part (a)

Device B is sequential—records are arranged in the numerical order

Part (b)

Device A: 98, 84, 105, 39, 31, 78, 109, 63
Device B: 31, 39, 63, 78, 84, 89, 105, 109

Part (c)

To delete a record in a sequential file:
Copy record 31
Skip record 39
Copy records 78 to 109

OR

1. All the records with key values less than the record to be deleted are written to the new file.

2. When the record to be deleted is encountered it is not written to the new file.

3. All the remaining records are written to the new file.

Part (d)

(i) Index-sequential file access

(ii) Index: 3; keys: 62 and 65

Section II – Productivity Tools

Question 7

This question tested candidates' knowledge of basic features of a spreadsheet program.

Candidates' performance on this question was quite good. For Part (a), many candidates indicated the IF function but were unable to indicate the correct test condition and results. The correct response was

=IF (C2='Junior', 100, 200) or
=IF (C2='Senior', 200, 100)

For Part (b), the majority of candidates provided the correct SUM function as =SUM(F2:F6). In some cases, candidates used the addition formula which is =F2+F3+F4+F5+F6.

In Part (c), the majority of candidates did not indicate currency as the numeric data format applied to column F. In a few cases, candidates indicated dollar or money format which was acceptable.

Part (d) was poorly done. The majority of candidates did not identify STATUS as the primary field and YEARS or RATE or FEES as the secondary field used to sort the data.

Question 8

This question tested candidates' knowledge of basic features of a database management program.

This question was satisfactorily done by the majority of candidates. For Part (a), the majority of candidates provided the correct data type for the Sector field (text or alphanumeric) and the Employees field (numeric).

For Part (b), the majority of candidates identified CID as the primary key for the Company table.

In Part (c), many candidates identified that the company table was sorted on the Employees field in ascending order.

For Part (d), many candidates stated that the *C code* field would be used to join the two tables.

Part (e) proved challenging to the majority of candidates who could not write the correct query. Some candidates provided the results of the query rather than the query itself. An example of a correct query is as follows:

Sector = 'Telecommunications' AND Employees > 200.

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to complete a truth table on a given set of rules and to write pseudocode to represent one of the given rules.

Part (a) was well done by the majority of candidates who completed the truth table correctly with the response P, R, R, F.

Performance on Part (b) was satisfactory. Some candidates indicated AND and OR as the Boolean values instead of Y and N.

Part (c) was poorly done as the majority of candidates could not write the correct algorithm for the given rule. An example of a correct response is as follows:

If (test1=Y) and (test2=Y) then grade = P

Question 10

This question tested candidates' ability to write program fragments using the PASCAL programming language for two given tasks.

Many candidates avoided this question. The use of arrays in programming challenged candidates. An example of a correct response is as follows:

(i)
```
For index :=1 to 10 do
Num := Num + LONG[index];
Writeln(num);
```

(ii)
```
For index := 1 to 10 DO
if (LONG[index] < 9)
then writeln(LONG[index]);
```

Question 11

This question tested candidates' ability to complete a trace table based on a given algorithm and to indicate the purpose of the algorithm.

This question was well done by the majority of candidates who completed the trace table correctly. The acceptable result was 2, 4, 6, 8 or for an infinite loop 2, 2, 2, 2. For Part (c), many candidates provided the purpose of an algorithm rather than the purpose of the given algorithm. The purpose of the given algorithm was to multiply each number by 2 or output the number 2, if it is an infinite loop.

Question 12

This question tested candidates' ability to explain commonly used programming concepts.

This question was poorly done by the majority of candidates who were unable to explain the given programming concepts and to provide one example in each case. An example of a correct response is as follows:

(a) Conditional branching gives a choice based on a condition.
E.g. IF -THEN, and IF-THEN-ELSE

(b) Looping structure replicates or repeats the same process until the end or it stops.
E.g. WHILE, REPEAT, FOR

(c) Debug a program finds errors so that the program can be corrected.
E.g. syntax and logic errors

(d) Declaring the variables assigns data types to variables.
E.g. Var x: integer

Initializing variables assigns initial values to variables
E.g. c = 9

(e) Document a program inserts comments within a program so that the program logic is easy to follow. E.g. {This subprogram computes the sum of the numbers in the array}

Paper 03 – School-Based Assessment (SBA)

The SBA consisted of a practical project testing the productivity tools (Word processing, Spreadsheets and Database Management) and problem-solving and programming profiles. Generally the presentation of the SBAs has improved. In most cases, the description of project was not submitted. Each project component should be strictly separated and labelled.

COMMENTS/RECOMMENDATIONS FOR TEACHERS

Sample Uniqueness

- In many cases, there was a lack of uniqueness among SBAs from the same centre. In fact, evidence showed in many samples that one student's work was used for the other students' samples, or an outline provided for the students to insert a few changes prior to submission.

Moderation Sheets

- The samples sent by the school should match that generated by the CXC SIRS system.
- Computer-generated printouts must match the marks and students on the moderation sheet and samples submitted.
- Teachers should mark the SBA and place the grades on the moderation sheet next to teacher's grade.

Mark schemes

- Some teachers failed to adhere to the current CXC guidelines and mark scheme.
- It is recommended that teachers familiarize themselves with the current CXC mark scheme to allow candidates a better chance of gaining marks for the tasks.
- Schools that have more than one teacher did not work together to produce one project and one mark scheme.
- An individual, detailed mark scheme was missing from a number of samples.
- Individual mark schemes need to be submitted for each of the five students.

Hard and Soft copy Submissions

- In more instances this year, teachers submitted only soft copies (CDs and memory sticks) and did not submit hard copy printouts that were required. Only *printouts* will be marked.
- Teachers are therefore advised to submit hard copy and not soft copy samples which must follow CXC guidelines.
- Teachers should make sure that each student's SBA is bounded and properly labelled.

- For teachers who have worked at marking centres, please be advised not to submit samples with 'M's on the pages. This is only done at CXC marking centres and is final.
- Teachers are advised not to use red or green ink when marking the SBA as these are used by the moderators. Black ink or pencil is acceptable.

- Teachers should avoid submitting lengthy, irrelevant data in the SBA. Fifteen to 20 pages for each component is more than adequate.

- Where there is more than one teacher, one common SBA and mark scheme should be submitted.

- No half marks should be awarded for any task.

- Marks should be given for work actually completed by the student.

Word Processing

This year students must be commended for their creativity in the flyers, brochures and invitations.

- SBA questions should be structured to assess skills relevant to the syllabus such as formatting features (inclusive of tables, columns, text formatting e.g. superscript, etc).

- Most students used headers and footers. No footnotes and endnotes were used.

- Too few students used columns.

- Appropriate paper sizes were not used for letters which should be A4/letter size paper.

- Most students inserted tables; however, they seldom used the formatting features for tables.

- Most of the formatting features were used by all candidates. However, superscript/subscript, simultaneous use of single and double line spacing and page numbers were rarely used.

- Transition from single-line spacing to double line spacing should be evident in students documented work.

- There was evidence that mail merge was done; however, most students failed to print the data source and primary document. The data source, primary and secondary documents (between three and five letters) should be submitted as proof/evidence of mail merge.

- Students imported well, however, most of the time the graphic or chart was inserted in the wrong position. The sizes of graphics and charts were also sometimes inappropriate. Teachers should encourage students to properly format all imported files to fit the given location.

- Students should be encouraged to use page numbering features.

Spreadsheets

- Overall the quality of students' submissions was good.

- Widespread lack of formulae sheets worked to the disadvantage of a number of students, leading to a reduction in marks awarded. Teachers must insist that students submit formulae sheets.

- Formulae sheets must be legible. Students should ensure that formulae sheet printouts are at default font size, or 100% zoom.

- Students need to place greater effort in formatting the spreadsheet in order to limit printouts. Too many unnecessary printouts were submitted. It is suggested that there be less than 30 printed pages for a single student's spreadsheet component.

- In some instances, graphs were not printed, or for the graphs which were printed, the axes were not labelled and had no titles.

- Sorted records should be clearly identified by highlighting or labelling the sorted range.

- Teachers and students need to concentrate more on quality of work done which are specific to the tasks, rather than copious quantities of unnecessary printouts.

- In the event of an insertion or deletion of records, records should be highlighted for easy identification.

- Many students failed to successfully perform advanced filtering.

- Students should pay closer attention to the colour scheme of charts, which would make charts more legible, especially if printed in black and white.

- Students need to be able to demonstrate the correct use of absolute cell referencing.

- Students should clearly indicate when a specific task is being executed. For example, if advanced filtering is the task, then a caption should be added to the results to indicate the criteria, if it is not previously indicated. Similarly, if sorting is the task, then a caption (label) indicating the particular field would be useful.

Database Management

General Comments

Overall, the mark schemes were good. The majority of SBA submissions used the mark schemes from the current CXC syllabus. As a result, there was less variation in the moderated marks. Usage of the new syllabus guidelines (effective from 2010) is very important.

- Teachers should try to keep records at the recommended number as stipulated by syllabus.

- Teachers should ensure that structures (design views of tables and queries) are submitted. Printouts of original tables, queries and report results are to be submitted. Screen shots should be used to supply supplementary evidence (primary key, criteria, calculated fields and sorting). Duplications of printouts should be avoided, however, evidence of modifications (sorting, additions and deletions of records) should be provided in 'before' and 'after' printouts.

- Try to fit tables/queries on one page.

- Ensure that formatting is done properly in Spreadsheet if data is to be exported to Database.

- There was an improvement in the presentation of samples. However, one neatly bound sample per candidate should be submitted with clearly defined sections (tables, queries, report) and graded individual mark schemes should always accompany each sample submitted.

Specific Comments

Developing Tables

Most samples showed evidence of two or more database tables. Although, some primary key evidence was seen there is a need for more hard copy evidence of primary keys used in the tables (use screen shots).

Simultaneous use of Two or More Tables/Files

There has been little improvement in this area since 2010. This section has still not achieved as well as required. Hard copy proof of relationship diagrams should be seen in the query design view.

Modifying database tables/files

Again, there seems to be little improvement since the 2010 report. There was not much hard copy evidence of addition/deletion/modification of fields or records. This activity can be evidenced by students submitting printed copies of the *before* and *after* modifications to table/records. Printing of the structure that initiated the modification can also be done. An example here is the *Delete* query or the *Make Table* action.

Queries

In general, simple queries were well done and there was a slight improvement in the ability of students to perform queries with calculated fields. However, more emphasis should be placed on performing complex queries. The design views of all queries should be included to provide evidence of activities performed. The following should be included:

- Simple queries
- Complex queries
- Calculated fields

Sort a Database File

This activity was performed well by most students but a little more emphasis can be placed on sorting in a table.

Generating Reports

This section of the syllabus was well done by many of the students; however, a few samples did not show statistical and/or summary features and grouping. It should be noted that as much as possible an 'appropriate' report title must be used. The design view of the report is not necessary.

Programming

General Comments

1. Project Description

Teachers should ensure that the scope of the project meets the requirements as detailed in the syllabus (P.27–29). The project should be sufficiently substantive to cover all the elements and skill sets measured by the mark scheme. These should include:

- at least three variable types
- use of array data structures
- variations of control structures

Some of the problem descriptions submitted this year were trivial and hence provided limited scope for students to demonstrate a variety of approaches to the problem solving.

2. Student responses

Teachers are encouraged to provide sufficient guidance to allow students to complete their assignment but should resist giving them the solution. In a number of cases, students' responses showed an extremely high degree of similarity. Emphasis should be placed in making students aware of the difference between an algorithm/pseudocode and a source code. Further, teachers need to ensure that students understand the nature of a 'problem statement'. It should not simply be the restatement of the project description. Note also that program solutions should be confined to the program language specified in the syllabus—Pascal.

3. SBA submission

Samples submitted should be properly packaged. That is, *all* printouts for each sample must be securely fastened and a mark sheet attached. Sections should be appropriately demarcated. *Only* printed copies of students' responses should be submitted. Soft copies on CDs, flash drives, etc. are not required for moderation purposes. Teachers should ensure that all sections of the student's work are submitted.

Specific Comments

Problem Statement/Definition

Generally, the problem statement was submitted along with the student responses. Students must follow the requirements given in the syllabus as stated on page 29. Some students used the IPO chart as a replacement for the problem statement/definition. This practice should be discouraged.

Representing the Solution in Flowchart or Pseudocode

Generally this area was fairly well done. However, the following should be borne in mind so that improvements can be made:

- Clearly indicate the start of the pseudocode with the word START.
- Students are required to do either a flow chart or pseudocode; not both.
- The control structures in flow charts must be clearly defined and used.
- Variables must be clearly identified, declared and initialized. It would be helpful if students create a data (variables) dictionary prior to developing an algorithm. The use of an IPO chart would be helpful in this regard.
- Arrays should be identified in the variable descriptors.

In developing the IPO chart, students should clearly indicate where looping and selection controls will be implemented. Control structures in flow charts were not properly done. For example, Yes/No options were not labelled, three or more flow lines going away from the decision box were used; there was a lack of connectors and inappropriate shapes; the processing box and input/output box were used interchangeably. In the pseudocode, there was little difference seen between that and the programming code. Students showed high proficiency in requesting data for storage and output of information.

Trace Tables

This section was very poorly done, or in some cases, not attempted. The following were observed:

- The variable names used in the algorithm were not identified in the trace table. In some cases, the variable names used were not in the algorithm at all. The variables identified in the trace tables should be mapped directly to the variables defined in either the algorithm or program submitted.
- Some projects did not require the creation of trace tables.
- A clear distinction needs to be made between an IPO chart and a trace table. A trace table cannot be used to replace an IPO chart.
- Students did not correctly show the data flow changes in the table, as sequentially defined by the algorithm.

Programme Working to Specification

The effectiveness with which the program achieved the objective

Generally, this was fairly well done. Most students were able to produce Pascal code but the majority of them did not produce evidence of the program actually running, in the form of screen shots—working programme and compilation—which should be submitted.

Language features used to achieve a working program

This section was generally well done.

Teachers must ensure that the problem design facilitates the use of IF- THEN- ELSE construct. Also, teachers must design the problem to facilitate a variety of looping control structures, especially with the use and manipulation of arrays.

Teachers are reminded that the use of 'Goto' to simulate loops is not allowed. Structured programming is what is required at the CSEC level.

Most students used two or more data types; however greater attention must be paid to variable declaration and initialization. In some projects, students used the actual data as variable names: for example, 4407: integer.

Most students performed the IF-THEN control appropriately but limited use of the IF-THEN-ELSE construct was observed. Some students used many IF-THEN and not an ELSE. Some students did not put the IF controls within a looping construct.

Looping controls were moderately done. Students need to properly initialize the looping controls. An example where a student started a while loop without initializing it is given below.

```
WHILE NAME <> 'END' DO
        READLN NAME
        {The NAME variable is not declared before the WHILE is implemented}
OR
READLN SCOUNT, NAME
WHILE ID <> 0 DO
        {Again, the ID variable is not declared before the WHILE is implemented}
```

Clarity of the program

This section was generally well done. However the following should be noted:
Program documentation should include the Pascal code, the author of the program, date created and a simple statement of the task the program sought to solve.

Screen shots are to be submitted to show program output

Students did not properly use indentation of the program code to enhance readability. Proper indentation of the program for printing of the program code is required. Too many candidates had everything in one margin and no indentation for looping and selection controls.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

JANUARY 2012

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The January 2012 examination was the second one based on the revised syllabus for private candidates. One thousand and ninety-nine candidates wrote the examination. Approximately 48 per cent of them obtained Grades I-III compared with 32 per cent in January 2011.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus namely; Theory (Profile 1), Productivity Tools (Profile 2) and Problem Solving and Programming (Profile 3). The mean score on this paper increased from 31.60 in 2011 to 35.74 in 2012; this represented approximately 60 per cent of the total mark obtainable on the paper.

Some areas with which candidates had difficulty and which require attention are:

- Determining the sequence in input-processing-output
- Determining the difference between wired and wireless
- Identifying the method of accessing a record using direct access
- Explaining the function of networks
- Recognizing the base used in a number system
- Identifying the type of processing that involves more than one processor
- Determining the output of an algorithm
- Identifying the data type for a particular value
- Recognizing the steps in solving a problem
- Recognizing page formatting features
- Identifying block operations that can be applied after selecting a paragraph
- Recognizing the steps in creating a website

Paper 02 – Structured Response Questions

This paper consisted of three sections with a total of 12 compulsory structured questions. Section I consisted of six short-answer questions, worth 60 marks, which tested the Theory profile. Section II consisted of two structured questions worth 15 marks; this section tested the Productivity Tools profile. Section III consisted of four structured questions worth 45 marks and tested the Problem Solving and Programming profile.

Section 1 – Theory

Question 1

Part (a) tested candidates' ability to identify and name the hardware components of the central processing unit (CPU) of a computer. This part of the question was fairly well done by the majority of candidates. Candidates were able to identify each component namely, input or output device, control unit, ALU, main memory or secondary storage, with some even giving examples. A few candidates misinterpreted the question and gave incorrect responses such as hardware, software, SATA, command interface and BIOS.

Part (b) tested candidates' ability to interpret the hardware specifications of a given computer system. This part of the question posed difficulty for the majority of candidates. Some candidates simply rewrote the entire question while others identified the line numbers only without associating it with the optical drive or the processor.

Part (c) tested candidates' ability to differentiate between the access time of a moving head disk drive and a fixed head disk drive. This part of the question proved challenging for candidates. Many candidates tried to guess the answer by stating that the _moving head moved' but did not say why it moved, where it moved or that there is a time factor involved. What was required was for candidates to indicate that the access time for a moving head is greater because the read/write head has to be moved to the track containing the data.

The mean score on this question was 4.27, which is less than half of the maximum mark obtainable.

Question 2

This question tested candidates' ability to convert a decimal number to its binary, octal and hexadecimal equivalent, then add and subtract two binary numbers. Some candidates failed to show any working and where the answer was also wrong, no mark at all was obtained. In cases where candidates showed working but got the answer wrong, some credit was awarded.

Part (a) was poorly attempted by the majority of candidates. The conversion from decimal 25 to binary for Part (a) (i) was well done, while most candidates stumbled with Parts (ii) and (iii) which required the conversion of decimal 25 to octal and hexadecimal respectively.

Parts (b) and (c) tested candidates' ability to add and subtract two binary numbers. Many candidates confused the question with _Subtract 101_2 from 11011_2' as two's complement. In some cases, candidates subtracted 11011_2 from 101_2.

The mean score on this question was 3.68 out of the maximum of 10.

Question 3

This question tested candidates' ability to match a given device with the most suitable professional who uses the device. This question, attempted by the majority of candidates, was generally well done. Part (a) comprised seven devices to be matched. Some candidates appeared confused between the use of a web camera and a digital camera. In some instances, candidates did not follow the directives given in the question to "write the numbers 1 to 7 on separate lines in your answer booklet…and write the letter next to the correct number in your answer booklet." Many candidates rewrote the questions and drew lines to match the correct responses. Teachers are encouraged to remind their students to read through instructions to questions carefully.

Part (b) required candidates to describe the use of biometric systems. Most candidates were able to identify where biometric systems are found; others gave examples instead of pointing out that these systems are used at security points. Few candidates were able to identify the benefits of using biometric systems over traditional methods of collecting data.

Performance on this question had the highest mean score of 6.50 out of 10.

Question 4

This question tested candidates' knowledge of some applications and their associated media requiring them to indicate whether they were text, audio, visual or hypertext; Candidates also had to identify technical terms associated with networks and web-based applications.

Part (a) was well done. Most candidates were able to state that VoIP is associated with audio or visual media, IRC with text, and www with hypertext.

Part (b) required candidates to identify seven technical terms in a paragraph on networking. This question was attempted by the majority of candidates, and there were many correct variations for the technical terms.

The mean performance however fell below half of the 10 marks obtainable.

Question 5

Part (a) tested candidates' understanding of methods used in preventing unauthorized access to computer facilities. Its subsections also tested candidates' knowledge of data integrity, data security and firewalls.

Many candidates who attempted this part received full marks. Some candidates listed restrictions that prevented access to the software instead of restrictions on physical access to the computer facilities.

Most candidates who attempted Part (b) explained data security correctly but could not properly explain or even attempt to explain data integrity.

Many candidates attempted Part (c) (i) which required a definition of _firewall'. Most of the definitions given were inaccurate although candidates were able to explain a firewall's uses. Part (c) (ii) was attempted by most candidates. Although many of them listed viruses and Trojans as possible answers which were incorrect, some candidates correctly identified hacking as an unwanted incident that a firewall could prevent.

The mean performance on this question was 4.03 out of a maximum of 10.

Question 6

This question tested candidates' ability to identify given documents that were either hard copy, soft copy, source, turnaround or machine-readable.

Part (a), which dealt specifically with hard copies, was well answered although in some cases candidates used their own letters such as X, Y, or Z as well as the names of the forms instead of the required letters A, B, C, or D given in the question.

Part (b) required candidates to identify one form or document which was an example of a soft copy, source document or turnaround document. This was well answered, although some candidates wrongly listed _flash drive' as a response. Some candidates could not explain the concept of a turnaround document.

Part (c) required candidates to give one example of data that would be found in one or more given documents concerning car registration. Many candidates were unable to appreciate the differences in the various documents and hence had difficulty correctly stating what data they contained.

The mean performance on this question was 5.67 out of 10.

Section 2 – Productivity Tools

Question 7

Many candidates seemed to have difficulty with this spreadsheet question.

In Part (a), candidates were asked to state the range of data containing a certain area of the spreadsheet. The use of the word _range' or phrase _range of data' appeared to present difficulty for some candidates.

For Part (b), candidates were asked to write a function to find the average value of a range of data. Most candidates had difficulty with the _function' feature. It was confused with the

formula use of SUM, AVERAGE. For example, in summing, candidates wrote =A3+A4+A5 instead of =sum(A3:A5)

In Part (c), candidates were asked to identify the formatting feature that was applied to a set of values. Many candidates used formatting features for word processing (for example _data was centred' or _right-justified') instead of using the spreadsheet formatting feature, for example, *comma, currency*.

For Part (d), candidates were asked to state the column heading that was used to sort a set of data. This was fairly well done although some candidates responded with the column label (for example, column B) not the actual heading (for example, POPULATION).

In Part (e), candidates were required to write an _IF' function to be inserted in a specific column. Most responses to this question indicated a good knowledge and use of the IF statement, however, many responses revealed that candidates had difficulty with the correct format and syntax of this function.

The mean performance on this question was 3.15 out of a maximum of 7.

Question 8

This question was based on database management. Candidates were asked to identify data types of fields, the primary key in a table and write queries.

In Part (a), candidates were asked to identify the data type of a field. The majority of candidates responded well to this question.

In Part (b), candidates were asked to state the name of the primary key from data in the table. This was mostly well done although some candidates identified the incorrect item as the primary key suggesting lack of knowledge. The majority of candidates were able to correctly extract the record as required in Part (c).

For Part (d), candidates were asked to write a query. Many candidates had problems identifying the criteria for REG_DATE. Many of them gave the results of the query rather than the query itself, while others did not use the _>=' operator effectively suggesting a lack of knowledge on operators.

In Part (e), candidates were asked to state the name of the field that was used to group a set of records. This was mostly well done, although some candidates wrongly stated that the primary key was the answer.

In Part (f), candidates were asked to state which record would be first in a sorted list. This was mostly well done, although some candidates gave a different ENGINE_CC number (a different number in the *same column* or the highest number in the series). Some candidates were not able to solve this problem in order to yield the correct answer. Some gave the value

in the top position while others gave the value at the bottom of the Vehicle table. This suggested that candidates confused ‗ascending order' and ‗top of sorted list' with ‗top' referring to the ‗first record'.

The mean performance on this question was 3.13 out of 7.

Section 3 – Problem Solving and Programming

Question 9

This question tested candidates' ability to complete a truth table on a given set of rules. It also tested their understanding of logical operators.

In Part (a) (i), candidates had difficulty completing the truth table. A few candidates wrote the algorithm into an input-processing-output table. In Part (a) (ii), candidates seemed not to know the differences among DIV, MOD and /. Answers included the division symbol, the word divide, X and ADD.

Part (b) was well done although some responses revealed that some candidates had difficulty providing examples that used relational operators <, >, <>, and =. In some cases, the symbols were not used while some candidates wrote out the expressions.

The mean performance was 8.26 out of the maximum of 15 attainable.

Question 10

This question tested candidates' understanding of the components of a Pascal program as well as their ability to identify appropriate Pascal code from the program for given conditions such as loop, assignment statement, and declaration.

Part (a) required candidates to indicate what the four programming symbols below represent. Candidates gave responses such as:

(i) ; semicolon *instead of* end of statement
(ii) { curly bracket or open bracket *instead of* start of comment
(iii) := equal sign *instead of* assignment statement
(iv) . full stop *instead of* end of program

Part (b) asked candidates to identify the type of error produced by a specific line in the program. Candidates could not differentiate between a logic error and a syntax error. Some candidates gave responses like grammatical errors, procedural errors and typing errors.

Part (c) required candidates to write appropriate Pascal code to illustrate a loop, assignment statement, declaration, program header and condition from the program provided. Candidates did not interpret the question properly as they did not refer to the given program, but wrote

their own program to answer that question. In Part (c) (i), very few candidates were able to identify a loop from the given program; some drew an actual loop or used a flow chart. In Parts (c) (ii) and (iii), candidates wrongly used the assignment and declaration terms interchangeably. In Part (c) (iv), some candidates wrote the program header as SumNumbers and not Program SumNumber. In Part (c) (v), many candidates wrote while (i <= 3) and not (i <= 3) for condition.

Teachers are encouraged to remind students that when answering programming questions, responses should reflect the programming language; answers should not be composed as though students are responding to an English Language paper.

The mean performance on this question was 2.97 out of a maximum of 10. This means there is still a long way for both teachers and students to go on this aspect of the syllabus.

Question 11

This question tested candidates' ability to identify the components of an array, write statements and fragments of code to return _write' values to and retrieve values from the array.

In Part (a), candidates were asked to state the size of the array illustrated in the question. About half of the responses suggested that candidates did not understand the basic concept of an array. Some candidates stated 14 cm, 4 kg, rather than the correct response of 4.

For Part (b), candidates were asked to write the order of index numbers that would output the letters CAT from the illustrated array. This was well done as candidates were able to trace the letters and identify the index.

Part (c) required that candidates write a fragment of Pascal code to output the contents of the array at index number 1 of the illustrated array. The majority of candidates did not attempt this part.

Part (d) asked candidates to write a fragment of Pascal code to write the letter _Z' into each cell of the array. Again the majority of candidates did not attempt this part; however there were some candidates who received full marks.

The mean performance on this question was 3.75 out of a maximum of 15.

Question 12

This question tested candidates' ability to write a simple algorithm to perform three tasks: prompt for a letter; write a line to read the letter into a variable called CHECK and if the letter is equal to _A', then output the word _Good'.

Many candidates wrote a Pascal program or drew flow charts instead of writing an algorithm.

In Part (a), many candidates wrote the instructions ‗Prompt for a letter' directly from the question or used a variable ‗Letter' instead of prompting the user for the input of the letter while for Part (b), many candidates used the variable ‗LETTER' instead of 'CHECK' for the input of the letter.

Part (c) was done well by most candidates.

The mean performance on this question was 2.75 out of a maximum of 5.

Paper 032 – Alternative to School-Based Assessment (SBA)

This paper is the alternative to the SBA and consisted of four questions testing the Productivity Tools and Problem-Solving and Programming profiles.

Question 1 – Word Processing

This question tested candidates' knowledge of the various features from a given letter presented in a word-processing application.

In Part (a), candidates were asked to state the justification that was used in the first paragraph of the body of the letter. Most candidates misinterpreted this part by actually giving a justification for the content of the letter instead of stating that the paragraph was fully justified. A few candidates stated left or right justification which was also wrong.

Part (b) required candidates to indicate whether a header, footer or footnote was used in the letter. Most candidates stated both header and footer when only footer was used in the letter.

In Part (c), candidates were asked to identify the line spacing used in the second paragraph of the body of the letter. This part was well answered although some candidates answered that the line spacing was ‗1.5 points' instead of 1.5

For Part (d), candidates were asked to describe how the hyperlink shown in the letter could be removed. Many candidates obtained only one of the two marks for correctly stating *highlight/select/click on the hyperlink*, but failed to get the second mark because they did not state the *Remove Hyperlink* option.

Part (e) required candidates to explain how the web address stated in the letter could be given a red colour font. This was correctly answered by the majority of candidates. Similarly, Parts (f) and (g) which concerned formatting features were also well answered with some candidates earning full marks.

In Part (h), candidates were asked to identify three illustrated icons used in a word-processing application. Part (h) (i) illustrated the icon to insert bullets; responses such as bullets, points

and lists were the popular answers. For Part (h) (ii), many candidates were able to correctly identify the UNDO icon, however few candidates were able to correctly identify the line spacing icon for Part (h) (iii).

In Part (i), candidates were required to name two documents required to perform a mail merge. Some candidates were not able to identify these two documents as primary/main and data source/secondary. A few candidates correctly identified the secondary document as Excel and a table in Database.

Part (j) was about merge fields. Merge fields seem to be a source of much confusion amongst candidates. This question was poorly done.

The mean performance for this question was 10.81 out of 20.

Question 2 – Spreadsheet

This question tested candidates' knowledge of the various features of a spreadsheet application. The question was based on a range of spreadsheet data and a chart. Most candidates knew what a range was and gave the correct responses in Part (a). Not many candidates understood numeric formatting such as the comma feature, hence Part (b) was poorly done. Although Part (c) on alignment was well handled, a few candidates wrote right justify instead of right align.

In Part (d), candidates were asked to write functions or formulas to calculate the total, minimum and average values in given ranges. The total and minimum values were correctly given; however writing the average was poorly done. Most candidates did not know how to write average and some wrote *ave*, or *avg* with or without a range.

Part (e) required candidates to identify which value would be at the top of a given range. This was well answered by the majority of candidates.

In Part (f), candidates were asked to state the spreadsheet feature that would cause Row 1 to remain visible as users scrolled down the rows. This was poorly done. It was quite apparent from the responses that candidates were either not taught this feature or had never applied it.

Most candidates knew about relative and absolute cell referencing in Part (g); in Part (h), the majority of candidates seemed not to know how to complete a select query. Part (i) was very well done. Though some candidates did not know how to create the query, they knew what records would be extracted.

Candidates were able to name the given chart in Part (a) (i); however, in Part (a) (ii), many of them were unable to state the range of data that was used to create the chart. Part (a) (iii) was fairly done as candidates were able to state that the purpose of the chart was to show the percentage of elderly persons in given regions.

This question had the lowest mean score of the four questions on the paper (6.29 out of 20).

Question 3 – Database Management

This question required candidates to answer questions based on two tables and a report produced from a database.

For Part (a), it seemed as though candidates were unfamiliar with the different data types and in Part (b), they were unable to demonstrate a good understanding of the concept of a primary key.

In Part (c), most candidates who attempted this question were able to complete the table.

For Part (d), candidates were required to identify various aspects of a given report. Many candidates were able to state the title of the report. Many of them were unable to identify the field on which the records were grouped. Some candidates were also unable to identify one or more fields that were sorted in a report. However, the majority of candidates were able to extract information from the report such as the total number of reported cases. Teachers are asked to provide more examples of grouping in reports during theory and practical lessons to help candidates identify fields that are grouped.

In Part (e), most candidates did not know how to create a calculated field although they knew how to write the calculation. Some could not apply the calculation to the correct field name such as ROC:[conviction]/[reported cases] *100

For Part (f), many candidates were able to accurately identify the field needed for the query; however, they were unable to correctly write the criteria. Many of them were unable to distinguish among >, <, <=, or >=. Candidates were also unable to write the result of the query; instead many of them rewrote the data in the table.

The mean performance on this question was 7.64 out of a maximum of 20.

Question 4 – Problem Solving and Programming

This question tested a wide range of problem-solving skills, from basic knowledge to analysis and interpretation. Candidates were asked to answer questions based on a fragment of Pascal code.

In Part (a) where candidates were asked to identify a constant from the Pascal code, some confused a constant with a variable and where they were required to write an appropriate data

type for a particular variable, some of them were unable to correctly state the data type as *real*. Emphasis should be placed on the distinction between integer and real value. In the subsection where candidates were asked to write an appropriate variable name to replace MISC, many of them did not understand how to use appropriate variable names to replace other variables. Where they were required to indicate the location of the cursor after a statement was executed, candidates seemed unable to differentiate between write and writeln statements in Pascal. The majority of candidates stated that the output would appear at the end of the line instead of at the beginning of the next line.

Where candidates were asked to explain the purpose of using -99 in a statement, some of them were able to identify -99 as the sentinel or dummy value but many of them could not explain the purpose of that particular value, which is *to stop the execution of the loop*.

In the subsection where candidates were asked to draw a flow chart to represent the fragment of code, the number of responses was very high which suggests that teachers spent a lot of time on flow charts and flow charting symbols. However, many candidates could not correctly draw the flow chart for this question; some of them used symbols in incorrect locations. Many candidates also used a graph or even pie chart to answer the question which was quite strange.

Where candidates were asked to indicate whether certain operations and statements were found in the given code, many of them could not identify whether the fragment of code contained a logic operation or a conditional statement — neither of them were in the code. Teachers are advised to concentrate on distinguishing between logic and arithmetic operations, conditional statements and loops.

In Part (b), candidates were asked to copy and complete a truth table by representing 1 as passing a subject or passing the SBA and 0 as failing a subject or failing an SBA.

In Part (b) (i), candidates could not correctly give the result of AND (the relational operator) in the truth table. Many candidates seemed unable to understand what the term *condition* meant when they were asked to write two conditions necessary for passing a subject. The correct answer was *to indicate 1 for passing the SBA and 1 for passing the exam*.

The mean performance on this question was as low as 8.76 out of the total of 30 attainable.

Observations and Recommendations

Although candidates‘ performance on Profile 3 (Problem Solving and Programming) seemed to have been much better than last year, problem solving with Pascal continues to pose problem for candidates. The ability to complete a trace table, write an algorithm, write fragments of code in Pascal and analyse a Pascal program are specific areas in which mastery remains elusive.

As has been previously recommended, the Ministries of Education of the participating territories are advised to continue to run teacher training workshops in Information Technology to prepare teachers to be able to address the deficiencies identified in particular and all areas of the syllabus in general.

C A R I B B E A N E X A M I N A T I O N S COUNCIL

REPORT ON CANDIDATES'S WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2012

INFORMATION TECHNOLOGY
GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

Three papers were written in this year‘s examination. Paper 01, Multiple Choice; Paper 02, Structured Questions and Paper 032, the Alternative to School Based Assessment for private candidates.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Some candidates encountered difficulty in the following areas:

- Role of a systems programmer
- Verification and validation checks
- Cable/wired and wireless data transmission media
- Spreadsheet: Use of pre-defined functions
- Spreadsheet: Type of data that can be entered in a cell
- Database: Linking tables
- Database: Use of primary key, secondary key, composite key, foreign key, candidate key and alternate key
- PowerPoint: animation effects to slides
- Web page design: Use of hyperlinks
- Problem solving and Program design:
  - Use of trace tables to determine the output of program segment
  - Tasks performed in each step in problem solving
  - Use of logical operators in truth table
- Program Implementation:
  - Valid data types in Pascal
  - Identifying error types in a program segment
  - Indicating the functions of a compiler
  - Declaring arrays in Pascal
  - Classifying program languages into computer generations

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured questions. Section I consisted of six short-answer questions worth 60 marks and tested the Theory profile. Section II consisted of two structured questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four structured questions worth 45 marks and tested the Problem solving and Programming profile.

Section I – Theory

Question 1

Part (a) required candidates to arrange given units of storage in order of capacity from smallest to largest. This part of the question was well done by the majority of candidates. Some candidates provided the reverse order of largest to smallest while some candidates used the first character of the unit of storage rather than the whole name. For example, some candidates used G instead of Gigabyte. Candidates are advised to write out the names in full.

In Part (b), candidates were required to state the meaning of the term *bit* and to indicate how it was derived. This part of the question posed difficulty for the majority of candidates. While some candidates were able to state the meaning of the term *bit* they were unable to explain how the term was derived.

Part (c) tested candidates' ability to show a difference between a *word* and a *byte*. This part of the question was well done by the majority of candidates who provided answers such as a *byte is made up of 8 bits while a word is one or more bytes.*

For Part (d), candidates' ability to explain the term *bi-stable device* was tested. This part of the question was satisfactorily done by the majority of candidates. Some candidates provided examples of a bi-stable device such as a switch being *on* or *off*. An example of a correct response is: A bi-stable device is one that can exist in either *one* of *two* states.

Question 2

Part (a) tested candidates' ability to match output devices with their most appropriate tasks. This part of the question was well done by the majority of candidates. In some cases, candidates made up their own tasks rather than use the given tasks. Candidates are advised to stick to the tasks as set out on the question paper.

Part (b) tested candidates' ability to identify situations where one type of printer would be more suitable than another and to state reasons for their choice. This part of the question proved to be a challenge to the majority of candidates who were unable to identify the situations and to provide the appropriate reasons.

Question 3

Part (a) tested candidates' knowledge of the functions of an operating system. This part of the question was satisfactorily done by the majority of candidates. Some candidates confused the features of an operating system with the functions of an operating system.

Part (b) tested candidates' ability to classify three given software into four categories of software. This part of the question was well done by the majority of candidates. Some candidates confused general purpose software with integrated software. In addition, some candidates could not recognize that Pascal compiler and Windows XP are examples of systems software.

In Part (c), candidates were required to explain why it is necessary to customize certain types of software and to provide one example of a type of customized software. This part of the question was well done by the majority of candidates. However, many candidates were unable to provide one example of customized software such as an accounting software package.

Question 4

Part (a) tested candidates' ability to identify cable/wired media from given drawings. This part of the question was satisfactorily done by the majority of candidates. Candidates knew the names of the cable/wired media but some were unable to associate them with the correct cabling drawing. Drawing C (fibre-optic cable) was not recognized by many candidates.

Part (b) required candidates to identify two types of wireless media (for example, satellite, microwave, infra-red). Most candidates provided examples of devices that use media such as cellular phone, notebook computer, rather than the types of wireless media.

Part (c) tested candidates' knowledge of the use of the various types of networks. Most candidates were familiar with the application of LAN and WAN but not MAN.

Part (d) tested candidates' knowledge of the meaning of the term *modem* and asked them to indicate how the term was derived. This part of the question was poorly done by the majority of candidates. Many candidates provided the functions of the modem but were unable to explain how the term modem was derived. An example of a correct response is as follows:

Modem is an acronym for modulator-demodulator.

Modem is formulated by taking the first two letters from the word 'modulator' and the first three letters from the word 'demodulator'.

Question 5

Part (a) tested candidates' ability to match professional computer job titles with the most appropriate task performed by each professional. This part of the question was poorly done by the majority of candidates. Candidates were not familiar with the tasks performed by the network administrator, systems programmer and database administrator. In many establishments, the computer technician performs the roles of some of the given computer professionals. This may have confused the candidates.

Part (b) tested candidates' ability to associate professions with related technologies. This part of the question was poorly done as the majority of candidates could not correctly associate the given professions with the given technologies. An example of a correct response is as follows:

PROFESSION	TECHNOLOGY
Music	MIDI
Law enforcement	Biometrics
Engineering	Sensors
Training	Multimedia

Question 6

This question tested candidates' knowledge of methods of verification and validation of data.

Part (a) required candidates to identify one error that can occur in the data collection phase. This part was poorly done; most candidates seemed unfamiliar with the activities in the data collection phase.

In Part (b), candidates were required to identify one error that can occur in the data capture phase. This part was poorly done; most candidates seemed unfamiliar with the activities in the data capture phase.

Part (c) tested candidates' knowledge of the concept of data validation. This part was poorly done. Part (d) tested candidates' knowledge of data validation checks. This part was satisfactorily done by the majority of candidates. Some candidates provided the names of the validation checks but did not describe what the checks do.

Section II – Productivity Tools

Evidence from the marking exercise indicated that many candidates need more hands-on training in the use of spreadsheet and database management software.

Question 7

This question tested candidates' knowledge of basic features of a spreadsheet program. It was satisfactorily done by the majority of candidates.

In Part (a), some candidates provided the names of all the candidates in the correct sort order rather than indicating "Persaud" as the name of the candidate who will be at the top of the sorted list as required.

For Part (b), the majority of candidates provided the SUM function correctly. Some candidates provided the arithmetic formula (+B4+C4+D4) instead of the sum function.

In Part (c), many candidates indicated the IF function but were unable to indicate the correct test condition and results. The correct response was: =IF(F6>=0.6, "Eligible", "Not Eligible")

For Part (d), the majority of candidates provided the correct ranges. In some cases however, candidates provided the range A1..F6 rather than the separate ranges for the "Name" column (A1..A6) and the "% of Total IA" column (F1..F6).

Question 8

This question tested candidates' knowledge of basic features of a database management program. It was satisfactorily done by the majority of candidates.

In Part (a), the majority of candidates provided the correct data type used in the SKILL table, numeric data type for the UNCERTIFIED field and alphanumeric (text) for the SKILL and AREA_ID fields.

For Part (b), the majority of candidates did not write the correct query. An example of a correct response is: ***SKILL = "Mason" AND UNCERTIFIED > 50***

In Part (c), the majority of candidates were able to join the two tables and indicate 25 as the number of uncertified persons in New Amsterdam.

For Part (d), many candidates correctly identified the UNCERTIFIED field as the field on which the SKILL table was sorted.

Many candidates were unable to identify the SKILL field or the AREA_ID field as the fields that can be used to group the records in the report in Part (e).

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to classify given pseudocode statements as input, processing or output statements and to complete a given truth table.

Part (a) was well done by the majority of candidates. Some candidates did not recognize that ‗S4: Prompt the user' was an output statement.

Part (b) was well answered. Some candidates were not clear on the use of the AND operator. In addition, some candidates used ‗Good at' and ‗Not good at' in the truth table instead of 1 and 0 respectively.

Question 10

In Part (a), the majority of candidates seemed unfamiliar with the use of the CONST statement to set a fixed value. An example of a correct response is: CONST Tax = 0.10;

Part (b) was well done by the majority of candidates. Candidates used meaningful variable names such as cost and price.

Part (c) was poorly done by the majority of candidates; they could not provide a correct arithmetic statement to calculate the final price. Many candidates used the ‗=' sign instead of the assignment ‗:=' symbol and also the multiplication sign (x) instead of the * symbol.

Question 11

This question tested candidates' ability to use control structures, identify errors and concepts associated with programming.

Part (a) was poorly done by the majority of candidates who appeared unfamiliar with the use of loops, in particular, the Repeat..Until loop. Many candidates did not initialize the counter (count := 1) and did not increment the counter (count :=count + 1). An example of a correct response is as follows:

(i)
```
Count := 1;
WHILE  count <= 10 DO
Begin
      read (mark);
     count := count + 1;
End;
```

(ii)
```
Count := 1;
REPEAT
        read (mark);
        count := count + 1;
UNTIL  count = 10;
```

Part (b) was well done by the majority of candidates. Some of them however seemed unfamiliar with run-time errors while some confused syntax with logic errors.

Part (c) was poorly done by the majority of candidates. Most candidates identified one or two statements describing external documentation instead of the three correct statements (D1, D3, D4).

Question 12

This question tested candidates' ability to analyse a set of programs involving arrays.

Part (a) asked candidates to identify the name of the program. The majority of candidates responded correctly. In some cases however, candidates stated the name of the program as _PROGRAM IRG' instead of _IRG'.

Part (b) required candidates to identify the name of the array. This part was satisfactorily done by the majority of candidates. In some cases however, candidates gave the whole array statement ALPH: ARRAY[1..3] OF CHAR instead of the name of the array, ALPH.

Part (c) was well done by the majority of candidates. They were able to correctly identify the size of the array. Some candidates however listed the size of the array as 1..3 instead of 3.

Part (d) was poorly done by the majority of candidates, they could not trace through the program and identify the output as follows:

```
G       (line 1)
G       (line 2)
G       (line 3)
```

Paper 03 – School-Based Assessment (SBA)

The SBA consisted of a practical project testing the productivity tools (word processing, spreadsheets and database management), problem solving and programming profiles.

Further Comments

- Generally the presentations of the SBAs have improved.
- In most cases, the description of the project was not submitted.
- Each project component should be strictly separated and labelled.

Sample Uniqueness

In many cases there was a lack of uniqueness among SBAs from the same centre. In fact, evidence showed that in many samples, one student's work was used for the other students' samples, or an outline provided for the students to insert a few changes prior to submission. This practice should be discouraged.

Moderation Sheets

- The samples sent by the school should match that generated by CXC's ORS system.
- Computer-generated printouts must match the marks and students on the moderation sheet and samples submitted.

Spreadsheets

Formula Sheets

Widespread lack of formulae sheets worked to the disadvantage of a number of students, leading to a reduction in marks awarded. Teachers must insist that students print and submit formulae sheets. Formulae sheets must be legible. Students should ensure that formulae sheet printouts are at default font size, or 100% zoom.

Students need to be able to demonstrate the correct use of absolute cell referencing (F2).

Formatting Features

In the event of an insertion or deletion of records, records should be highlighted for easy identification. A separator or label indicating the before or after' insertions or deletions should be included.

Sorting

Sorted records should be clearly identified by highlighting or labelling the sorted range.

Charting Operations

In some instances, graphs were not printed, or for the graphs which were printed, the axes were not labelled and had no titles. Teachers should ensure that axes are labelled and an appropriate title assigned to the chart.

Students should pay closer attention to the colour scheme of charts, which would make charts more legible, especially if printed in black and white.

Two different types of charts should be submitted, for example, a pie chart and a bar chart or a column chart. The pie chart should include an appropriate title, legend and data labels. The bar chart should compare different series of data.

Extracting Data

Many students failed to successfully perform advanced filtering. Students should clearly indicate when a specific task is being executed. For example, if advanced filtering is the task, then a caption should be added to the results to indicate the criteria, if it is not previously indicated. Similarly, if sorting is the task, then a caption (label) indicating the particular field would be useful.

Teachers must ensure that the advanced filter be part of the SBA. In addition, the advanced filter should be used to extract summary data. Evidence of the criteria should be shown as well as the results. The criteria range and the results should appear on the same page.

Length of SBA

In the area of spreadsheet formatting, much improvement is needed in order to limit printouts. Too many unnecessary printouts were submitted. Teachers and students need to concentrate more on the quality of work done, specific to the tasks, rather than copious quantities of unnecessary printouts.

The number of printouts should be limited (at most 15 pages) to avoid unnecessary and repetitive printouts. Documents should be appropriately and intelligently formatted so as to ensure good printouts. Students should make good use of page breaks for column adjustments to ensure that data and charts are not spread across several pages in a way which makes them difficult to understand or interpret.

Presentation

The SBA report is an official document and therefore should be presented in a coherent manner.

Printouts should be properly collated and secured so as to ensure good presentation.

Syllabus Guidelines for Marking SBA

Teachers are strongly urged to strictly adhere to CXC‘s mark scheme as provided in the syllabus.

The assignment details should also be submitted.

Database Management

Overall the mark schemes were good. The majority of SBA submissions used the schemes from the current CXC syllabus. As a result there was less variation in the moderated marks. Usage of the new syllabus guidelines (effective from 2010) is very important.

- The recommended number of records, as stipulated in the syllabus, should be kept.

- Teachers should ensure that structures (design views of tables and queries) are submitted. Printouts of original tables, queries and report results are to be submitted. Screen shots should be used to supply supplementary evidence (primary key, criteria, calculated fields and sorting). Duplications of printouts should be avoided, however, evidence of modifications (sorting, additions and deletions of records) should be provided in ‗before‘ and ‗after‘ printouts.

- Tables/queries should fit on one page.

- Students should ensure that formatting is done properly in Spreadsheet if data is to be exported to Database.

- There was an improvement in the presentation of samples. However, one neatly bound sample per student should be submitted with clearly defined sections (tables, queries, report) and graded individual mark schemes should always accompany each sample submitted.

Tables

Most samples showed evidence of two or more database tables. Although some primary key evidence was seen, there is a need for screen shots of table structures (design views) to provide clear evidence of the existence of primary keys and modification of field sizes. In some cases the database documenter was used. However, when used the documenter should only present relevant data, that is, field names, field type, primary keys, field sizes, and relationships should be displayed. There is no need to show field properties.

Though some samples included evidence of joined table by hard copy proof of relationship diagrams, there is still much room for improvement.

Modifying Database Tables/Files

Most samples provided no evidence of additions/deletions/modifications of fields or records. Evidence of these tasks being done can be provided by ‗before' and ‗after' hard copies of tables/records/fields. The structure that initiated the modification can also be done and clearly stated.

Queries

Generally, simple queries were well done. However, evidence (design views via screen shots or SQL statements) should be provided to show how queries were done. More emphasis needs to be placed on performing complex queries and calculated fields.

Sorting

Although this activity was performed well by many students, more emphasis should be placed on sorting tables. Students need to provide clearly labelled ‗before and after' copies of the table(s) which have been sorted (indicating the type of sort and which field or fields have been sorted).

Reports

Some samples did not show reports. Also some reports were only provided in the word processing section. More emphasis should be placed on grouping in reports showing more than one record per group. Summary/statistical features should be included. Evidence of sorting must be shown in reports. Reports should show appropriate titles.

Programming

Generally, the quality of work produced in this section has improved. However, the significant degree to which templates were used or duplicates submitted remains a source of great concern.

Teachers are reminded that while sufficient guidance should be provided to allow students to complete the project (as specified in the syllabus), students should be encouraged to demonstrate their learning and creativity in deriving a solution to the problem specified. That is, teachers should resist giving students the solution. To this end, the project specified should be of a sufficiently substantive nature to allow for a variety of solution-focused approaches.

In a number of cases, students' responses showed an extremely high degree of similarity. Emphasis should be placed on making students aware of the difference between an algorithm/pseudocode and a source code. Further, teachers need to ensure that students understand the nature of a *problem statement*. It should not simply be the restatement of the project description. Note also that program solutions should be confined to the program language specified in the syllabus — Pascal.

A substantive project should incorporate the following:

- A minimum of three variable types
- At least one array data structure
- A minimum of two selection structures

Problem Statement

Most students did not write a problem statement. In cases where the problem statement was submitted, it was taken directly from the SBA assignment. That is, students have been rewriting the programming question as a problem statement. Teachers must encourage students to write their problem statement by determining that the problem is from the assignment; they should not copy the SBA assignment. Note that problem statements should be well defined and precede the algorithm.

Algorithm

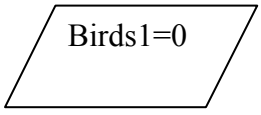
This area showed improvement in comparison to previous years. While flow charts and pseudocode were submitted by students to describe algorithms, the use of pseudocode seems to be the more preferred method. Flow charts and pseudocode are used as tools to describe algorithms. Hence, students should not submit both. Only *one* is required.

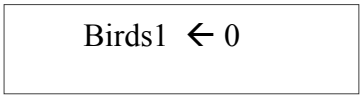
Flow Chart

In creating the flow chart, students must use the correct symbols, especially input/output and processing. The directional lines should clearly indicate the flow of data (direction) and should not intersect. If the flow chart extends beyond one page, then the use of connectors is advised. In a number of cases where flow charts were used, looping and selection structures were blurred.

Students should note the following advice regarding flow charts:

- Show direction of flow lines
- Make use of correct symbols
- A decision symbol should indicate whether it represents a loop or conditional statement
- Decision symbols need to be labelled so as to indicate the next step
- Input/output symbols should be indicated clearly whether data is being accepted or displayed
- Initialize variables when doing flow chart
- Correct symbol and syntax should be used for initializing

e.g. 

was used rather than 

Pseudocode

There were too many instances where students removed the semicolons from the source code and called it pseudocode. Teachers must encourage students to write the pseudocode before the source code, using standard approaches. Some students did not put *start* at the beginning of the pseudocode; variable initialization was not always evident at the beginning of the program, but in some cases appeared within loops. Some students did not prompt the user for inputs. A significant number of students did not use any arrays or loops, but the overall quality and responses was an improvement over 2011. The majority of the students showed high proficiency in recognizing the need for and use of a selection construct (in most cases, the IF construct).

Teachers should encourage students to design and describe the algorithm before writing the source code, thereby ensuring that they have a workable solution that is *not* a duplication of the source code.

The following are the key concerns regarding pseudocode:

- The use of complete Pascal code for the whole algorithm is not advisable.
- Pascal code and the pseudocode describing the algorithm should be distinct, that is, students should avoid submitting the Pascal program code as their algorithm. Algorithms should be done before the Pascal program and should serve as the basis for the development of the actual program code.
- Variable names should be a continuous string; not separated with a space, for example, the instruction ***Read First Name*** should be ***Read FirstName***.
- Incorrect representation of control structures, for example:

  IF without END IF,
  FOR without END FOR
  WHILE without END WHILE.

- Failure to initialize variables and arrays within the pseudocode.
- Inconsistent variable names as it relates to their use in trace tables.

Trace Table

This section was poorly done by the majority of students. In some instances, teachers requested that students write a separate algorithm for the trace table.

Specific areas of concern are as follows:

- Variables incorrectly represented in trace tables: trace tables should show the exact variables from the algorithm or flow chart to execute the dry run.
- Changes in values should be correctly and adequately demonstrated after the use of test data.
- It is not necessary to include formulae sheet from Excel in trace tables.

The following is a typical example of what was presented as a trace table:

Step	**Write**	**Read**	**Calculate**
Step 1	Start		
Step 2	Name		
Step 3		Gender	
Step 4		Parent name	
Step 5		Telephone number	
Step 6	Term1, term 2, term 3		
Step 7	Exam 1, exam 2, exam3		
Step 8	Total (term 1 + term 2 + term 3)		
Step 9	Average (total)/ 6		
Step 10			Studentaverage is > = 90% set Grade = A^+ Average = 80 – 94% then Grade = A Average =60 – 79% then Grade = B Average = 50 – 59% then Grade = C Average = 40 – 49% then Grade = D Average = < 40 % then Grade = F

It is to be noted that this bears no semblance to the program under consideration. Variable names could not be mapped to segments of the code or a logical sequence to the changes determined.

Programming

Compilation

Students should be encouraged to print screen shots of the working program. The screen shots must match the programming code.

Variables

Students demonstrated good use of different data types in declaring variables. Some students initialized their variables very well. However, a significant number of them did not use the array data structure. Some used the record data structure effectively, but this is outside the scope of the syllabus. Teachers need to encourage students to use arrays rather than records. The main data types used were string, real, integer, char or Boolean.

Selection

All students used selection constructs (IF and/or CASE). However, students need to be able to adequately show their ability to use the variations, for example, IF … THEN, and IF … THEN … ELSE. Consider the following code segment:

```
Start
.
.
    Display –Please enter your gender”
    Get (gender)
    While gender <> ‗nil‘ do
        Begin
          If gender = ‗M‘ then
                male <- male + 1
        else
                female <- female + 1
          endif
          if age >= 18 then
                adults <= adults + 1
          endif

    endwhile
.
.
STOP
```

This segment uses two IF statements, one with IF… THEN… ELSE… ENDIF and the other IF…THEN…ENDIF.

Looping

Most students used one looping structure, or one type of looping structure. Students must be encouraged to use more than one type of looping structure, and use it accurately. At least one of the looping structures *must* be used to manipulate the array.

Documentation

Most students did not present proper program documentation. They did not include their name (author), the date created or problem statement. The documentation must not be part of the program, but it should be a comment at the top of the source code. Many students inserted comments throughout the program indicating what was occurring at each stage.

Indentation of the source code was poorly done. Students in most cases did not indent at all or indented by space or sections.

Most students designed their source code ensuring that it was user-friendly by having appropriate prompts and comments; in some cases colour was used in their outputs.

The following is a list of concerns associated with the program implementation section:

- Failure to present printout of compiled program and printout of program outputs

- Failure to use more than one type of looping structure, for example, FOR LOOP and a WHILE LOOP or FOR LOOP and REPEAT LOOP
- Failure to use more than one type of selection statement, for example, IF…THEN and IF…THEN…ELSE
- Failure to initialize variables
- Failure to use loop to manipulate an array
- Failure to indent program code to enhance readability
- Inadequate program documentation — documentation should include the author, date created and a description of the program as well as significant segments of the program
- Failure to include appropriate prompts

Note that candidates must use PASCAL language code for the program.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

JANUARY 2013

INFORMATION TECHNOLOGY
GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The January 2013 examination was the third one based on the revised syllabus for private candidates. Eight hundred and twenty-one candidates wrote the examination. Approximately 59 per cent of them obtained Grades I–III compared with 48 per cent in January 2012.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem Solving and Programming (Profile 3). Performance on Profile 1 was lower than 2012 with a mean score of 38 compared with 36 for 2012. Teachers and coordinators are advised to pay special attention to verification and validation, and examples to illustrate the various types.

Paper 02 – Structured Response Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem Solving and Programming profile.

Section I – Theory

Question 1

Part (a) tested candidates' ability to distinguish between the various components of a computer system. Some candidates gave examples of the hardware components such as keyboard, printer and monitor instead of the general terms: *control unit, secondary storage, input device, output device.*

Part (b) tested candidates' knowledge of the types of devices that may be found in specific components of the computer. Approximately five per cent of candidates did not attempt this question. No candidate gave bistable device as an answer. Those who responded mentioned either „registers' or „cache', which were acceptable. For Part (b) (ii), some candidates wrote „USB' instead of *USB drive* but generally, candidates were able to name secondary storage devices. For Parts (b) (iii) and (iv), many candidates did not give examples but named the component. Overall, candidates who attempted this question obtained between five and full marks out of ten.

Question 2

Part (a) tested candidates' ability to convert binary to octal and binary to hexadecimal. This question was poorly done by the majority of candidates. Most candidates seemed unfamiliar with octal and hexadecimal and converted to binary instead. For the hexadecimal conversion, most candidates did not use *B* to represent the remainder of *11*.

Part (b) tested candidates' knowledge of IP addresses. In Part (b) (i), many candidates misinterpreted the word *network* to mean „social network' as opposed to a *computer network*. Part (b) (ii) was well done. The majority of candidates gave the correct response as

University, East, Floor B, PC08. However, many candidates misinterpreted Part (b) (iii). It was apparent that candidates did not understand the question, resulting in them either not attempting it or converting the whole IP address of 128.8.74.3 to binary. Teachers and students should place more emphasis on this section of the syllabus.

Question 3

Part (a) tested candidates' knowledge of the term *hard copy* and its usage. Many candidates attempted this question and they seemed to know the definition of *hard copy* even though a few of the responses were vague, stating that it was „something you can touch and feel.' These were acceptable. In some instances, candidates stated that „a hard copy could be damaged' instead of actually specifying that *pages could be lost or misplaced*. Here too, candidates were not penalized.

Part (b) tested candidates' knowledge of compact disks (CDs). Approximately 50 per cent of the candidates were able to state the meaning of the term *CD* accurately. Incorrect responses were „computer disk' or „compatible disk'. For Part (i), the majority of candidates knew that *CD* was a secondary storage device. Approximately 65 per cent of the candidates were able to answer Part (b) (iv) accurately. Some candidates misunderstood the question and stated the brand names of the CDs instead of the types. The most popular response for Part (b) (v) was „the flash memory was more expensive'. A number of the candidates stated that „the flash memory card could be easily infected with a virus'; confusing a flash memory card with a flash drive.

Question 4

Part (a) tested candidates' knowledge of networks and the type of technology used for the various wired and wireless networks. Part (a) (i) was generally well done. The majority of candidates correctly identified local area network (LAN) as the answer. However, they incorrectly stated that LAN was „local access network'. The responses given for Parts (a) (ii) and (iii) were quite encouraging. Some candidates mistakenly answered „twisted pair' instead of *coaxial cable* for Part (a) (iii). A relatively large number of candidates did not attempt Part (a) (iv) and those who did, identified a transmission medium as „fiber optic cable' rather than the type of transmission which included *broadband*, *voiceband*, *satellite*, *microwave* and *infrared transmission*. Part (a) (v) was not very popular among the candidates and very few of them were able to provide the accurate network protocol of *Wi-fi* or *Bluetooth* for the answer; candidates erroneously stated other protocols such as „HTTP' and „FTP'.

Part (b) tested candidates' knowledge of job responsibilities of computer professionals. The number of correct responses was understandably high. Candidates experienced the greatest difficulty matching the job responsibility for network administrator and computer engineer. The others were generally well done.

Question 5

Part (a) tested candidates' ability to describe a positive and a negative impact that Information Technology has on the music, teaching or medical profession. Candidates were able to list the positive impacts on the profession but the negative impacts posed some challenges. Some candidates failed to express any details in their responses. For example, candidates stated, „it was easy to use' and „faster' for positive impact and „system crashes' and „data loss' for negative impact. These should have been related to each profession.

Part (b) tested candidates' knowledge of hardware devices or software used in the music, teaching or medical profession. The majority of candidates answered this question. It was generally well done.

Part (c) tested candidates' knowledge of how hardware devices or software is used in the music, teaching or medical profession. Although this question was attempted by a relatively large number of candidates, most of them were awarded less than full marks since they could not adequately describe how the hardware or software was used.

Question 6

This question was not very popular among candidates although it was clear and unambiguous. From the responses given, it was evident that many candidates misunderstood what was being asked as they referred to „word processing', „spreadsheet' and „databases' in their responses.

Part (a) tested candidates' knowledge of data verification, how errors can be detected and corrected. Few candidates responded correctly and a vast majority of them failed to obtain full marks. The correct response was *double-entry* for Part (a) (i) but many candidates failed to state this. For Part (a) (ii), many candidates failed to use the terms *typographical error* and *transpositional error*; instead, they chose to explain what the errors are.

For Part (iii), very few candidates were able to state that *the error can be detected when the data entered by two clerical officers or twice by the same officer* do not match. Many candidates who attempted Part (iv) inaccurately stated that „the form needed to be returned to the student for checking' rather than a supervisor.

Part (b) tested data validation and the ability to identify appropriate methods of data validation for various situations. Performance here was also very disappointing indicating clearly that both teachers and students may be neglecting this aspect of the syllabus. For everyone's benefit, both the questions and answers are reproduced below.

The Question

A student registration system at New Age High School requires students to complete a registration form.

(a) In order to verify the data, the data from this form are keyed in by one clerical officer at the school and then re-entered by another clerical officer.

(i) Name the data verification method described above.
(ii) Describe ONE type of error that the data verification method would detect.
(iii) State how the error in (a) (ii) above is detected.
(iv) Outline how the error in (a) (ii) above can be corrected.

(b) After the data are verified, a program scans the data entered to validate the data submitted by the students. State the name of EACH validation check for EACH of the examples below:

(i) The student's name does not contain any special characters.
(ii) The student's date of birth is after 31 August 2000 but before 01 September 2001.

(iii) The student's weight is greater than 500 lb.
(iv) The student's age on the form is correct given the student's date of birth.

The Answer

(a) (i) Double-entry
(ii) Typographical or Transpositional error where the clerical officer has keyed in wrong data.
(iii) When the data keyed in by the two clerical officers do not match then either one or both is/are incorrect.
(iv) When the error is detected then a supervisor would check the original form and re-enter the data submitted by the student.

(b) (i) Data type check
(ii) Range check
(iii) Reasonableness check
(iv) (In)consistency check

Section II – Productivity Tools

Question 7

The question tested candidates' knowledge of the basic features of a database management program, more specifically data types, primary keys and queries. The majority of candidates found it difficult to provide suitable responses for the various parts of the question. More practical work using a Database Management program is needed to correct the difficulties experienced by candidates.

For Part (a), the majority of candidates provided the correct response for the field name, *Name*. However, some candidates gave inaccurate responses like „letters', „char', „real', „word' and „general'. For the field name *DOB*, many candidates gave the correct response.

For Part (b), most candidates were able to identify *IDNo* as the correct field for the primary key.

For Part (c), the majority of candidates were able to identify the correct fields for the query. However, some candidates, in constructing the criteria for the query, used the incorrect operator, the symbol for less than (<) instead of the greater than symbol (>).

Question 8

This question tested candidates' knowledge of the basic features of a word processing program, more specifically, moving a paragraph to another part of a document, creating a new page and mail merge.

Part (a) was attempted by many candidates and was generally well done. The most common mistake occurred when candidates stated „copy' instead of *cut* for moving the paragraph, but most candidates demonstrated their ability to perform this task.

Part (b) was not well done. Many candidates seemed to have misunderstood the question. They misinterpreted it to mean another page in the document rather than a new one that had

to be created. As a result, many of them gave in their response, ‚scroll down', which was incorrect.

For Part (c), the majority of candidates failed to pay attention to the terms *word processing feature* and *personalized letter*. Consequently, the correct response, which was *mail merge* was not given.

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to identify programming statements written in Pascal code, programming constructs and programming errors.

Pat (a) was generally well done. Most candidates were able to identify the programming language as Pascal. Candidates who gave incorrect responses stated that the programming language was ‚pseudocode' or ‚algorithm'.

In Part (b), the majority of candidates were able to correctly recognize the code as a sequence of statements but many of them did not attempt to offer any explanation to justify this. Where explanations were given, most candidates did not state that *the instructions would be executed once*. A few candidates were able to gain full marks.

Part (c) was not popular among candidates. For those who attempted this part, the specific function of the *Writeln* statement was often incorrectly stated as ‚displaying text' or ‚prompting for input.' Many candidates' responses were only partially correct. They failed to state that after the output, the cursor moves to the next line.

In Part (d), some candidates incorrectly identified the final output only (line 10) instead of showing the output from each of the *Writeln* statements which was

Enter first one
Enter second one
The result is 12

Few candidates were able to gain full marks for this part of the question. Though it was not required, a number of candidates rewrote the program given.

For Part (e), the majority of candidates did not write *Set A* and *Set B* on separate lines as instructed and therefore did not provide separate responses for each set of input values. Many candidates identified the error in Part (e) (i) as *syntax error*. For Part (e) (ii), a relatively large number of candidates were able to identify *Num 1* as the cause of the error.

Question 10

This question tested candidates' knowledge of programming languages and the steps associated with implementing a program.

Part (a) tested candidates' knowledge of low-level and high-level languages and steps associated with implementing a program. It was poorly done. Many candidates who attempted the question described the low-level and high-level languages without naming examples of them and those who provided examples named one only. More candidates were able to state examples of low-level languages than high level languages.

In Part (b), very few candidates were able to identify the correct sequence of the steps associated with implementing a program. Teachers need to ensure that students fully understand this process.

Question 11

This question tested candidates' knowledge of array and their ability to manipulate data in an array.

Part (a) was well done. Part (b) was poorly done. The required answer here was *char* or *characters*. Part (c) was also poorly done. Common responses which were inaccurate were „ORM', „NFORM', „INFORM', '456' and „1,2,3,4,5'. The correct response was *FORM*.

Question 12

This question tested candidates' ability to identify syntax errors in a Pascal program. Many candidates could not demonstrate their knowledge of the purpose of the semi-colon found at the end of the statement. This produced an error. They therefore failed to state *removing the semi-colon at the end of the statement in line 6 would correct these errors*. Another error identification that posed a problem was declaring X and Y as integers. A number of candidates failed to write the line numbers of the errors as well. This resulted in loss of marks but overall the question was generally well done.

Paper 032 – Alternative to School-Based Assessment (SBA)

This paper consisted of four questions which tested the Productivity Tools and Problem Solving and Programming profiles.

Question 1 – Word Processing

This question tested candidates' knowledge of the various features of a word processing application. The question was based on a letter provided. Overall, word processing was not well done. Approximately 58 per cent of the candidates scored less than full marks for this question.

In Part (a), the majority of candidates were not able to recognize that the line spacing was 2" or that the body of the document was double-spaced. Teachers may need to practise using 1.5 and double-line spacing with their students. Many candidates, as well, did not demonstrate having knowledge of the term *justification* as it relates to word processing. They were therefore not able to gain full marks for this question.

Part (b) was generally well done. Some responses did not relate to the letter but gave other formatting features.

In Part (c), most candidates were able to explain how to remove the underline from the text.

Part (d) asked candidates to indicate whether four features *header*, *footer*, *footnote*, or *endnote* were found in the memo. A large percentage of candidates were unable to distinguish between the terms given and therefore they were unable to identify the features that were found in the letter.

In Part (e), candidates performed poorly. The majority did not state that the *find and replace* feature was the one that should be used. Some of the candidates who stated the correct feature failed to mention that the word *election* needed to be selected and r*eplace all* chosen.

For Part (f), candidates were unable to transfer their knowledge of inserting a picture to explain in detail how it can be done. This resulted in them not performing well on this part of the question.

In Part (g), candidates were unable to state that the name of the document that contains the merge fields is known as the *primary document* or *main document*.

For Part (h), approximately half of the candidates who attempted this question scored the full two marks. Others were unable to identify the number of merge fields needed in the document or the correct names of the merge fields.

Question 2 – Spreadsheet

This question tested candidates' knowledge of the various features of a spreadsheet application. The question was based on a chart which was provided.

Part (a) was generally well done by most candidates. In Part (b), candidates were able to name other types of charts that were appropriate for representing the data. For Part (c), the majority of candidates was able to state the title of the chart. However, a few candidates stated the name of the vertical axis instead of the horizontal axis.

In Part (d), many candidates were able to identify the purpose of the chart. For Part (e), the majority of candidates was able to write the data that was used to create the chart. However, a few misread the values from the chart and wrote „1000' instead of *10000*.

For Part (f), a large number of candidates gave good responses. Some however named an incorrect range of values or combined the *sum* function with the + operator. Part (g) was not well done. The majority of candidates only named one column range (No. of Voters) as the solution while others did not demonstrate knowledge of the concept of a *range*.

The majority of candidates attempted Part (h) and approximately 85 per cent of the responses were poor. Many candidates experienced difficulty in writing down the requirements of a criterion for filtering the data. In some instances, a wrong value was given in the condition or candidates gave the response for Part (i). Some attention should be paid to teaching this topic.

In Part (i), a large number of candidates who attempted this question wrote the district letters only as the response and not the complete answer which included the *no. of voters*.

For Part (j), a very small percentage of candidates who attempted this question were able to give a correct response. Common errors in responses were "error", "##" and "no result".

Question 3 – Database Management

This question tested candidates' knowledge of the various features of a Database Management application. The question was based on a database with two tables. A large number of candidates attempted this question.

Part (a) was fairly well done. Some candidates were unable to differentiate between fields and records. A few did not understand the concepts and multiplied 10 by 3 and gave 30 as their answer. A substantial number of candidates indicated Pascal programming data types for Part (a) (ii) and therefore gave responses such as ‚char', ‚string', ‚alphabet' and ‚integer'. A few candidates also listed one data type for the two fields and some candidates stated that there was no primary key since there was no unique field in the table. For (a) Part (iii), approximately half of the candidates gave one field as the primary key instead of the two *DCODE + PTYPE*. Teachers need to ensure that candidates are taught that more than one field can make up a primary key. Most candidates were able to provide the correct response for Part (a) (iv).

For Part (b), a large percentage of the candidates were able to give an accurate response.

The majority of candidates answered Part (c) accurately although many of them just wrote ‚Sum of Places'. A number of candidates, however, were not able to state that the POLLING table was the one used in the query for Part (b) (ii). Instead, they stated what a query is used for.

For Part (d), some candidates seemed confused with the meaning of > and some candidates stated what a query is generally used for rather than stating what the query was specifically used for in this instance. A number of candidates gave only one table for Part (d) (ii) instead of two. Most of the candidates identified the correct number of records for Part (d) (iii).

Many candidates gave inaccurate responses for Part (e) (i). They named ‚currency', ‚number' and ‚integer' as their responses. The correct response was *calculated field*. For Part (e) (ii), the majority of candidates was able to give the correct response although some of them inaccurately stated ‚money'.

In Part (f) (i), some candidates were able to state the field which was used to group the records but some listed all three fields. This occurred for Part (f) (ii) as well. Many candidates left out Part (f) (iii) and some selected the SUMMARY line from the report for their response. The majority of candidates was able to identify the title of the report for Part (f) (iv). This part was generally well done.

Question 4 – Programming and Problem Solving

This question tested candidates' knowledge of concepts associated with Problem Solving and Program Design and Implementation using the programming language, Pascal.

In Part (a), most candidates were able to clearly state the data types. However, some had difficulty. Very few candidates recognized the statement as a declaration. The majority of candidates understood when a syntax error can occur and therefore scored well on this question but many of them were unable to identify when the error would occur.

Many candidates were unable to correctly interpret Part (b) (i) that asked them to state the variable that *lg* represents, but were able to recognize the initial value of *lg*. However, the majority of candidates was able to identify the control structure and the line numbers where they were used.

Many candidates attempted Part (c) and responded fairly well. Some candidates demonstrated lack of knowledge of the concept of *trace table*.

A small percentage of candidates attempted Part (d) but did poorly. Teachers need to ensure that students are taught the proper symbols used in constructing a flow chart as many were confused as to what symbols to use for the various statements.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2013

INFORMATION TECHNOLOGY

GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

In May/June 2013, 26 552 candidates from the participating territories wrote the Information Technology Examinations. This represents a decrease of 3.5 per cent when compared with May/June 2012**.**

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of sixty multiple choice questions testing all areas of the syllabus. Some areas of difficulty included the following:

- Methods of file organization and access – sequential access, index-sequential
- Current and emerging technological trends – CADD, CAE, CAM
- Application software: concepts and technical terms associated with word processing, spreadsheets, database management, webpage design and presentation (PowerPoint) software
- Problem-solving and program design:

  – Determining the output of a program segment/algorithm.
  – Use of logical operators in a truth table

Program implementation:

- Valid data types in Pascal
- Declaring arrays in Pascal
- Classifying programming languages into different generations

Paper 02 – Structured Questions

This paper consisted of three sections with a total of twelve compulsory structured questions. Section I consisted of six short answer questions worth a total of 60 marks and testing the Theory profile. Section II consisted of two structured questions worth a total of 15 marks and testing the Productivity Tools profile. Section III consisted of four structured questions totalling 45 marks and testing the Problem-Solving and Programming profile.

Section I — Theory

Question 1

Part (a) required candidates to identify an input or output device that is best suited to perform each of a number of given activities. This part of the question was well done by the majority of candidates. Some candidates incorrectly provided both an input and an output device for each activity.
Examples of correct responses are as follows:

(i) *monitor or printer or multimedia projector*
(ii) *plotter or graphics tablet or digitizer or light pen*
(iii) *joystick or game console or mouse or keyboard*
(iv) *bar-code reader or POS terminal*
(v) *biometric device or biometric scanner or fingerprint scanner*

In Part (b), candidates were required to state two characteristics to consider when purchasing a printer. This part of the question was also well done by the majority of candidates who provided a variety of characteristics to consider when purchasing a printer. An example of a correct response is as follows:

Any two factors: speed; quality of print; storage capacity; size, cost; noise level; power consumption; colour/black and white; print volume of cartridge; compatibility with operating system; performance rating; manufacturer's warranty; paper handling capacity.

Part (c) required candidates to state the general name associated with a device such as a printer. This part of the question was well done by the majority of candidates. An example of a correct response is as follows:

Output device or hardware device or peripheral device
For Part (d), candidates were asked to explain the term 'bi-stable device'. This part of the question was satisfactorily done by the majority of candidates. Some candidates provided examples of bi-stable devices such as a switch being "on" or "off", while other candidates seemed unfamiliar with the term "bi-stable device". An example of a correct response is as follows:

A bi-stable device is a device that can exist in one of two discrete states.

Question 2

Part (a) required candidates to provide the names of two types of user interface and to indicate an appropriate input device that can be used in each user interface provided. The majority of candidates provided the names of two types of user interface but some of the candidates were unable to provide the appropriate input device for each user interface identified. In some cases, candidates incorrectly provided interfaces used with hard disks such as SATA and SCSI. Examples of a correct responses are as follows:

- *Command driven/command line Interface — Keyboard used as input device*
- Menu interface — pointing device (mouse) and keyboard used as input device.
- Graphical user interface — pointing device (mouse), touch screen and light pen used as input device.

In Part (b), candidates were required to identify the type of menu illustrated in the question. The majority of candidates correctly identified the illustration of Menu A but Menu B illustration proved challenging. An example of a correct response is as follows:

- *Menu A — pulldown/dropdown menu*
- *Menu B — popup menu*

Part (c) tested candidates' knowledge of operating systems. The majority of candidates could not provide an example of operating system software. In addition, many candidates listed four functions of an operating system without providing any explanation rather than providing one function with the required explanation. An example of a correct response is as follows:

(i) *Windows or DOS or Linux or Unix or Mac OS*

(ii) Any ONE function with explanation from the following:

- *Process management: Allocates time or resources of the CPU to each process that the computer is running*
- *File management: creates/deletes/renames files/folders.*
- *Memory management: allocates areas of memory to different programs so that each program can function effectively*
- *Input/output device management: makes communication possible between peripheral devices and the system unit*
- *Security: provides the user with protection mechanism(password)to prevent unauthorized access*
- *User Interface: helps the user to interact with the computer*

Question 3

This question required candidates to demonstrate their knowledge of the ways information can be misused. This question was poorly done by the majority of candidates who could not provide the technical terms for the given statements.

Examples of correct responses are as follows:

(a) (i) *Industrial espionage*
(ii) *A computer virus/malware/worms*
(iii) *Software piracy*
(iv) *Identify theft*
(v) *Computer fraud*

(b) (i) *Propaganda*
(ii) *Unauthorized access/hacking*
(iii) *Surveillance or electronic eavesdropping*
(iv) *Credit and debit card fraud*
(v) *Invasion of privacy*

Question 4

For Part (a), candidates were required to state the differences between RAM and ROM. This part of the question was well done by the majority of candidates. An examples of a correct responses are as follows:

Any two differences indicated in the table below.

RAM	**ROM**
Temporary	*Permanent*
Volatile	*Non-volatile*
Needs an electrical current to hold the information	*Does not need an electrical current to hold the information*
Can be upgraded	*Cannot be upgraded*
Larger capacity	*Smaller capacity*

In Part (b), candidates were required to provide two reasons for computers to have secondary storage. The majority of candidates could only provide one reason which is to store data permanently. Examples of correct responses are as follows:

Any two of the following:

(i) *To store data permanently*
(ii) *To transfer data from one computer to another in a stand-alone environment*
(iii) *To backup data and program*

Part (c) required candidates to match the features of storage devices with their names. This part of the question was well done by the majority of candidates. Some candidates did not know the storage capacity of a floppy disk. This may be because floppy disks are rarely used currently. The correct/matching responses are as follows:

I. *C*
II. *E*
III. *B*
IV. *F*
V. *A*
VI. *D*

Question 5

In Part (a), candidates were asked to state the purpose of encryption and to indicate the type of data that a company may want to encrypt. This part of the question was poorly done by the majority of candidates. Some candidates had a general idea of encryption but could not identify the data that the company may want to encrypt. An example of a correct response is as follows:

(i) *To ensure that the data cannot be interpreted (translated) during transmission except by the intended user.*
(ii) *Confidential data*

In Part (b), candidates were asked to indicate two security measures to protect data from unauthorized access. The majority of candidates provided only one security measure. The use of a password was the popular choice. Possible correct responses include:

Password; biometric system; *file access restriction; separate user accounts*

In Part (c) candidates were required to provide two precautionary measures to protect data in the event of a fire. This was satisfactorily done as the majority of candidates indicated the use of a fire-proof safe and data backup. However, many candidates did not mention that the data backup should be stored in another location. An example of a correct response is as follows:

- *Backup and storing in another location*
- *Storing backup data in a fireproof safe*

In Part (d) candidates were required to provide two validation checks and explain what each check does. Most candidates provided the names of the validation checks but could not describe what the checks did. Possible correct responses include any two of the following:

- Range Check – to ensure that the input data is within a given range. For example, the month number is between 1 and 12 inclusively.
- Reasonableness check – to find out if the input data is realistic. For example, the height of a person is not above 8 ft.
- Data type check – to find out if the input data is of the correct type. For example, characters only are entered for a person's name.
- Inconsistency/consistency check – to ensure that the data entered in one part of the form is consistent with the data in another part of the form. For example, the date of birth entered tallies with the present age of the client.

Question 6

This question required candidates to demonstrate their knowledge of how numbers are stored and manipulated in the binary, hexadecimal and ASCII system. This question was satisfactorily done by the majority of candidates. An example of a correct response is as follows:

(a) *16* | *21*

1 r 5

$21_{10} = 15_{16}$

(b) *D = 1000100*
G is 3 letters/positions after D
3 = 011
G = 1000100 + 011 = 1000111

(c) *Binary Coded Decimal*

(d) *Each digit is represented using a 4 bit binary code*

Section II – Productivity Tools

Question 7

This question required candidates to state the basic features of a spreadsheet program. It was satisfactorily done by the majority of candidates.

In Part (a), the majority of candidates indicated correctly the numbers of rows used to insert data in the spreadsheet.

For Part (b), many candidates provided the correct formula or function. In some cases, however, an incorrect range was provided in the formula/function

In Part (c), many candidates sorted the range in descending order instead of ascending order and as such provided the wrong cell address.

For Part (d), many candidates could not provide the correct functions to count the number of items in a range and to find the minimum value in a range.

An example of a correct answer is as follows:

(a) *6 or 7 rows*
(b) (i) *= Sum (B4:D4 or = B4 + c4 + d4*
(ii) *A4*

(c) (i) Count or countA
(ii) Min

Question 8

In this question candidates were required to demonstrate their knowledge of basic features of a database management program. This question was satisfactorily done by the majority of candidates.

For Part (a), many candidates could not provide the appropriate field names, data types and descriptions.

While in Part (b), many candidates provided the appropriate primary key.

In Part (c), many candidates provided the complete criteria while some candidates provided part of the criteria (>500) without stating the field to be used in the criteria.

In Part (d) of the question, the majority of candidates correctly identified a report as the database feature.

An example of a correct response is as follows:

(a)

Field Name	Data Type	Field Description
Customer Name	*Text*	***The first name and last name of individuals***
Money Owed	*Number OR Currency*	***The amount of money owed***
Phone Number	*Text*	***Phone contact of the person in the format xxx-xxxx***

(b) *Phone Number/customer name*

(c)

Money Owed
>500.00

(d) *Report*

Section III – Problem Solving and Programming

Question 9

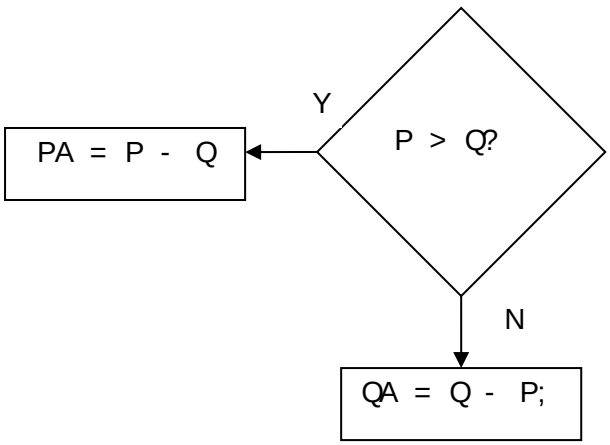
This question tested candidates' ability to construct a flowchart on a given scenario and to complete the given truth table and trace table.

Part (a) was satisfactorily done by the majority of the candidates. Some candidates seemed unfamiliar with the use of flowchart symbols used to represent: decision, input/output, processing and data flow.

Part (b) was well answered although some candidates did not following the program fragment to complete the columns with headings PA and QA and populated the entire two columns rather than the specific cells.

An example of a correct response is as follows:

(a)



(b)

P	Q	P > Q?	PA	QA
1	1	**N**		**0**
1	0	**Y**	**1**	
0	1	**N**		**1**
0	0	**N**		**0**
P	Q	P > Q?	PA	QA
1	1	**N**		**0**
1	0	**Y**	**1**	
0	1	**N**		**1**
0	0	**N**		**0**
P	Q	P > Q?	PA	QA
1	1	**N**		**0**
1	0	**Y**	**1**	
0	1	**N**		**1**
0	0	**N**		**0**

Question 10

This question required candidates to analyse the code of a Pascal program to identify program errors, to rewrite it using correct syntax and to determine the output of the program.

Part (a) of the question was poorly done by the majority of candidates.

Part (b) was also poorly done. The majority of candidates were unable to initialize the variable x to 0 and to state the line number to indicate where it should be placed in the program.

An example of a correct response is as follows:

(a) (i) *no output* or cannot compile
(ii) *Line 9 / no line number*
(iii) *syntax error*
(iv) *Line 9:*
else writeln('Y is the smaller number');
(v) *Conditional/selection/if-then-else*

(b) (i) *X := 0*;
(ii) *Line 5*

Question 11

This question required candidates to declare an array in Pascal. This question was poorly done by the majority of candidates. Some candidates interchanged the content of the array with the index and as such provided the incorrect response. In addition, many candidates seemed unfamiliar with the structure of an array declaration.

An example of correct array declaration is as follows:

Var list :array[1..6]of char;

Question 12

This question required candidates to write program statements in Pascal for given specific tasks.

Part (a) of the question was well done by the majority of the candidates. However, in some cases, candidates did not provide the semi-colon at the end of the statement

Part (b) of the question was satisfactorily done by the majority of the candidates but in many cases, candidates seemed unfamiliar with the integer data type and incorrectly used whole number or real as the data type.

Part (c) was satisfactory although candidates wrongly used the algorithm assignment operator (←) instead of the Pascal assignment operator (:=).

Part (d) was satisfactorily done by the majority of candidates. However, some candidates used the PRINT command instead of the Pascal command Writeln. In addition, some candidates used the WRITELN command but incorrectly put the variable SUM in quotes ('SUM').

An example of a correct response is as follows:

(a) *PROGRAM TOTAL*;
(b) VAR SUM: Integer;
(c) SUM :=O;
(d) Writeln(SUM);

Paper 03 – School-based Assessment (SBA)

The school-based assessment consisted of a practical project testing Profile 2, Productivity Tools (word processing, spreadsheets and database management), and Profile 3, Problem-Solving and Programming.

The following are some general comments on aspects of the SBA that emerged from the moderation exercise this year.

1. The presentations of the SBAs have improved in some territories.
2. In most cases, the description of the project was not submitted.
3. Project components were not separated and labelled.
4. Tasks completed in the various SBA components were not identified.

Sample Uniqueness

In many instances, there was a lack of uniqueness among SBAs coming from the same centre. In some cases, evidence was seen in many of those samples that one candidates' work was used for the other candidates' samples, or a template was provided for the candidates to insert a few changes prior to submission. This is completely unacceptable. The syllabus states clearly that an SBA sample should be the candidate's original work.

Moderation Sheets

1. The samples sent by the school should match that generated by CXC SIRS system.
2. Computer-generated printouts must match the marks and candidates on the moderation sheet and samples submitted.
3. Teachers should mark the SBAs and place the marks on the moderation sheet on the row labelled *Teacher*.

Mark schemes

1. Some teachers failed to adhere to the current CXC guidelines and mark scheme.

2. It is recommended that teachers familiarize themselves with the CXC mark scheme to allow candidates a better chance of gaining marks for the tasks. Teachers should also breakdown the marks in the mark scheme by identifying the tasks for the allocation of each mark.

3. In some schools that have more than one teacher the teachers did not seem to work collaboratively to produce one project and one mark scheme.

4. The mark schemes for the individual candidates were missing from a number of the samples.

Hardcopy and softcopy submissions

1. Some teachers continue to submit only softcopies (CDs). Hardcopies/printouts are required.

2. Teachers should make sure that each candidate's SBA is bound and properly held together and labelled.

3. Teachers are advised not to use red or green ink when marking the SBA as these colours are used by the moderators. Black or blue ink or pencil is acceptable.

4. Students should avoid submitting lengthy irrelevant data in the SBA. Fifteen to twenty pages for each component is more than adequate.

5. Where there is more than one teacher, one common SBA and mark scheme should be submitted.

6. Half marks should NOT be awarded for any task.

7. Marks should be given for work actually completed by the candidate. Evidence of this should be seen in the hard copy submitted.

Word processing

1. Teachers created their own SBA questions and for this they should be complimented. However, these questions were not always structured to assess skills relevant to the word processing component of the syllabus, such as formatting features (inclusive of tables, columns, text formatting, bullets and numbering).

2. Teachers are asked to create/use SBA assignments which require candidates to perform ALL of the skills being assessed by the marking scheme. Tasks which should be included as part of the SBA assignment are as follows:

   (a) Creation of table(s) using the table feature in Microsoft Word (imported tables will not be awarded the marks for this criterion).
   (b) Separation of text or pages into two or more newspaper type columns.
   (c) Changing of paper size and/or orientation, and text orientation
   (d) Changing of line spacing, justification and alignment
   (e) Changes in page margins
   (f) Insertion of graphics

3. In some cases, teachers' mark schemes were inconsistent with the CXC mark scheme; for example, candidates were awarded marks for content rather than completion of specific tasks or marks awarded exceeded the suggested maximum for the specific sections. This should be avoided.

General note: Mark schemes should be broken down as completely as possible, based on specific skills, and marks allocated in accordance with the mark scheme provided in the CSEC Information Technology syllabus guidelines.

4. Software programs that are not considered to be word processing software (e.g. Microsoft Publisher) should not be used to generate samples for word processing.

5. Some samples showed significant signs of similarity. Teachers should allow students to use their creativity.

6. Most of the formatting features were used by all candidates. However, candidates rarely demonstrated simultaneous use of single and double line spacing and page numbers, multiple page documents were used.

7. Most candidates used headers and footers. Footnotes and endnotes were rarely used. Headers or footers should appear on consecutive pages especially in cases where the mail merge feature is used.

8. The effective use of tables and columns was not adequately demonstrated.

   (a) Candidates were expected to separate a document or body of text into "newspaper style" (either 2 or 3) columns. This can be demonstrated in brochures, pamphlets or within a typed document.
   (b) Inserting a table using Microsoft Word and then adding data was not done in many cases. Appropriate borders and shading may be shown. Importing spreadsheet or database tables was done very frequently and this does not reflect the skill being tested.

The following are examples of how these aspects could have been presented:

(a) Correct use of columns

Dear Parent Guardian

The executive of the Deighton Griffith School Parent Teachers' Association welcomes you and your child/ward to the Deighton Griffith Family.

We strongly believe in the importance of home-school-community relationships and therefore intend to work together to ensure that students achieve success in their various areas of endeavour.

This school years also marks an exciting time in the school's life as we celebrate 21 years of existence and implement various initiatives in our new strategic plan. Each member of the Deighton family has some role to play in ensuring our continued growth and success.

The PTA meets every first Saturday of the month at 1:30 pm. Topics discussed are always relevant to you as a parent and to your child's school life.

Please complete the survey below and submit it with your form, so that we can better serve your needs.

Example of text separated into two columns as part of a document.

Example of page separated into three columns and used to create a brochure. Landscape orientation is also used here.

(b) Correct use of tables

A table should have clearly defined rows and columns. The use of different borders and/or shading is also advised.

This school years also marks an exciting time in the school's life as we celebrate 21 years of existence and implement various initiatives in our new strategic plan. Each member of the Deighton family has some role to play in ensuring our continued growth and success.	This school years also marks an exciting time in the school's life as we celebrate 21 years of existence	We strongly believe in the importance of home-school-community relationships and therefore intend to work teogehter to ensure that students achieve success in their various areas of endeavour.
The executive of the Deighton Griffith School Parent Teachers' Association welcomes you and your child/ward to the Deighton Griffith Family.	The PTA meets every first Saturday of the month at 4:30 pm. Topics discussed are always relevant to you as a parent and to your child's school life. Please complete the survey below and submit it with your form, so that we can better serve your needs.	

9. Many centres did not submit all the required printouts for the mail merge Candidates are expected to submit the following in order to achieve maximum marks:

(a) A primary document with the names of the merge fields inserted
(b) A secondary document with the data for the merge fields inserted in the appropriate location.

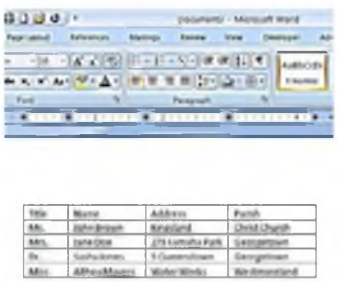
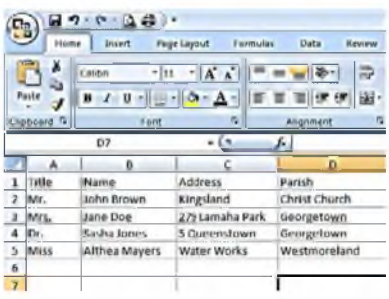
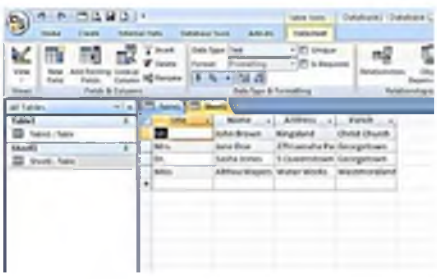
Merge fields should be linked to the data source rather than typed in by the candidate.

Merge Field Example

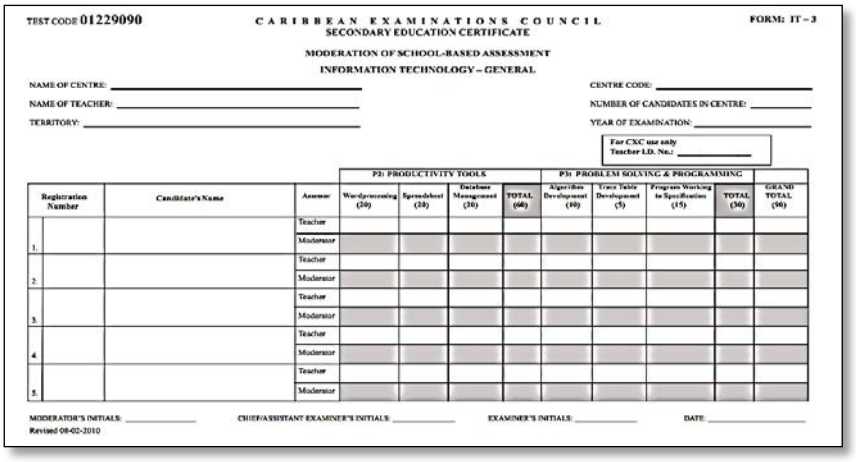
Correctly inserted fields	**Typed merge fields**
«Title» «Name» «Address» «Parish»	<Title> <Name> {Address} <<Parish>>

(c) A copy of the data source as mentioned below in #12
(d) A small sample of printouts of the **completed merge (at least three but no more than five)**. Candidates are **NOT** required to print all the merge letters.

10. Data source as evidence of the mail merge must be submitted. Evidence of a data source could be either:

a table in Word	**a worksheet in Excel**	**or a database table**
		

11. A few teachers did not submit completed CSEC Moderation Sheets for the School Based Assessment detailing the breakdown of marks for candidates in the sample. The form shown below should be completed and submitted.



TEST CODE 01229090 CARIBBEAN EXAMINATIONS COUNCIL FORM: IT – 3

SECONDARY EDUCATION CERTIFICATE

MODERATION OF SCHOOL-BASED ASSESSMENT

INFORMATION TECHNOLOGY – GENERAL

NAME OF CENTRE: _____ CENTRE CODE: _____

NAME OF TEACHER: _____ NUMBER OF CANDIDATES IN CENTRE: _____

TERRITORY: _____ YEAR OF EXAMINATION: _____

For CXC use only
Teacher I.D. No.: _____

	Registration Number	Candidate's Name	Assessor	P2: PRODUCTIVITY TOOLS				P3: PROBLEM SOLVING & PROGRAMMING				GRAND TOTAL (90)
				Word-processing (20)	Spreadsheet (20)	Database Management (20)	TOTAL (60)	Algorithm Development (10)	Trace Table Development (5)	Program Working to Specification (15)	TOTAL (30)	
1.			Teacher									
			Moderator									
2.			Teacher									
			Moderator									
3.			Teacher									
			Moderator									
4.			Teacher									
			Moderator									
5.			Teacher									
			Moderator									

MODERATOR'S INITIALS: _____ CHIEF/ASSISTANT EXAMINER'S INITIALS: _____ EXAMINER'S INITIALS: _____ DATE: _____

Revised 08-02-2010

12. The overall quality of the selected samples was satisfactory.

13. There was an improvement in the packaging of SBA samples but there are still some centres that submitted loose pages. Some centres are still submitting an excessive number of pages in their SBA and better presentation of the packaging of the samples is required as well.

14. Candidates should not produce screenshots of pages in this section. These are usually difficult to read after being resized and may result in the loss of marks for the relevant areas.

Spread-sheets

Approximately 85 per cent of candidates sampled were able to score 50 per cent and above in the spreadsheet section of the SBA.

Formulas and Formula Sheets

In numerous samples, there were no formulae sheets. This worked to the disadvantage of the candidates, leading to loss of marks. Teachers need to convey to students the process of printing formulae sheets, and insist that students print and submit them in their final submission. Formulae sheets must be legible. Samples need to show evidence of candidate's ability to accurately use formulas including incorporating absolute cell referencing (F2). This must be seen in formula sheets that are submitted in order for marks to be awarded. A minimum of two functions should be used in the solution.

Formatting Features

In the event of an insertion or deletion of records, records must be highlighted for easy identification. A separator or label indicating the 'before or after' insertions or deletions must be included as well.

Sorting

Sorted records must be clearly identified by highlighting or labelling the sorted range. Candidates must include a statement on the sorted page indicating the particular field (fields) upon which the sort has been performed.

Charting Operations

In some instances, graphs were not printed, or when graphs were printed, the axes were not labelled and legends and/titles were missing. Teachers must ensure that axes are labelled and an appropriate title assigned to the chart. Teachers must place greater emphasis on chart creation and labelling. Although, candidates can be given one graph to do as part of the SBA, the graph should show a comparison of at least two series of data.

Extraction of Data and Criteria Range

Many candidates failed to successfully perform advanced filtering or a complex criterion. Teachers must ensure that the advanced filter is part of the SBA. Evidence of the criteria used must be shown, as well as the results. The criteria range and the results must appear on the same page. A caption (heading) should be used to clearly indicate the presence of the criteria range filter. Alternatively, a screen shot can be presented if the filter buttons are used but the criteria must be seen.

Length of SBA

In the area of spreadsheet formatting, much improvement is needed in order to limit printouts. Too many unnecessary printouts were submitted. Teachers and students need to concentrate more on the quality of work done, specific to the tasks, rather than copious quantities of unnecessary printouts.

The number of printouts must be limited (at most 15 pages inclusive of formulae sheets, the actual worksheets, advanced filter data, and charts) to avoid unnecessary and repetitive printouts.

Documents must be well-formatted so as to ensure good printouts. Candidates must make good use of page breaks for column adjustments to ensure that data and charts are not spread across several pages in a way which makes them difficult to understand or interpret. Teachers should avoid giving students SBAs that require the use of a large number of columns which results in some level of difficulty to print.

Presentation

The SBA report is a required document and therefore must be presented in a coherent manner. Printouts must be properly and carefully collated, secured and labelled so as to ensure good presentation. Spread sheet printouts should be in one section, database management printouts in another section, and word processing and problem solving printouts in their separate sections as well.

Syllabus Guidelines for Marking SBA

Teachers are strongly urged to strictly adhere to CXC's mark scheme as provided in the syllabus. Marks should NOT be allocated to tasks that are not in agreement with this mark scheme. The assignment details must also be submitted.

Screenshots

Screenshots must NOT be used as a substitute for default worksheet printouts.

Database Management

Overall, the SBA samples were well done with most assignments chosen being relevant to the syllabus and appropriate for the CSEC level. Moreover, the assignments adhered to the length specified by the syllabus and the required format. Some issues highlighted in reports done in the previous years were not repeated and this proved that collectively regional teachers and candidates are producing a higher standard of SBAs.

The majority of the SBA submissions were marked in accordance with CXC guidelines but, some teachers failed to show the breakdown of marks when more than one mark was allocated to a task. Approximately 75 per cent of candidates sampled were able to score 50 per cent and above in the database management section of the SBA. A definite improvement is needed in this section.

Printouts and Packaging

While it is advisable that tables/ queries/ screen shots fit on one page, they should still be legible. Suitable packaging of individual samples should be employed. All pages should be properly bound with clearly defined sections (tables, queries, report).

It was difficult in some samples to distinguish tables from queries. Candidates are advised to use appropriate labels on each sheet.

e.g Table: Personal Info
Query: Salaries above $5000.00

or

Personal Info Table
Salaries above $5000 query

Candidates should use one paper size only when submitting SBA assignments in order to enhance presentation.

Duplications of printouts should be avoided.

Properly and correctly completed individual mark schemes should always accompany each sample submitted.

Samples should be properly organized and bound. All submissions should be printed directly from the database software and all parts of the SBA must be submitted as hard copy.

Tables

Most samples contained two or more database tables. However, it is imperative that candidates present hard copies of all database tables. It should be noted that for every table, the datasheet view and the design view (screen shot) **MUST** be submitted as evidence of appropriate table design. This should show any primary key used and the data types and field properties.

Modifying Database Tables/Files

Many candidates attempted to modify tables/table structures by performing additions/deletions of records/fields. In some cases, however, there was no supporting evidence provided to indicate the change made to the table/ table structure. When attempting to modify tables/ table structure, candidates should show printouts of 'before' and 'after' the modification. Additionally, candidates should indicate the record or field which is being modified for example:

Deletion of record with customer idno = '7345'

Queries

Generally, most candidates were able to perform queries. However, some of the candidates failed to show the design views (screen shots). Candidates must take note that when presenting design views of queries, both the tables used in the query and the criteria **MUST** be clearly shown. In addition, where a calculated field is being created, the complete formula must be visible in the design view screen shot. It is advisable that SBA assignments include queries with multiple conditions (criteria). Failing to follow these guidelines may result in loss of marks.

Reports

Some samples did not show reports. It was also noticed that reports were only provided in the word processing section. The majority of candidates did not produce any form of grouping in their reports. More emphasis should be placed on this aspect, with the inclusion of more than one record per group. Summary/statistical features should be included. Evidence of sorting must be shown in reports which should be titled appropriately.

Mark Scheme

The mark scheme in the syllabus for database is divided into three sections. Teachers should adhere to this. It was observed that teachers allocated sometimes more and sometimes fewer marks per section than is allowed by the mark scheme. Individual mark schemes must be submitted for each sample submitted. Using CXC guidelines, the mark scheme must be broken down to show how each mark is allocated. Teachers are reminded that CXC does not award fractional marks for the SBA, therefore they should not allocate fractional marks in assessing their students.

Section 1 of mark scheme

The first section of the mark scheme deals with the creation and modification of database tables and fields. The following are some issues highlighted:

(a) Design views showing different data types, changing in field definitions, addition and deletion of fields, primary keys and changes in field size were missing in many samples. In order to attain maximum marks in this section, it is required that design views of the database tables with all the above are placed in the report

(b) If field sizes, field definitions or records are modified, before and after screen shot must be shown in order to prove that this has taken place.

(c) Many centres submitted SQL. Once the design views of tables and queries are submitted , there is no need for SQL submissions.

Section 2 of mark scheme

This section deals with the creation of queries.

(a) The design views of the queries were very rarely shown. In order to gain maximum marks, the design view printouts are essential. This would prove the tables used are the correct ones and that an accurate relationship/join was done.

(b) Multiple criteria and queries using multiple tables should be used. In many instances this was not shown which may have resulted in loss of marks.

(c) Calculated fields were done fairly well but here again, the majority of centres did not submit any design views to prove the correctness of calculated fields used.

Section 3 of mark scheme

This section deals with the creation of reports.

Samples that contained reports revealed that they were done fairly well. However, there were instances of reports having many pages excluding some key aspects that would have helped the candidates attain maximum marks. Please note that only one report is needed but it must show the following.

- Grouping on a field
- Sorting on a field
- Use of summary features, that is, count, sum, average, grand total
- Selection of correct fields necessary for the creation of the report

Teachers awarded marks for aspects such as formatting of the report title, presentation of reports, and spelling accuracy. This does not adhere to the mark scheme. Teachers should not assign marks for any aspect of the report other that those listed above.

Problem Solving and Programming

Overall, the SBA samples revealed that this section gave the candidates the most difficulty. Candidates generally scored the lowest in this component although the quality of the samples has improved from previous years. Approximately 65 per cent of candidates sampled were able to score fifty per cent and above in this section of the SBA. However, an unacceptable 15 per cent of samples presented no responses for this section. A definite improvement is needed in this section of the SBA as well.

Presentation

The samples submitted for this year showed an improvement in the way they were demarcated, in that (separate and distinct sections for each of the components were indicated). Many of the samples submitted had the sections clearly presented with an appropriate table of contents, page numbering, well-labelled headings for sections such as trace tables, pseudocode and Pascal source code. Teachers should ensure that hard copies are submitted for moderation.

Problem Solution

There is concern relating to the creativity of the problem solutions produced. It was evident that templates were used in a small per-centage of the solutions submitted and this should be avoided. In some cases, the printed work submitted for several candidates was identical. Further, a small per-centage of the samples submitted were not substantive in nature and the solutions provided were too trivial. Teachers should encourage their students to produce original solutions to the problems presented.

Problem Statement

About 75 per cent of the candidates attempted to produce problem statements. However, only about 40 per cent completed them accurately. Some of the candidates resubmitted the question that was given, while others gave a simple phrase which did not provide a comprehensive description of the problem. It should be noted that an appropriate problem statement should take the form of a paragraph and should give an indication of the necessary input, output and processing requirements for the problem.

For example:

Using the TrinBarJam Elections SBA given in the syllabus, an example of an **inadequate** statement would be:

"*This pseudocode identifies the winning candidate of an election*."

A more appropriate problem statement would be:

"*The following pseudocode is designed to find the winning candidate. It will accept the candidate's name and number of votes. It will determine the highest votes and output the winner's name*."

Flowcharts/Pseudocode

Over 90 per cent of the candidates attempted this section. Some candidates submitted both flowchart and pseudocode. Only one of these was required.

Flowcharts

Proficiency in the use of flowcharts was generally unsatisfactory. Incorrect symbols were used in many instances to produce the chart. Candidates clearly did not understand the relevance and use of flow lines or the need to use appropriate symbols to reflect the processes being carried out. Candidates should ensure correct use of symbols and clearly label flow lines for any decision symbol being used.

Pseudocode

The beginning and end of the solution should be clearly indicated, with the words START and STOP. The pseudocode should be structured with constructs clearly identified; the solution should not resemble Pascal code or slightly modified Pascal code.

The pseudocode solution should take the following format with variable definitions **preceding** the processing statements:

```
Identify and Define variables

START
        Initialise variables

        Processing steps

STOP
```

In order for full marks to be awarded for this section, the project should be substantive enough to include EACH of the following:

Prompting for input

Storing data (in variables and arrays)

Selection (If..then and If..then..else)

Repetition (*At least two of the following loops – For..do, While..do, Repeat..until with one being used in the manipulation of an array*)
Output.

Variable names used should be appropriate and meaningful.

Candidates should ensure that the layout of their work is adequately done. This means the beginning and ending of all program structures should be clearly seen, with appropriate indentation.

IF <condition> THEN
  <action (s)>
ELSE
  <action (s)>
ENDIF
	FOR <loop_variable = initial value> TO <end value> DO
	
	  <action (s)>
	
	ENDFOR

WHILE <condition> DO
  <action (s)>
ENDWHILE
	REPEAT
	  <action (s)>
	UNTIL <condition>

Trace Tables

The following points must be noted:

The variables in the trace table should match those identified in the pseudocode or the program.

Sample data used to test the solution should be robust. This means must test both valid and invalid data for key variables.

Changes in values in the table should be clearly represented.

Program Implementation

This section was generally well done. Approximately 90 per cent of the candidates attempted this component, with the majority obtaining at least half of the marks for this section.

To be awarded full marks for this section, candidates should ensure the following guidelines are adhered to:

> Evidence of a working program should be clearly seen through the use of screen shots showing output to convince the reader that the program has successfully compiled without any errors.
> Candidates should ensure that their solution employs a minimum of three different data types.
> Variables should be initialised appropriately in the program.

The project should be sufficiently substantive enough to demonstrate the use of:

Two different types of **selection** statements *(if..then, if..then..else)*
Two different types of **iteration** statements *with* ONE of the iteration statements **manipulating an array**.

Programs should be well documented: name of author, date created and a simple statement of the problem must be inserted. Process statements can also be documented. Candidates should pay close attention to layout, including proper indentation and white spacing.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2014

INFORMATION TECHNOLOGY

GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The June 2014 examination was attempted by 22 889 candidates compared with 26 715 in June 2013. Approximately 82 per cent achieved acceptable grades (Grades I–III) as compared with 81 per cent in the previous year.

Overall, more candidates attempted all the questions including Section III as compared with previous years. Candidates continue to write the question in their responses. Teachers should encourage students to write brief answers. There were many cases where candidates provided multiple answers to a question which require only one response.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of sixty (60) multiple choice questions testing all areas of the syllabus. Overall, this paper was well done by the majority of candidates; the mean for this paper was 68 per cent. A few areas presented some challenges to candidates. These areas included file organization and file access methods; identification of the type of program statements (input, processing, output, and storage); use of arrays and using the view feature in PowerPoint.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of twelve (12) compulsory structured questions. Section I consisted of six (6) short answer questions worth a total of sixty (60) marks testing the Theory profile. Section II consisted of two (2) structured questions worth a total of fifteen (15) marks testing the Productivity Tools profile. Section III consisted of four (4) structured questions totalling forty-five (45) marks testing the Problem-Solving and Program Programming profile.

Section I — Theory

Question 1

This question tested candidates' ability to arrange units of storage in descending order from the largest capacity to the smallest capacity and to state the names of hardware devices used to perform given tasks.

Part (a) of the question was poorly done by the majority of candidates who arranged the units of storage from the smallest to largest instead of from the largest to smallest order as required in the question. An example of a correct response is as follows:

Terabyte /TB
Gigabyte /GB
Megabyte /MB
Kilobyte /KB

Part (b) of the question was well done by the majority of candidates. In Part (v) some candidates provided output devices such as printer rather that audio output device such as speakers or headphones. An example of a correct response is as follows:

(i) *ALU*
(ii) *RAM (Main Memory)*
(iii) *Control Unit*
(iv) *Magnetic Ink Character Reader (MICR)*
(v) *Speaker or Headphones*
(vi) *Scanner or digitizer or light pen or web camera*

Question 2

This question tested candidates' knowledge of the concepts of verification and validation.

Part (a) of the question was poorly done by the majority of candidates who seemed familiar with validation checks but were unable to apply their knowledge to identify the PURPOSE of the checks with reference to the data entry form provided. An example of a correct response is as follows:

(i) *Checks First Name to ensure that the data is alphabetic (letters).*
(ii) *Checks Number of brothers attending this school to ensure that the number entered is lower than a fixed reasonable number.*
(iii) *Checks Date of Birth to ensure that the data is within the allowable range for students entering the school*
(iv) *Checks Current Age to ensure that the age is correct given the current date and the Date of Birth*

Part (b) of the question was poorly done by the majority of candidates who seem familiar with the terms verification and validation but were unable to differentiate between them. Examples of correct responses are as follows:

Verification ensuresthat data is inputted accurately while validation checks that data is complete, allowable, reasonable or sensible.OR
Verification is a process carried out by humans while validation is an automated process carried out by computer software.

Question 3

This question tested candidates' ability to identify hardware specifications and software programs from the specifications given for a computer system

Overall, this question was satisfactorily done by the majority of candidates. Some candidates did not provide the complete specification as given. For example, for Part (a) candidates wrote Intel rather than Intel Celeron B815 Dual core as the type of processor. Some candidates also confused operating system software (Part (h)) with general purpose software (Part (i)). In addition, many candidates did not identify the number of USB ports (Part (f)). An example of a correct response is as follows:

(a) ***Intel® Celeron® B815 Dual Core***
(b) ***1.60 GHz***
(c) ***SATA***
(d) ***1366 × 768***
(e) ***headphones, Speakers, LED display (any 2)***
(f) ***3***
(g) ***Weight or Dimensions or Size of Battery***
(h) ***Microsoft Windows 7 Home Premium 64-bit Edition***
(i) ***Microsoft Office 2007 (Full Version)***

Question 4

This question tested candidates' knowledge of forms of information processing and methods of file organization and file access.

Part (a) of the question was satisfactorily done by the majority of candidates. Candidates may need to be exposed to more of these scenario-based applications involving information processing. An example of a sample response is as follows:

(i) Commercial Information Processing
(ii) Scientific Data Processing
(iii) Process Control
(iv) Automation/Industrial Processing System

Part (b) of the question was poorly done by the majority of candidates. Indexed sequential file organization and machine readable document posed difficulty to many candidates. Candidates may need to be exposed to more of these scenario-based applications involving file organization and access methods as well as to machine readable document as a source of data. An example of a sample response is as follows:

(i) file organization: sequential
type of access: sequential
(ii) file organization: indexed sequential
type of access: random/direct
(iii) Direct/random
(iv) Machine readable document

Question 5

This question tested candidates' knowledge of concepts associated with data communications and networks. The overall mean for this question was 38 per cent.

Part (a) of the question was satisfactorily done by the majority of candidates. Some candidates did not provide the full names of the cables and indicated fibre cable instead of fibre optic cable. An example of a correct response is as follows:

Coaxial, Fibre Optic, Twisted pair (any two)

Part (b) of the question was poorly done by the majority of candidates. Most candidates confused wireless media (satellite, microwave, infra-red) with wireless network technologies (Bluetooth, wi-fi). An example of a correct response is as follows:

Satellite, Microwave, Infra-red (any two)

Part (c) of the question was well done by the majority of candidates who seemed familiar with simplex and half-duplex data transmissions. An example of a correct response is as follows:

Simplex transmission allows data to be transmitted in one direction only while Duplex transmission allows data to be transmitted in both directions but in only one direction at a time

Part (d) of the question was poorly done by the majority of candidates. Candidates seem to confuse Intranet with a LAN and Extranet with WAN. An example of a correct response is as follows:

Intranet cannot be accessed from outside of the organization but Extranet can be accessed from wherever the user has access to the Internet

Part (e) of the question was well done by the majority of candidates who provided a suitable reason for the establishment of an Extranet by an organisation. An example of a correct response is as follows:

Allows employees to work away from office or to provide access to customers, suppliers, board members, etc.

Part (f) of the question was fairly well done by the majority of candidates. Susceptible to hacking was the popular disadvantage of an Extranet. Some candidates incorrectly mentioned that an Extranet is more costly to setup. An example of a correct response is as follows:

Susceptible to hacking or electronic surveillance

Question 6

This question tested candidates' knowledge of measures to secure data, data integrity and appropriate methods to verify that data is inputted accurately.

Part (a) of the question was well done by the majority of candidates. Some candidates confused physical restrictions with software restrictions. An example of a correct response is as follows:

Place computers in a secured area or use of security guard or use of biometric devices or use of locks.

Part (b) of the question was well done by the majority of candidates. The use of password was the popular correct choice. An example of a correct response is as follows:

Use of passwords or encryption or firewall

Part (c) of the question was satisfactorily done by the majority of candidates. Most candidates only provided two (2) out of four (4) distinct ways in which the integrity of the data can be destroyed. An example of a correct response is as follows:

Any FOUR (4) of the following:

(i) Human error
(ii) Natural disaster
(iii) Worms and viruses
(iv) Hardware malfunction
(v) Fraud /hacking
(vi) Malicious deletion or changing of data

Part (d) of the question was poorly done by the majority of candidates. Most candidates did not recognize that the question was asking for restoring data in a local area network environment and incorrectly provided answers on restoring online data from the Internet. An example of a correct response is as follows:

Upload the last Back-up and update uploaded files with the records from the incremental dumps

Part (e) of the question was poorly done as most candidates confused verification and validation methods. An example of a correct response is as follows:

Data is entered by one staff member and the same data is entered by another staff. Both sets of data are then compared to ensure that they are the same (double entry). Use of proof-reading is also acceptable.

Section II – Productivity Tools

Question 7

This question required candidates to identify basic features and functions of a spreadsheet program.

Part (a) of the question was fairly well done by the majority of candidates. Some candidates wrote the required cell address in the incorrect format. For example, 3E instead of E3.

Part (b) of the question was well done by the majority of candidates who provided the correct SUM function.

Part (c) of the question was poorly done by the majority of candidates. Most candidates seemed unfamiliar with the MAX function and instead incorrectly used the HIGHEST and AVERAGE functions -. However, the correct range was provided for the function used.

Part (d) of the question was fairly well done by the majority of candidates. Some candidates incorrectly identified the line graph which was displayed as a frequency polygon, graph chart and line bar chart.

Part (e) of the question was poorly done by the majority of candidates. Most candidates listed the surnames instead of the range containing the surnames.

The correct responses for Question 7 is as follows:

(a) E3
(b) SUM(C4..E4)
(c) MAX(C2..C5)
(d) Line graph
(e) B2..B5

Question 8

In this question candidates were required to demonstrate their knowledge of basic features of a database management program.

Part (a) of the question was fairly well done by the majority of candidates. Most of the candidates indicated date as the data type for the *DateofBirth* field but incorrectly indicated number as the data type for the *StudentNo* field .

For Part (b) of the question, the majority of candidates correctly identified the most appropriate field that may be used as the primary key.

Part (c) of the question was poorly done by the majority of candidates. Most candidates correctly identified the primary field but not the secondary field for sorting the data in the PARENTS table.

Part (d) of the question was well done by the majority of candidates who were able to correctly identify the field to join the tables.

Part (e) of the question proved challenging to the majority of candidates. Some candidates provided structured query language (SQL) codes while other use query by example (QBE) to do the query. In both cases, some of the components for the query were not provided.

The correct responses for Question 8 are as follows:

(a) ***StudentNo: text and DateofBirth: date***
(b) ***StudentNo.***
(c) ***Surname and FirstName.***
(d) ***StudentNo***
(e) ***Use of SQL***

Select * from students
where House = "Lara"

OR use of QBE

TABLE	***FIELD***	***CRITERIA***
STUDENTS	***HOUSE***	***"Lara"***

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to arrange given steps in problem solving in the correct order and to indicate the most appropriate variable type to store the data given.

Part (a) of the question was fairly well done by the majority of candidates. The weaker responses did not provide the correct complete sequence of steps in problem solving.

The correct response is as follows:

Define the problem
Propose and evaluate solutions
Determination of the most efficient solution
Develop and represent algorithm
Test and validate the solution

Part (b) of the question was poorly done by the majority of candidates who confused data types used in database management (alphanumeric, numeric and logical) with variable types used in programming. (integer, real, character, string/literal, Boolean). The correct responses are as follows:

(i) ***Integer***
(ii) ***Real/Floating point***
(iii) ***Character/Boolean***
(iv) ***literal/string***

Question 10

This question required candidates to arrange steps in program implementation in the correct sequence and to differentiate between programming languages.

Part (a) of the question was poorly done by the majority of candidates who provided the incorrect sequence. An example of a correct response is as follows:

Create source code
Compile program
Link program
Execute program
Maintain program

Part (b) of the question was fairly well done by the majority of candidates. Some candidates however, wrote that first generation languages had numbers instead of 0's and 1's and did not explain the difference. An example of a correct response is as follows

First generation language is written in binary code and a Second generation language uses some alphabetic characters/mnemonic code

Part (c) of the question was poorly done by the majority of candidates. Candidates knew about machine language and high level language codes but were unable to provide one difference between them. An example of a correct response is as follows:

Any TWO of the following:

1. ***Machine language code is machine dependent; high level language code is machine independent***
2. ***Machine language code can be executed immediately: high level language code must be compiled or interpreted***
3. ***Machine language is written in binary while high level language uses English-like statements***

Part (d) of the question was very well done by the majority of candidates who seemed familiar with fourth generation languages. An example of a correct response is as follows:

Any ONE of the following

1. ***Fourth generation language is easier to use than Third generation language***
2. ***Fourth generation language provides greater help to the user than Third generation language***
3. ***It is easier to train a user to use a Fourth generation language than a Third generation language***

Question 11

This question tested candidates' ability to complete a trace table for a given algorithm; and to write an algorithm to read two different numbers and print the smaller one.

Part (a) of the question was poorly done by the majority of candidates. Many candidates did not recognize that the value of the variable N remains constant and did not provide the correct changing values for Product and Times in the trace table. The correct response is as follows:

N	**Product**	**Times**
4	**1**	**1**
4	**1**	**2**
4	**2**	**3**
4	**6**	**4**

Part (b) of the question was fairly well done by the majority of candidates. Some candidates wrote the correct variables but incorrectly put the variables in quotes, printed the wrong variable based on their conditions and did not use the 'then' in the if-then-else control structure. In addition, some candidates provided Flowchart and IPO diagrams instead of pseudocode. An example of a correct response is as follows:

```
Read Num1, Num2
If Num1<Num2 Then
        Print Num1
Else
        Print Num2
```

Question 12

This question required candidates to write program statements in Pascal for the algorithm given.

Part (a) of the question posed a great deal of difficulty for most candidates. In many cases, candidates seem unfamiliar with the use of arrays in Pascal. In cases where the candidates attempted to declare the array, the correct structure and syntax were not used. An example of a correct response is as follows:

```
VAR
        MARKS : array[1..10] of integer;
```

Part (b) of the question was fairly well done by the majority of candidates. In many cases, candidates declared Average as an integer rather than real. In addition, some candidates used an assignment operator (:=) rather than the colon (:) used in declaring variables.

An example of a correct response is as follows:

```
var
        SUM : integer;
        AVERAGE : real;
```

Part (c) of the question was fairly well done, Most candidates did not use the assignment operator (:=) and provided arbitrary values instead of zero.

An example of a correct response is as follows:

```
SUM := 0;
```

Part (d) of the question was poorly done. Some candidates sum the individual array elements rather than using a looping structure, which is a more efficient way to sum the array elements. For candidates who used looping structure, the proper syntax was not used and the logic in the loop was incorrect.

An example of a correct response is as follows:

```
SUM:= MARKS[1] + MARKS[2] + MARKS[3] + MARKS [4] + MARKS [5] + MARKS[6] + MARKS [7] +
MARKS[8] + MARKS[9] + MARKS[10];
```

OR using the FOR loop

```
for index: = 1 to 10 do
        SUM:= SUM + MARKS[index];
```

OR using the WHILE loop

```
Index := 1
While index <= 10 do
  begin
  SUM:= SUM + MARKS[index];
  Index := index + 1;
 end;
```

OR using the REPEAT loop

```
Index := 1
 Repeat
 SUM:= SUM + MARKS[index];
 Index := index + 1;
Until Index = 11;
```

Paper 03 – School-based Assessment (SBA)

The school-based assessment consisted of a practical project testing Profile 2 - Productivity Tools (word processing, spreadsheets and database management), and Profile 3 - Problem-Solving and Programming.

GENERAL COMMENTS

Word-processing

There has been some improvement in the performance. However, some teachers are still creating assignments that do not meet the full demands of the CSEC syllabus..

Spreadsheets

The majority of samples were well done. There has been an improvement in the quality of submissions when compared to samples in the previous years.

Database Management

In the majority of the samples received, the database management section was attempted. The attempts in this section were fairly well done but there are improvements that can be made.

Problem Solving and Programming

Generally, the standard of the performance of the candidates for this section of the SBA can be described as moderate to fair. Largely, the presentations were acceptable, but overall the problem solution lacked creativity.

There was improvement in the distinction between the algorithm and program code, that is, very few candidates presented the Pascal code as an algorithm.

DETAILED COMMENTS

Word Processing

1. Teachers were creative in formulating their own SBA questions and should be commended for this. Some of these questions however, were not structured to assess skills relevant to the Word Processing syllabus, such as formatting features (inclusive of creating tables, columns, text formatting, changing page and text orientations)

2. In some cases, teachers' mark schemes were inconsistent with the CSEC mark scheme (e.g. candidates were awarded marks for content rather than completion of specific tasks or marks awarded exceeded the suggested maximum).

3. Candidates were awarded fractional marks (e.g. half or quarter marks) in some cases. This does not meet CXCs requirements. Additionally, there were instances where too many marks were allocated for smaller components, for e.g. Use of graphics – 3 marks instead of 1 mark (as is specified by the syllabus).

4. In some cases, teachers submitted duplicates of the same SBA for all candidates. It is advised that teachers encourage students to be creative in completing their individual projects.

5. Most candidates used headers and footers. Footnotes and endnotes were rarely used. Headers or footers should appear on consecutive pages especially in cases where the mail merge feature is used. Headers should not fall far down on the page as this is not proof of ability to effectively use the feature of the word-processor.
6. Most of the formatting features were used by all candidates. However, a few important ones were rarely demonstrated, such as simultaneous use of single and double line spacing and multiple page layouts (where text flows from one page onto another) in Figure 1, book fold as seen in Figure 2 (where two pages are printed on one page) and justification. It must be noted that 2 marks are awarded for formatting, and 2 marks for multiple page / book fold / columns. Students are expected to demonstrate competencies in using at least two in each category in order to get the full 2 marks awarded. Fewer than two will result in the candidate receiving only 1 mark or no marks.

Figure 1. Multiple Pages

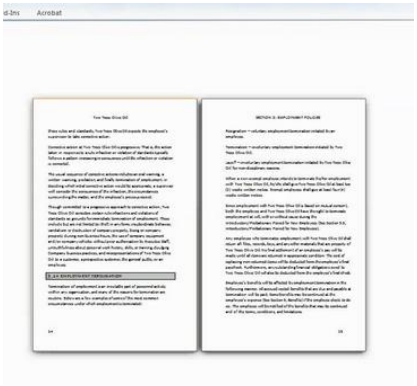
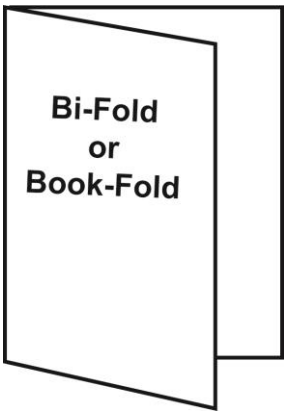
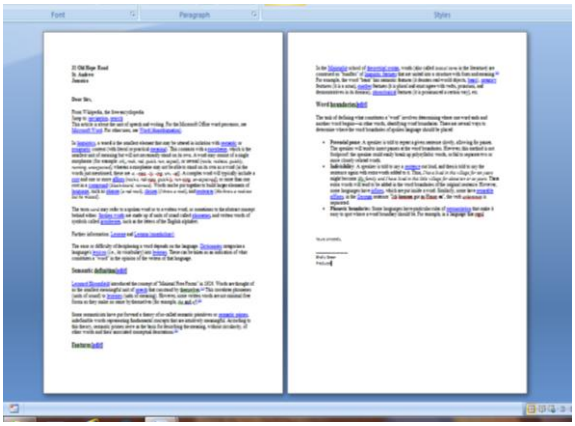


Figure 2. Book Fold



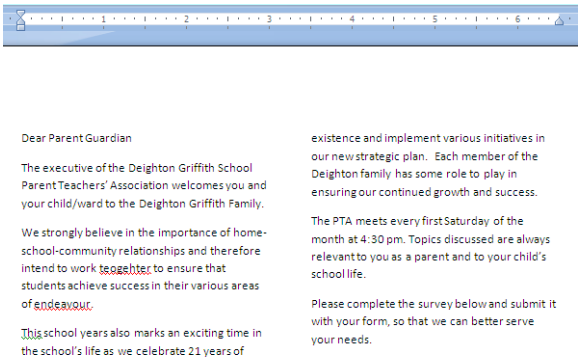


7. Evidence of insertion or deletion of text (word, sentence or paragraph) / graphic must be shown within the document. Therefore it is important to submit copies of documents showing a **before** and **after** as proof that this was done.

8. The effective use of tables and columns was not tested within the guidelines of the syllabus. Most candidates did not display effective use of either feature. Column use involves separating text into "newspaper style" (e.g. 2 or 3 columns). Table use involves demonstrating how data can be added to a table and then modified with appropriate borders and shading using the word-processing application. Figure 3 shows examples of how columns and tables may be presented.

Figure 3. Example of appropriate use of columns and tables

Appropriate use of columns



Dear Parent Guardian

The executive of the Deighton Griffith School Parent Teachers' Association welcomes you and your child/ward to the Deighton Griffith Family.

We strongly believe in the importance of home-school-community relationships and therefore intend to work tegeghter to ensure that students achieve success in their various areas of endeavour.

This school years also marks an exciting time in the school's life as we celebrate 21 years of existence and implement various initiatives in our new strategic plan. Each member of the Deighton family has some role to play in ensuring our continued growth and success.

The PTA meets every first Saturday of the month at 4:30 pm. Topics discussed are always relevant to you as a parent and to your child's school life.

Please complete the survey below and submit it with your form, so that we can better serve your needs.

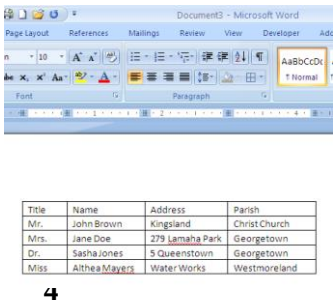
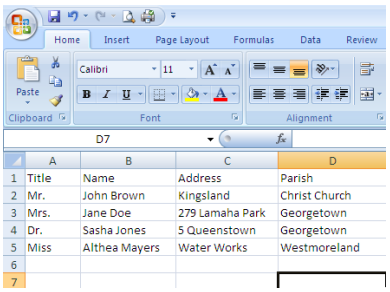
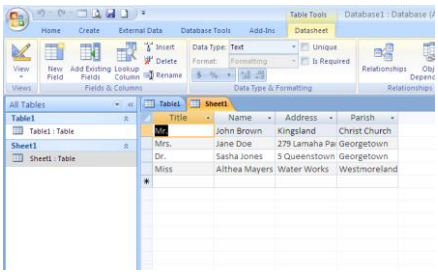
Appropriate use of tables

This school years also marks an exciting time in the school's life as we celebrate 21 years of existence and implement various initiatives in our new strategic plan. Each member of the Deighton family has some role to play in ensuring our continued growth and success.	This school years also marks an exciting time in the school's life as we celebrate 21 years of existence	We strongly believe in the importance of home-school-community relationships and therefore intend to work tegeghter to ensure that students achieve success in their various areas of endeavour.
The executive of the Deighton Griffith School Parent Teachers' Association welcomes you and your child/ward to the Deighton Griffith Family.	The PTA meets every first Saturday of the month at 4:30 pm. Topics discussed are always relevant to you as a parent and to your child's school life. Please complete the survey below and submit it with your form, so that we can better serve your needs.	

N.B. Tables imported from other applications to Word are marked as "ability to import…" worth 1 mark, and not as "tables" for 2 marks.

9. While **ALL** teachers submitted a completed CSEC Moderation Sheet for the School Based Assessment, there were instances where the marks on the Moderation Sheet differed from the scores on the mark scheme. There were also cases where a component was missing from the project yet marks were shown on the Moderation Sheet. It is recommended that teachers mark the print outs of the assignments submitted by the candidates and not from the soft copy before the document is printed (as this might be the cause for the discrepancies).

10. All assignment details were not submitted, **e.g.** Data source, a.k.a. the secondary document as evidence of the mail merge. As shown in Figure 4, this could be either:

a table in Word	a worksheet in Excel	a database table in Access
		

Title	Name	Address	Parish
Mr.	John Brown	Kingsland	Christ Church
Mrs.	Jane Doe	279 Lamaha Park	Georgetown
Dr.	Sasha Jones	5 Queenstown	Georgetown
Miss	Althea Mayers	Water Works	Westmoreland

Figure 4. Examples of required assignment details

11. Instead of providing screen shots, show the actual mail merged documents. No mark is awarded for screen shots of the window of a Microsoft Word document, for example, that contains merged fields.

    All required printouts for the mail merge were not submitted. Candidates should submit

    (a) A primary document *without* merge fields inserted
    (b) A primary document *with* merge fields inserted in the appropriate location.
    Merge fields should be linked to the data source rather than typed in by the candidate.

For example,

Correctly inserted fields	**Typed merge fields**
«Title»«Name» «Address» «Parish»	<Title><Name> {Address} <<Parish>>

(c) A copy of the data source (as secondary document) mentioned above in #11 above
(d) A small sample of printouts of the **completed merge** (***at least three but no more than five***)
(e) Candidates are **NOT** required to print all the merged letters.

12. The overall quality of the selected samples was fair.

Spreadsheets

Formula sheets

Formula sheets were not submitted for some samples. This proved to the detriment of the sample as marks were not awarded. The formula sheet provides evidence to the authenticity of formulas. Formula sheets need to be printed from the formula view in Microsoft Excel. It should also have a reasonable font size. The font sizes of some formula sheets were very small and therefore made the scoring difficult.

Appropriate Formula

Teachers need to ensure that students use correct formulas and functions to produce the correct answers. It was observed that although the right function was used e.g. =sum, the function contained incorrect information for example, =sum(F9*G12).

Range names

It was seen that the proper usage of range was not understood by the students. Students were confused over a range and range names. Generally, range names were not utilized much.

Manipulating the Spreadsheet

There needs to be clearer evidence of spreadsheet manipulation. Copying, inserting and deletions of rows and columns should have before and after printouts of the particular sections of the workbook.

Sorting

This was generally well done but there needs to be clear evidence of which field the data is sorted on.

Performing Chart Operations

Graphing was generally well done. There were issues in the labels, legends and titles. Teachers need to ensure that students create a graph that shows a comparison of at least two series of data.
The graph should also be of a reasonable size so that all information can be clearly identified.

Extraction of Data and Criteria Range

Many candidates did not successfully perform advanced filtering with two or more criteria. Teachers must ensure that the advanced filter is part of the SBA. Evidence of the criteria used must be shown, as well as the results. The criteria range and the results must appear on the same page. A caption (heading) should be used

to clearly indicate the presence of the criteria range filter. Alternatively, a screen shot can be presented if the filter buttons are used but the criteria must be seen.

Database Management

Mark schemes

1. Following the syllabus guidelines

   Many centres submitted guidelines that did not include skills that **MUST** be tested from the syllabus. The syllabus provides the **weightings** for various tasks on page 26–27 and these must be followed.

2. Submission of individual mark schemes

   Teachers are reminded that graded individual mark schemes **MUST** be submitted for each student in the sample.

3. Complete breakdown of marks

   Teachers are reminded that individual mark/s awarded for each skill **MUST** be shown. For example;

Process	**Key Skills**	Mark Allocation
The effectiveness with which students use facilities in creating and modifying the database	Adding a new record to the resource table. Sorting the student table on last name Deleting the parent field in the Accounts table	1 1 1

4. Presentation

   Submission of projects

   - Projects should be submitted securely with each section/application clearly labelled.
   - Mark schemes for each section should be placed immediately before or after the section.
   - All pieces of work relevant to database should be placed in this section.

5. Printouts

   - Students are required to print and submit copies of the DESIGN views for **tables and queries** as well as the corresponding data sheet views. It is recommended that screen shots for the design views are submitted. *See example on next page*.

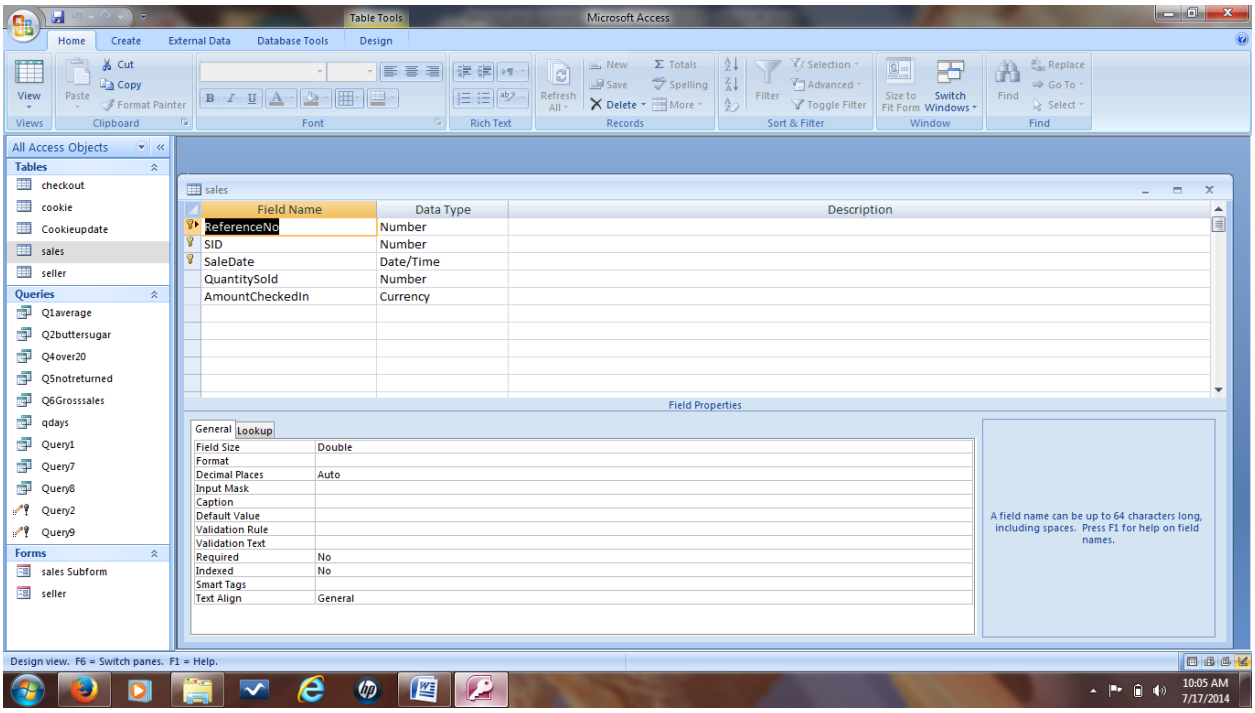


Figure 5. Example of a Screen shot of a query

Problem Solving and Programming

This year more candidates attempted the programming section of the SBA. Improvement in the presentation of the samples was evident as students appeared to be using productivity software to create algorithms, flowcharts and trace tables.

Problem Solution

Generally, the quality of samples has improved over the previous years. However, there is still some concern relating to the creativity applied to the problem solution and the diversity of ideas used.
It was evident that templates were used in a significant percentage of the solutions received and this practice **is strongly discouraged**.

Furthersome of the samples submitted were not substantive in nature and consequently the solutions provided were too trivial.

Teachers are encouraged to find problems within the community to solve. See page 30 of the Syllabus for recommendations.

The following are some examples:

- housing solutions
- beach clean-up applications
- natural disaster projects
- hotel industry projects

Problem Statement

There has been a general improvement in the number of candidates who submitted the problem statement. Most candidates were able to describe the solution to the problem, however some copied the actual question from the assignment and submitted it as the problem statement.

Candidates should be able to describe their solution to the problem given which should include the necessary input, processing and output requirements for the problem.

Note that an appropriate problem statement should take the form of a paragraph and should give an indication of the necessary input, processing and output requirements for the problem.

For example:-

Using the TrinBarJam Elections SBA given in the syllabus, an example of an inadequate statement would be:

"This pseudocode identifies the winning candidate of an election."

A more appropriate problem statement would be:

"The following pseudocode is designed to find the winning candidate. It will accept the candidate's name and amount of votes. It will determine the highest votes and output of the winner's name."

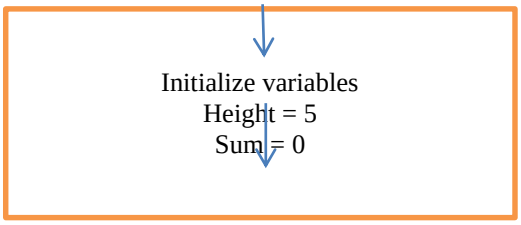
Flowcharts/Pseudocodes

Flowcharts

There has been some improvement in the number of candidates who submitted flowcharts, however it has been noted that some candidates used incorrect symbols in flowcharting (looping, selection, flow lines and connectors). Candidates should ensure correct use of symbols and clearly show looping constructs at all times.

Initialization

When doing *initialization* in the flowchart, variable names should be used in the symbols in addition to using general phrases. For example:



Pseudocode

It is highly recommended that candidates write the pseudocode before coding the solution. The solution/ algorithm should not resemble Pascal code nor a slightly modified Pascal code.
The pseudocode solution should take the following format with variable definitions preceding the processing statements, as seen in Diagram 1 below.

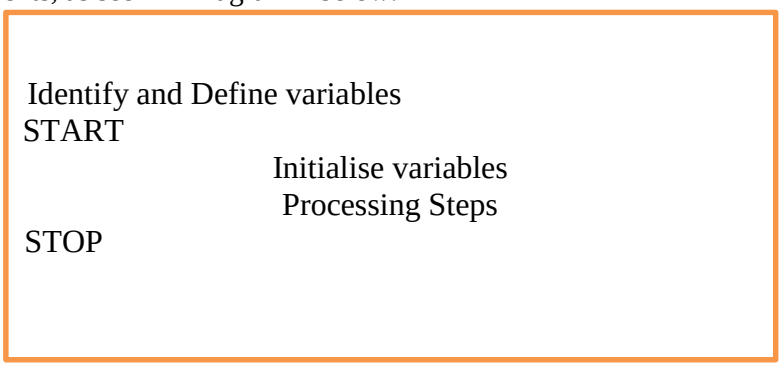


Diagram 1

Improvement in the use of START and STOP, variable names, initializing variables and the use of prompts has been noted. Most candidates were able to demonstrate storing data in variables but some were challenged to store data in arrays. In addition, many more candidates attempted to use arrays in their solutions.

Logical use of Structures

Most candidates were able to correctly demonstrate selection and looping in the samples submitted.

Output results

The majority of candidates were able to correctly demonstrate "output results" in their solutions.

Trace tables

It was noted that many candidates did not identify the key variables in their solutions and did not use robust data to test their programs. This section was not well done by the majority of candidates.

The following points are noteworthy:

1. The variables in the trace table should match those identified in the pseudocode or the program.
2. Sample data used to test the solution should be robust; i.e. test both valid and invalid data for key variables.
3. Changes in variables in the table should be clearly represented.

Program Implementation

This section was generally well done. Approximately 95 per cent of the candidates attempted this component, with the majority being awarded at least half of the marks for this section. Students must be encouraged to be creative.

To be awarded full marks for this section, candidates should ensure the following guidelines be adhered to:

- Evidence of a working program should be clearly seen through the use of screen shots.
- Candidates should ensure that their solution employs a minimum of three different data types.
- Variables should be initialized appropriately in the program.
- The project should be sufficiently substantive to demonstrate the use of

    - **Two (2)** different types of ***selection*** statements
    - **Two (2)** different types of ***iteration*** statements ***with one (1)*** of the iteration statements ***manipulating an array***.

Some candidates were unable to demonstrate initialization in the samples submitted. Many candidates were able to demonstrate selection and repetition in their samples, but more attention must be placed on the *type of loop* that should be used for the task. For example, the use of a *'while'* loop instead of a '*for'* loop. More emphasis should also be placed on the ***if-then-else*** construct in the program.

Documentation

While there was improvement over last year's submission, this was seen largely in the internal documentation.

Programs should be well documented: name of author, date created and a simple statement of the problem must be inserted. Process statements can also be documented. Candidates should pay close attention to layout, i.e. proper indentation and 'white spacing'.

GENERAL RECOMMENDATIONS

Length of SBA

In the area of spreadsheet formatting, much improvement is needed in order to limit printouts. Too many unnecessary printouts were submitted. Teachers and students need to concentrate more on the quality of work done, specific to the tasks. The number of printouts must be limited (at most, 25 pages inclusive of formulae sheets, the actual worksheets, advanced filter data, and charts).

Documents must be well-formatted so as to ensure good printouts. Candidates must make good use of page breaks for column adjustments to ensure that data and charts are not spread across several pages in a way that makes them difficult to understand or interpret. Teachers should avoid assigning SBAs that require the use of a large number of columns that are difficult to print.

Presentation

The SBA report should be presented in a coherent manner. Printouts must be properly and carefully collated, secured and labelled so as to ensure good presentation. Spreadsheet printouts should be in one section, database management printouts in another section, and word processing and problem solving printouts in their separate sections.

Although the packaging and size of SBA samples has improved over the years, improvement in the presentation of the packaging of the samples is still required.

Syllabus Guidelines for Marking SBA

Teachers are strongly urged to strictly adhere to CXC's mark scheme as provided in the syllabus. Marks should NOT be allocated to tasks that are not aligned to this mark scheme. The assignment details must also be submitted.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

JANUARY 2015

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The General Proficiency Information Technology examination is offered in January and May/June each year. There was a candidate entry of approximately 698 in January 2015 and 63 per cent of the candidates earned Grades I–III.

Paper 01 consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem Solving and Programming (Profile 3). Teachers and coordinators are advised to pay special attention to verification and validation, and use examples to illustrate the various types. The mean score for this paper was 42 out of 60 (approximately 78 per cent).

Paper 02 consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem Solving and Programming profile. The mean score for this paper was 50 out of 120 (approximately 42 per cent).

This paper is the alternative to the SBA and consisted of four questions testing the Productivity Tools and Problem Solving and Programming profiles. The mean score for this paper was 42 out of 90 marks (approximately 47 per cent).

DETAILED COMMENTS

Section I – Theory

Question 1

Part (a) tested candidates' ability to convert a decimal number to hexadecimal. This question was poorly done by the majority of candidates. Most candidates seemed unfamiliar with conversion to hexadecimal and converted to binary instead. Most candidates did not use E to represent the remainder of 14, while others wrote the answer as E4. A number of candidates divided by other bases such as 2, 8, or 10 and not base 16.

Solution
78/16 = 4 R 14
4/16 = 0 R 4
But 14 = E in hexadecimal
78 in hexadecimal = 4E

Part (b) tested candidates' ability to convert the BCD of a signed decimal number to decimal. Some candidates were able to score partial marks but had difficulty converting the binary number to its decimal equivalent. Some candidates seemed not to realize that 1011 was negative (used 11 instead); in a few cases candidates added the decimal numbers together.

Part (c) tested candidates' ability to interpret the ASCII representation of a character. Many candidates were unable to derive the correct representation. Some counted the difference between H

and K to be more than three, subtracted incorrect in binary, or did not convert the decimal number to binary. In some cases candidates divided the binary number. The question for Part (c) was:

The ASCII representation of the character "K" is 1001011. What is the ASCII representation of the character "H"?

Solution(s)
H is three characters less than K.
K = 1001011 - 0000011 = 1001000
OR
K = 1001011 = 78 decimal
78-3 = 72 decimal then convert to binary = 1001000

Part (d) tested candidates' ability to determine the decimal number of its two's complement 8-bit representation. This question was poorly done by the majority of candidates. A number of candidates obtained 196 as the answer since they did not make the number negative. Some of those who derived the correct answer forgot the negative sign, while others were able to subtract and flip the digits but did not convert to decimal. The question for Part (d) was:

The two's complement 8-bit representation of a decimal number is 11000100. What is the decimal number?

Solution(s)
The two's complement value of 1000 0000 = -128
The two's complement value of 1100 0000 = -128 + 64
The two's complement value of 1100 0100 = -128 + 64 + 0 + 0 + 0 + 4 + 0 +0 = - 60
OR
Subtract 1 from binary number 11000100, then invert. Finally convert to decimal
OR
Invert bits, add 1, and then convert to decimal number

Question 2

Part (a) tested candidates' ability to categorize a list of devices and input or output devices. Most candidates were able to correctly categorize these devices while a few incorrectly listed 'pressure sensor' as an output device.

Part (b) tested candidates' ability to state an application that was suitable for the five devices. This was generally well done. Most candidates were able to list music, architectural plans, and games as applications that use headphones, plotter and joystick respectively. Several candidates stated the general purpose of the device instead of an application in which the device is used, for example, 'printing documents' instead of 'printing building plans in an architectural application'. A few candidates had difficulty stating applications for these devices.

Question 3

Part (a) tested candidates' ability to name the hardware component that performed a range of given tasks. Some candidates could not state a storage device for the hardware component that stores data to

be used later. Rather they listed RAM, primary memory, or even input and output devices. In some cases candidates gave CPU and its parts for the hardware component that stores the 'boot up' program or the component that stores data to be used later.

Part (b) tested candidates' ability to identify specific aspects from an excerpt of the specifications of a computer system. Some candidates were able to give the correct responses while others wrote the entire description for a hardware component rather than indicating the specific item asked for. For example, some candidates wrote '*1 TB 7200 rpm SATA Hard drive'* rather than *'1 TB'* as the size of the hard drive.

Question 4

This question tested candidates' ability to state examples of operating systems, hardware and software user interfaces along with their characteristics and functions.

For Part (a), some candidates incorrectly named Microsoft as an operating system.

For Part (b), most candidates were able to list an example of software user interface other than a graphical user interface (GUI).

For Part (c), a number of candidates were not specific in listing Braille keyboard instead of keyboard as a type of hardware user interface. Touch screen was another example of a hardware user interface.

For Part (d), the majority of candidates was able to identify a feature of the GUI.

For Part (e), only a few candidates were able to give a function of the operating system as file management (for example, uninstall); memory management (for example, defrag); security enforcement; device management; input management; output management; or process management.

Question 5

This question tested candidates' ability to state methods used to ensure that data from a survey was entered correctly into a computer from a data entry form. This question was poorly done as candidates did not apply their knowledge of data verification to the scenario. In Part (a), most candidates were unable to list the names of methods that are used in data verification; instead they attempted to define data verification and data validation. Others gave verification and validations or a specific check as their answer instead *of proofreading, double entry*, or *scan from original document*.

In Part (b), even though some candidates were able to list the methods, they were not able to explain how the methods work to ensure that the data would be entered more accurately.

In Part (c), while some candidates were able to list the validation checks, they were not able to describe the checks especially consistency checks and reasonableness checks.

The following is a model response to Question 5.

Data has been collected for a survey and entered into a computer using a data entry form.

(a) State TWO methods that can be used to ensure that the data is entered accurately into the computer.

- *Proofreading*
- *Double entry*
- *Scan from original document*

(b) Explain how the TWO methods named in (a) above ensure that the data is entered accurately into the computer.

- *Original data is the same as data in the computer*
- *Data is entered twice into the computer and compared to see if they match*
- *No human error caused by keying in data*

(c) State the names of THREE checks and explain how they work to ensure that the data entered is valid.

Any three
Range check – data within a given range
Data type check – data appropriate to the field required such as date, numeric, alphanumeric, text
Consistency check – data verified to what is expected from a corresponding field, such as age matches given date of birth
Reasonableness check–data within acceptable limits

Question 6

This question tested candidates' ability to list and match appropriate hardware devices used in a scenario.

Part (a) tested candidates' ability to list hardware devices required to set up a video conference laboratory with high-speed Internet connection in a school. This was well done by the majority of candidates.

Part (b) tested candidates' ability to match terms with concepts associated with the Internet. Both parts were well done by the majority of candidates.

Question 7

The question tested candidates' knowledge of basic features of a spreadsheet, more specifically functions, formulas, formatting of data and the result of sorting data. Some candidates misinterpreted this question as a word processing one and not a spreadsheet.

For Part (a), candidates were tested on the naming of a feature. This was fairly well answered, however, some candidates wrote 'merge columns', 'centre' or 'centre align' instead *of merging cells* or *'merge and centre'*.

For Part (b), candidates were tested on writing a function to find the maximum of a range of data. The majority of candidates provided the correct range but were unable to name the function MAX. In some cases, candidates wrote Maximum instead of MAX while others wrote SUM.

In Part (c), candidates were tested on writing a formula to compute a percentage increase on a sales amount. Many candidates experienced difficulty composing the mathematical function for calculating the ten per cent increase. The majority of candidates was able to identify the correct cell but not the correct formula to compute the projected sales. Therefore, while candidates were able to secure marks for stating D9 and 10%*D9, they did not add D9 in the formula.

In Part (d), candidates were tested on the formatting used for a range of cells. Many candidates did not identify the correct format — comma or number with no decimal places. Incorrect responses were A–Z, counting, numerals, bold, alignment, number, currency and accounting.

Part (e) tested candidates' ability to sort data in ascending order and state the result in a given cell. Many candidates were able to correctly answer this part.

Question 8

This question tested candidates' knowledge of the basic features of a database management program. It was satisfactorily done by the majority of candidates who demonstrated a fair knowledge of database management.

Part (a) tested candidates' ability to name two data types used in a table. The majority of candidates provided the correct data types while others mentioned data types that were not applicable to the question.

Part (b) tested candidates' ability to state the most appropriate field as the primary key. The majority of candidates identified CODE as the primary key but were unable to state *unique for every field* as the reason for the choice.

Part (c) tested candidates' ability to state the criterion used for a query. Many identified the correct field as 'Warranty' and the criterion as 3.

Part (d) tested candidates' ability to identify fields used to group and sort data in a given report. Many candidates correctly stated the field to group the data as MANUFACTURER and to sort the data as MANUFACTURER or DOP.

Question 9

This question tested candidates' ability to identify control structures, state the value of constants and variables as well as draw a flowchart to represent a Pascal program. Candidates did a poor job of designing the flowcharts. Simply taking the time to make the shapes in a proper manner should be stressed by teachers as many rhombus shapes could have been mistaken for parallelograms.

Part (a) tested candidates' ability to name a control structure in the program. Many candidates answered this question incorrectly with responses such as Pascal, const, or var. They were also unable to identify the line number of the conditional statement.

The correct answer was:

Conditional branching OR (*if-then*) OR *(if-then-else)* OR *selection*
If-then: LINE 11–12 OR *If-then-else: LINE 11–13*

Part (b) tested candidates' ability to draw a flowchart to represent the program. This was not well done by the majority of candidates who used incorrect symbols in their diagram. For example, candidates

- used an input/output symbol instead of a processing symbol
- labelled flowchart symbols with Pascal syntax
- used the decision symbol incorrectly in many diagrams and in most cases the Y/N lines were connected to the wrong flow symbol.

Part (c) tested candidates' ability to state the value of a constant and explain what the value represented in the program. Many correctly identified the value of the constant as tax-rate. Some incorrectly wrote the value of the constant as 20 per cent rather than 0.2. Others wrote that the value represented a tax value without specifying 0.2 or that it represented the tax rate of 20 per cent.

Part (d) tested candidates' ability to state the name and data type of a variable in the program. The majority of candidates correctly identified the variable as tax 2015 and the data type as real.

Question 10

This question tested candidates' knowledge of declaring, assigning values to, and adding values in an array in Pascal.

For Part (a), the majority of candidates seemed unfamiliar with writing an array declaration in Pascal. Many wrote the word *OMEGA* or *ARRAY* alone or wrote the incorrect order of the declaration of the array. Others wrote 'ARRAY: OMEGA (1...3) of integer'; instead of *OMEGA: ARRAY (1...3) of integer*.

Part (b) tested candidates' ability to assign values to the specific locations of the array using Pascal statements. Candidates used variables declared as integers rather than locations of an array to assign the values. In addition, some candidates used an equal sign (=) instead of the assignment operator (:=) to assign the values. Some candidates wrote 'number1:5' and 'Number2:10' instead of *OMEGA [1]:= 5;" and OMEGA [2]:= 10;*

Part (c) tested candidates' ability to add values in specific locations of the array. Most candidates did not use the assignment operator (:=), instead they used the colon (:) or equal sign (=). Many candidates seemed unable to apply code in order to add the values in the first and second locations of the array and store the sum in the third location. Frequently, they added together values of integer variables instead of writing the correct answer as *OMEGA [3]:= OMEGA [1] + OMEGA [2];*

Question 11

This question tested candidates' ability to state the correct term in a passage about commonly used terms and concepts in programming and the sequence of steps associated with implementing a

program. This question was done fairly well by most candidates. However, some candidates were not sure where to place what on the table.

Question 12

This question tested candidates' ability to indicate the correct order of steps for problem-solving activities as well as state the generation for a list of programming languages.

Parts (a) and (b) were fairly well done by the majority of candidates.

Paper 032 – Alternative to School-Based Assessment (SBA)

Question 1 – Spreadsheet

This question required candidates to identify data formats and features, the number of columns and rows used to create a worksheet, and write formulas and functions. It was well done by many of the candidates.

Part (a) required candidates to state the data format applied to numeric data in the worksheet. Most candidates did not state *comma format*, but instead stated 'numeric', 'currency' or 'integer' as their response.

In Part (b), candidates were asked to identify the feature used to centre text across columns. Most candidates were unable to state the correct answer as *merge and centre*; rather, many stated 'merge' or 'centre'.

Part (c) required candidates to state the number of rows and columns used to create the worksheet. This was well done by most candidates who stated *6 columns* and *15 rows*.

In Part (d), candidates were required to write the function based on a condition. Most candidates were not able to write the correct IF function. Several candidates stated a Pascal or pseudocode IF statement.

Part (e) tested candidates' ability to identify the result of a sorted set of data. This was well done by most candidates who stated *Block 3*. Part (f) tested candidates' ability to state two cells whose values would change as a result of changes in another cell. This was well done by the majority of candidates.

Part (g) tested candidates' ability to write criteria required to extract data using a filter. A few candidates were not able to state the correct filter. Part (h) tested candidates' ability to name the type of chart used along with its range of data and the purpose of the chart. Most candidates were not able to list the ranges for the x and y axis nor were they able to state the purpose of the bar chart. The correct answers for the given column chart were *Category: B4...D4* and *Data: B15...D15* for the ranges. The purpose of the chart was to *show the **total damages** by **category***.

Question 2 – Database Management

This question comprised two tables to test candidates' ability to state the data type, number of record, result of sorting and extracting data from queries.

For Part (a), candidates had to state the data type of a field in a table. This was satisfactorily done.

Part (b) was satisfactorily done with candidates stating the number of records and fields in the table correctly, answering *3 fields* and *8 records*.

Part (c) required candidates to identify the field that can be used as a primary key in the specific table. Many candidates did not realize that there was no suitable field as there was duplicate data in LOSS_ID & AREA fields.

For Part (d), candidates were asked to state the name of the field that should be used to join the tables. Many candidates correctly stated *LOSS_ID* as the field.

Part (e) required candidates to state the name of the area that would be at the top of a sorted list. Many candidates correctly stated *Block 8*.

For Part (f), candidates had to answer questions on a given query. While candidates were able to state the tables and fields used in the query, many were unable to state the purpose of the query or the number of records displayed when the query was executed.

Part (g) required candidates to complete a query to produce given results. Some areas of this part of the question were not well done by the majority of candidates. Candidates were able to give field names, but some did not include the table name, and for the criteria, many placed 'cm200' under the wrong field.

Part (h) consisted of questions on a given report. The majority of candidates could not clearly state what 4105 represented which was *the total amount of assistance provided*.

Question 3 – Word Processing

This question comprised a primary document for a mail merge and required candidates to identify formatting features, icons, text alignment and justification, merge fields, as well as state rows and columns in a table.

For Part (a), candidates were asked to give at least two of the formatting features used in the letter (such as bold and uppercase). Some candidates gave font size rather than font type as one of the formatting features.

Candidates were asked in Part (b) to identify which text alignment had been applied to the document. Most candidates gave the correct alignment as *centre*. Similarly, Part (c) required candidates to state the justification applied to the body of the document. Some candidates could not identify the justification as *full justification* and wrote 'left justification' as their response.

For Part (d), candidates were required to identify the use of two icons. Some candidates identified the icon as line spacing rather than the *bullet icon* while others did not know the correct term and identified it as the 'icon to make a list or put things in point form'. Candidates knew the second icon was the *colour icon* but some incorrectly identified it as font colour or text colour.

In Part (e) candidates were required to state the number of rows and columns in a table; the majority of candidates was able to identify them correctly.

For Part (f), candidates were asked to identify a footnote in the document. Many candidates accurately identified the footnote, although many candidates incorrectly stated 'footer'.

Part (g) asked candidates to state the number of merge fields in the document. The majority of candidates correctly identified *two* or *three* merge fields.

In Part (h), candidates were required to state how many letters would be printed after the mail merge; most candidates correctly stated that there would be *ten letters* generated.

Part (i) asked candidates to identify the amount of total damages listed in the letter for Block 8. The correct amount was stated by most candidates although a few identified other values (such as 545, 238)

Part (j) required candidates to state an appropriate feature to insert test at the bottom of each page. Most candidates identified the footer although a few incorrectly wrote 'footnote'.

For Part (k), candidates had to list the steps required to insert a logo at the top left side of the document. Candidates were able to explain the method for placing the logo into the document although many forgot to include the *alignment* step.

Part (l) asked candidates to state the format applied to a part of some text. Many candidates incorrectly stated 'an index' while others stated 'superscript' or 'small font'. The correct answer was *subscript*.

For Part (m), candidates had to state two steps required to move a table to another location in the document. Many candidates stated 'copy and paste' instead of *cut and paste* for the movement of the table.

Question 4 – Problem Solving and Programming

This question comprised a Pascal scenario. Candidates were required to identify various aspects of the program such as line number of control structures, constants and variables; complete a trace table; and draw a flowchart.

Part (a) required candidates to state data input and output in the program. Most candidates correctly identified the data being read as *number of children in family* or *nc*. Some incorrect responses included writing the variable data type. Many correctly identified the line number of the input statement and many incorrectly identified the line number for the statement prompting for input instead of the actual statement.

For Part (b), candidates were asked to explain the difference between a variable and a constant. The majority of candidates performed well on this question.

In Part (c), candidates were required to state the name of a variable used in the program. Many candidates correctly identified the name of a variable, the data type and the line number of the declaration. Incorrect responses included writing the entire declaration line without specifying the variable name and data type.

Candidates were asked in Part (d) to state the name of a constant used in the program. Many candidates correctly identified the name of the constant, the value and declaration line number. Many incorrectly wrote the entire line of declaration for the response without specifying the name of the constant and value.

Part (e) required candidates to identify a type of error in the program. The type of error was identified correctly as *syntax error* by most candidates. Very few incorrectly identified logic errors and others identified what the program will fail to do when the error is made.

For Part (f), candidates were required to identify a type of error that would prevent the program from giving the correct results. Most candidates correctly stated *logic error*; some incorrectly identified 'syntax error'.

Candidates were asked in Part (g) to explain the purpose of comments in a Pascal program. This was answered correctly by a few candidates who indicated that it was *to explain what the program segment is doing*.

Part (h) asked candidates to state the name of a control structure used in the program. This question was not answered well by the majority of candidates who identified input and output statements and looping statements instead of *conditional branching (if-then).*

In Part (i), candidates had to identify a line number that demonstrated the initialization of a variable. This question was done well by most candidates while others incorrectly identified the variable declaration statement and the statement nc: =3 instead of the line number.

For Part (j), candidates had to explain the purpose of a line of code in the program. Many candidates were unable to correctly explain the purpose *to assign the number of children to 3 for family with more than 3 children*.

Part (k) required candidates to state the line number that contained one arithmetic operation in the program. This was correctly answered by the majority of candidates. However, some candidates identified the line number for the conditional statement.

Candidates were asked in Part (l) to complete a trace table. This was not well done by the majority of candidates. Candidates struggled to correctly fill the trace table and were unable to determine the values beyond the initial values of the variables in the trace table.

In Part (m), candidates were required to construct a flowchart of the program. This was very poorly done; the majority of candidates was unable to use the programming flowchart symbols correctly. In the small numbers of responses that had a few errors, candidates omitted labels for the decision/condition or did not use flow lines.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2015

INFORMATION TECHNOLOGY
GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The General Proficiency Information Technology examination is offered in January and May/June each year. There was a candidate entry of approximately 25 520 in June 2015. 88 per cent of the candidates earned Grades I–III. The mean score for the examination was 162 out of 240 marks.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem Solving and Programming (Profile 3). Performance on Profile 1 was higher than 2014 with a mean score of 52 compared with 45 for 2014.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem Solving and Programming profile.

Section I – Theory

Question 1

Part (a) (i) tested candidates' ability to identify two additional peripheral devices used with a computer system. This question was done fairly well by most candidates. Many, however, did not recognize that, the term *additional* was used in the question and identified standard peripheral devices such as 'mouse' and 'keyboard'. More suitable responses included *printer*, *scanner* and *web cameras*.

Part (a) (ii) tested candidates' ability to describe the uses made of the peripheral devices identified in Part (a) (i). This question was done well by most candidates. However, many candidates gave very general responses such as 'printing documents and 'scanning documents'. The responses of several candidates were not related to the context of the question which described a school environment.

Part (b) (i) tested candidates' ability to identify types of application software used with a computer system. This question was satisfactorily done. Many candidates used examples of application software such as Microsoft Word rather than the types such as *general purpose*, *custom written* or *specialized software* as identified in the syllabus.

Part (b) (ii) tested candidates' ability to identify ways the application software identified in Part (b) (i) could be used. This question was done well by the majority of candidates.

Question 2

Part (a) tested candidates' ability to identify the communication mode used for three hardware devices. This part was fairly well done. Those who were unable to earn full marks seemed not to understand the term *communication mode*, while others confused the modes for the devices.

Part (b) tested candidates' ability to classify various types of security restrictions as either a software or physical restriction. This part was well done, with the majority of candidates gaining full marks. Candidates showed a good understanding of security methods.

Part (c) tested candidates' ability to identify ways in which sensitive data can be misused. This part was fairly well done, with the majority of candidates attempting it and many of them gaining full marks. Although candidates did not list the ways, they were awarded marks for any valid explanation that was provided.

Question 3

Part (a) tested candidates' ability to name the type of software that performs each of the following tasks:

- Compresses the size of a file
- Converts program instructions into machine code one line at a time
- Provides a medical diagnosis based on a patient's illness
- Controls machine tools and related machinery in the manufacturing of car parts
- Contains a number of applications that run as a single program

This part of this question was poorly done. Most candidates did not seem to know the difference between *system software*, *application software*, *custom written software* and *specialized software*. Several candidates stated examples instead of stating a type of software.

The majority of candidates were unable to state the type of software that *compresses the size of a file* and the type of software that *provides a medical diagnosis based on a patient's illness*. However, several candidates correctly stated that an interpreter *converts program instructions into machine code one line at a time*.

Part (b) (i) tested candidates' ability to name the type of user interface indicated in each of three scenarios. This part of the question was fairly well done. Most candidates recognized that Scenario 1 referred to a *command line interface* and several candidates stated that Scenario 2 referred to a *graphical user interface*.

Part (b) (ii) tested candidates' ability to name the type of software that provides the user interface. Most candidates correctly stated that *systems software* was the type of software that *provides the user interface*.

Part (b) (iii) tested candidates' ability to state which scenario indicates a hardware interface. Several candidates stated that Scenario 3 was a hardware interface.

Question 4

The question provided candidates with six figures representing storage media and tested their ability to identify each type of storage media, the access method used on the storage media, and to compare magnetic and optical storage media with respect to capacity and data access speed.

Part (a) was well done by the majority of candidates who was able to correct identify the type of storage media.

In Part (b), the majority of candidates correctly identified the figure that uses sequential access but for direct access, most candidates only provided one of the five figures that used direct access.

For Part (c), the majority of candidates responded that one of the answers should be magnetic storage media while the other should be optical storage media.

Question 5

This question tested candidates' ability to match the following tasks with the relevant device component.

- Converts paper-based text to digital form
- Marks candidates' responses on a multiple-choice examination
- Produces a hard copy document
- Used for playing a car racing game on the computer
- Turns on the light when someone enters the room
- Contains 'boot up' instructions
- Draws lines in an architectural design
- Modulates and demodulates signals
- Reads data containing information on a product
- Reads digits specially printed on a cheque

This question was fairly well done as the majority of candidates was able to match tasks 5, 4, 9, 8, and 3 to the *sensor*, *joystick*, *barcode reader*, *modem* and *printer* respectively. Several candidates were able to match tasks 6 and 2 to *ROM* and *OMR* respectively. However, only a few candidates correctly matched tasks 7, 10 and 1 to the *pad and tablet*, *MICR device* and *scanner*.

Question 6

This question tested candidates' ability to convert and represent data stored in the computer.

Part (a) tested candidates' ability to represent a decimal number using the two's complement 8-bit representation. Most candidates inverted digits for the one's complement and proceeded to add the 1 to obtain the one's complement. Few forgot either to invert the digits before adding the 1 or did not include the sign bit. Some candidates seemed not to know what to do.

Solution
53 = 00110101
one's complement = 11001010
two's complement = 11001010 + 1 = 11001011

Part (b) tested candidates' ability to find the binary coded decimal (BCD) of a signed decimal number. Some candidates were unable to convert the number to BCD and some did not demonstrate knowledge of the digits for the + sign. Many candidates converted each digit individually. Others seemed not to know that four bits was required for each number and gave 101 for 5, 111 for 7.

Solution
Decimal : + 5 7 9
BCD : (1010) (0101) (0111) (1001)

Part (c) tested candidates' ability to find the decimal number of equivalent of 50. Most candidates were able to identify 13 as the hexadecimal equivalent of D, but were not able to interpret the complete decimal number.

Solution
Hexadecimal : 5D
Decimal : (5 x 16) + 13 (decimal equivalent of D) = 93

Part (d) tested candidates' ability to determine the ASCII representation of a character. Most candidates correctly identified the character O as being two letters away from the character M. However, in some cases, they either converted incorrectly or did not perform the correct addition. Some candidates included the character M which gave them three positions, and not two positions from the character O.

Solution
ASCII (M) = 1001101
(O is 2 positions to the right (+ve))
ASCII (O) = 1001101 + 10 = 1001111

Question 7

This question tested candidates' knowledge of basic features of a spreadsheet, more specifically cell addresses, functions, formulas, formatting of data and charts. It was fairly well done. Parts (b) and (d) (ii) posed the greatest challenges.

For Part (a), candidates were tested on identifying the cell that contained the total number of teachers in the spreadsheet. This was fairly well answered as many candidates gave the correct response as E9.

For Part (b), candidates were tested on writing a formula to find the total cost for training teachers. This part was poorly done. Many candidates provided the correct response as =B9*3000 but too many candidates incorrectly wrote =SUM (B9*3000) before the formula, which was unnecessary.

In Part (c), candidates were tested on identifying the formatting feature used for a range of cells. Many candidates were not able to correctly identify the comma format. Incorrect responses were 'right alignment', 'number', 'currency' and 'accounting'.

Part (d) tested candidates' ability to identify the type of chart shown and the range of cells used to create the chart. The majority of candidates was able to identify the type of chart for Part (i). In Part (ii) many candidates incorrectly stated the two ranges as either the 'category name range' or the 'data range'.

Question 8

This question tested candidates' knowledge of basic features of a database management program. It was satisfactorily done by the majority of candidates who demonstrated a fair knowledge of database management.

Part (a) tested candidates' ability to name two data types used in a table. The majority of candidates provided the correct data types. Part (b) tested candidates' ability to identify the last name of the person that would be at the top when the data was sorted in ascending order by the DOE field. The majority of candidates identified PERSAUD as the last name of the person. Some candidates stated the first name or both surname and first name of the employee.

Part (c) tested candidates' ability to state the criterion used for a given query. This was fairly done. Many candidates were able to identify one of the fields. Some candidates wrote MALE instead of M and ASSESSORS instead of ASSESSOR.

Part (d) tested candidates' ability to identify fields used to group data in a given report. Many candidates correctly stated the field to group the data as SPECIALIZATION and GENDER although many of them lost a mark for only stating SPECIALIZATION.

Question 9

Part (a) tested candidates' ability to identify and declare two constants using Pascal statements. This question was not answered well by most of the candidates. Many did not identify names of constants that were suitable for Pascal declaration. The majority of candidates was unable to write the declaration statement correctly. Errors in responses included using the word CONSTANT and misuse of the colon and assignment statements.

The following is an example of a possible solution

```
CONST
Trate = 0.05;
Drate = 0.01;
```

Part (b) tested candidates' ability to declare two variables in Pascal. Overall, performance on this section was poor. Several candidates correctly used VAR to start the declaration but lost marks due to incorrect syntax. The overwhelming majority of candidates was unable to give suitable variable names or complete the declaration statements. Errors included using spaces within the names of variables, reusing the constant identifiers given in response to Part (a) and misuse of symbols such as := and = for variable declaration.

The following is an example of the solution

```
VAR
val : real;
yrs : integer;
```

Part (c) tested candidates' ability to create Pascal statements to perform specific calculations. Overall, performance on this question was poor with several candidates scoring well below the average mark. Candidates had difficulty writing the Pascal statements using the correct syntax and making use of the variables and constants from Parts (a) and (b).

Candidates showed a lack of understanding of the original problem and were unable to write the statements to calculate the property tax correctly. This question had a high number of candidates making no attempt.

The following are examples of the solution

Example 1

```
Ytax := (val * Trate) – ((val * Trate) *
Drate);
```

Example 2

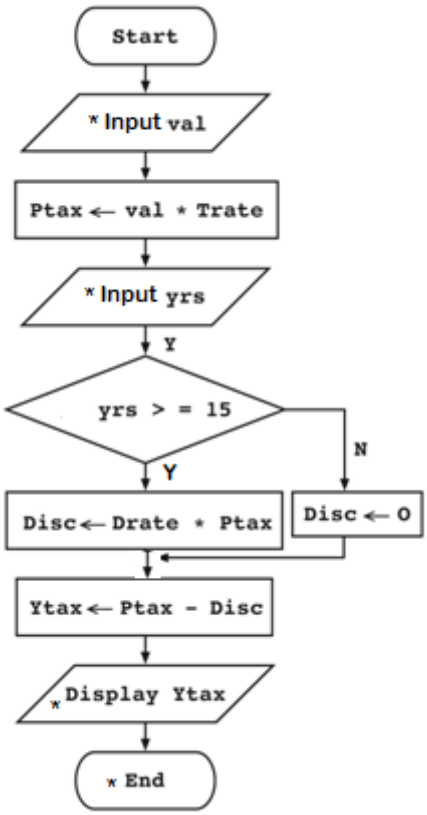
```
Ptax := val * Trate;
Disc := Ptax * Drate;
Ytax := Ptax – Disc;
```

Example 3

```
Disc := (val * Trate) *
Drate;
Ytax := (val * Trate) – Disc;
```

Part (d) tested candidates' ability to create a flowchart to solve the problem described in the question. This was attempted by the majority of candidates. Several problems were observed in the responses with the most significant being candidates' misuse of flowchart symbols. These included incorrect symbols when representing a task being performed, or labels and flow arrows incorrectly placed or omitted. Overall, the majority of candidates was unable to correctly construct the flowchart representing the logic required to solve the problem.

Sample Solution



Question 10

This question tested candidates' ability to identify generations of programming languages and state technical terms for various descriptions.

Part (a) tested candidates' ability to state the generation of the programming language from a list of examples of programming code from various programming languages. This part was attempted by the majority of candidates although some candidates confused the generations. Some candidates stated the programming language instead of the generation of the programming language.

Part (b) tested candidates' ability to state the technical term for a set of descriptions during testing, debugging, and compiling a program along with errors produced at various stages. Many candidates confused object code with source code, and run time error with syntax error. Some candidates used the term 'machine code' instead of *object code* for code that is created after a program is compiled successfully.

Question 11

Part (a) tested candidates' ability to declare a named one-dimensional array using a Pascal statement. This part of the question was fairly well done. Although candidates showed a basic knowledge of the Pascal array declaration, quite a bit of them mixed up the order, such as placing the word ARRAY before the array name. Candidates need to be reminded of the correct syntax of the array declaration, especially the use of the square brackets and the number of dots in the size of the array.

Part (b) tested candidates' ability to assign a value to a specific location of the named array using Pascal statements. This part of the question was not well done. Most candidates were not able to properly assign a value to a specific array location, some used variables declared as integers rather than locations of an array to assign the values, while others did not know the required Pascal syntax. In addition, some candidates used an equal sign instead of the assignment operator.

Part (c) tested candidates' ability to initialize a named variable to zero using a single Pascal statement. This part of the question was fairly well done, with just about half of the candidates gaining the mark. Candidates are still not clear on the use of proper Pascal syntax, such as the assignment operator and semicolon. Teachers are asked to place more emphasis on proper syntax.

Part (d) tested candidates' ability to add values in specific locations of the array and store them in a named variable. This part of the question was not well done. Most candidates did not use the proper syntax when manipulating the values in the array locations and omitted the square brackets, the assignment operator, or the semicolon.

Question 12

Part (a) tested candidates' ability to complete a truth table based on given conditions. This part of the question was well done by the majority of candidates. A few candidates did not use 0 or 1 under the 'Sound Alarm' column but instead responded with 'Alarm' or 'No alarm'. The solution shown below tested the OR logical operator.

Temperature	Smoke	Sound Alarm
1	0	1
1	1	1
0	0	0
0	1	1

Part (b) tested candidates' ability to construct a trace table from a given segment of an algorithm. This part of the question was poorly done by the majority of candidates. Only a few candidates constructed the trace table correctly while others were able to score partial marks for correct steps completed in the trace table. Some candidates did not stop when 'A' became greater than 10 and continued to execute the algorithm. The construction of trace tables continues to challenge candidates and more practice is needed in this area to better prepare candidates to handle questions based on trace tables in the examination.

Paper 03 – School-Based Assessment (SBA)

The SBA consisted of four questions testing the Productivity Tools and Problem Solving and Programming profiles.

Sample Uniqueness

In many cases there was a lack of uniqueness among SBAs from the same centre. In fact, evidence showed in many samples that one student's work was used for other students' samples, or an outline provided for the students to insert a few changes prior to submission.

Teachers are advised of the following points taken from the IT syllabus.

Page 7: Tutors must also monitor candidates' project to determine the veracity of work submitted.
Tutors should not accept projects which were not monitored during development.

Page 24: The teacher should use the mark scheme provided by CXC and include any comments pertinent to the conduct of the assessment.

These points imply that if teachers observe collusion by students or receive samples that are identical, then they must document this on students' samples and award zero marks for the identical components for the students involved. The principal should be notified as there are implications for candidates of the centre. If on moderation, students' samples are found to be identical, the centre will first be given a warning and zero marks awarded for the identical components. All candidates' grades will be cancelled from the centre on receiving a second set of samples the following year with this irregularity.

Moderation Sheets

- The samples sent by the centre should match that generated by the CXC ORS system.
- Computer-generated printouts must match the marks and students on the moderation sheet and samples submitted.

- Teachers should mark the SBA and place the grades on the moderation sheet next to teacher's grade.

Mark Schemes

- Some teachers failed to adhere to the current CXC guidelines and mark scheme.
- It is recommended that teachers familiarize themselves with the CXC mark scheme to allow students a better chance of gaining marks for the tasks.
- Individual mark scheme needs to be submitted for each of the five candidates.

Hardcopy and Softcopy Submissions

- Some teachers submitted only softcopies (CDs and memory sticks) and not hardcopy printouts that were required. Only printouts were marked, as no computers were on site for marking these students' work.
- Teachers should make sure that each student's SBA is bounded and properly labelled.
- Teachers are advised not to use red or green ink when marking the SBA as these are used by the moderators. Black ink or pencil is acceptable.
- Where there is more than one teacher, one common SBA and mark scheme should be submitted.
- No half marks should be awarded for any task.
- Marks should be awarded for work actually submitted for moderation
- Teachers should avoid submitting lengthy irrelevant data in the SBA — 15–20 pages for each component is more than adequate.

The following is a sample which was submitted for moderation.

At left: Irrelevant material submitted
At right: Adequate submissions containing all five samples

Presentation

The SBA should be presented in a coherent manner. Printouts should be properly collated and secured so as to ensure good presentation.

Syllabus Guidelines for Marking the SBA

Teachers are strongly urged to strictly adhere to CXC's mark scheme as provided in the syllabus. Details of the assignment should also be submitted.

Word Processing

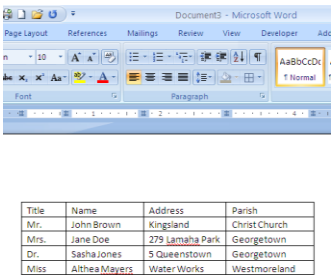
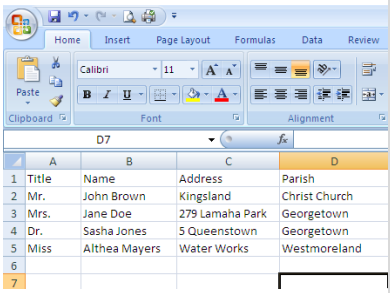
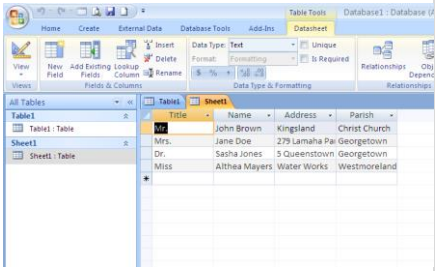
- There has been an increase in the number of teachers who utilized CXC's mark scheme.
- Teachers must be commended for highlighting areas in students' projects which demonstrated skills for which marks were awarded.
- Students must be commended for presenting documents which showed evidence before and after insertions, deletions and block operations.
- There has been a decrease in the number of duplicates in the Word Processing component.

Findings

- Generally, formatting for presentation was well done. Formatting for emphasis — bold, italics, font and font size — was extensively used; however, borders and shading to highlight and give emphasis were rarely used.
- It was difficult to detect the use of the spell and grammar check and the find and replace function.
- While students frequently demonstrated the skill of changing page orientation, text orientation was rarely demonstrated.
- Headers and footers were very popular among projects, however, the application of endnotes was almost never observed.
- Many students obtained marks for tables in their projects. However, most of these were imported tables from a spreadsheet or a database.
- Some students attempted to give the impression that they used the column facility but instead text boxes and graphics were used.
- There were also some projects which did not contain any columns/book folds/multipages. However, some candidates were found to use other software facilities such as publisher to produce requested tasks for example, book folds.
- Graphics were used extensively by students.
- Itemizations such as text insertions and deletions as well as block operations were rarely evident.
- While the majority of students indicated good use of merge fields, some attempted to incorrectly show them by typing inequality symbols, as shown in the following examples.

Correctly Inserted Fields	**These are NOT merge fields**
«Title» «Name» «Address» «Parish»	<Title> <Name> {Address} <<Parish>>

- In many cases, an excessive number of merged letters were presented. A large percentage of students did not include the data source and did not understand it to be the secondary document. For example, data source as evidence of the mail merge could be either of the following:

A table in Word	A worksheet in Excel	A database table
		

Title	Name	Address	Parish
Mr.	John Brown	Kingsland	Christ Church
Mrs.	Jane Doe	279 Lamaha Park	Georgetown
Dr.	Sasha Jones	5 Queenstown	Georgetown
Miss	Althea Mayers	Water Works	Westmoreland

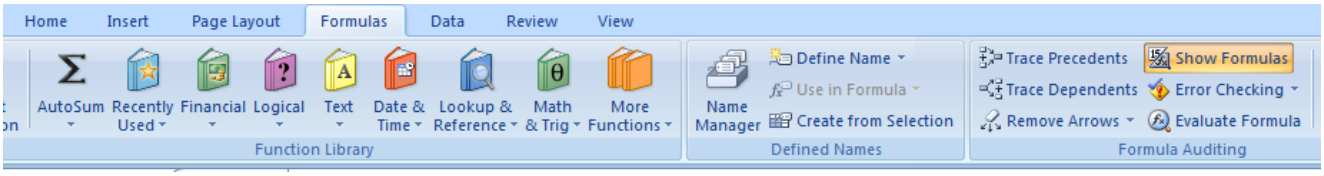
- In many cases, marks awarded to students exceeded CSEC suggested maximum marks.
- Evidence of screenshots was often not legible.
- Evidence of marks on the moderation sheet was often different from marks given by the teacher on individual projects.
- Some teachers created SBA projects which failed to test required Word Processing skills relevant to the CXC syllabus.
- Some projects were presented without itemized mark schemes, and in some cases projects submitted were not marked.
- Overall, the quality of projects was fair in comparison with the previous year's submissions.

Recommendations

- Project questions should provide opportunities for candidates to demonstrate skill in changing page margins, page orientations, paper size and text orientation.
- Students should be encouraged to create tables, as well as book folds and columns using the word processing facilities *only*.
- Students must be encouraged to insert page numbers where documents consist of multiple pages.
- Students should provide evidence of insertions, deletions and block operations by printing the before and after documents displaying changes.
- Teachers must ensure that students print the primary document with correctly inserted merge fields (*not typed*).
- The data source document (secondary document) *must* be included in this section in order to give evidence of mail merge.
- At least three or no more than five merged documents are required.
- It is recommended that a table of contents with page numbering be included.

Spreadsheet

- Formula sheets were not submitted for some samples. This proved to the detriment of the sample as marks were not awarded. The formula sheet provides evidence to support the authenticity of formulas. Formula sheets need to be printed from the formula view in Microsoft Excel (see below). It should also have a reasonable font size. The font sizes of some formula sheets were too small and therefore made the scoring difficult.
- Formula sheets must be legible. Students should ensure that formulae sheet printouts are at the default font size, or 100% zoom.



Formula view in Microsoft Excel

- Students need to be able to demonstrate the correct use of absolute cell referencing (F2).
- Teachers are encouraged to use naming of ranges.
- Teachers are encouraged to use a variation of both system and arithmetic functions in the SBA project.

Appropriate Formula and Functions

- Teachers need to ensure that students use correct formulas and functions to produce the correct answers. It was observed that although the right function was used, for example, =sum, the function contained *incorrect* information, for example, =SUM(F9*G12). Functions from the syllabus should be primarily used.
- Formulas should be developed independently of predefined functions, for example, =(A2*B2)/100. Spreadsheets should include the use of relative and absolute addressing with more absolute addressing being used in the preparation of the school-based assessments.

Range names

- It was observed that the proper use of a range `was not understood by the students. Students confused ‘range’ and ‘range names’. Generally, range names were not utilized much.

Operations on Rows and Columns

- There needs to be clearer evidence of spreadsheet manipulation. Copying, inserting and deletions between existing rows and columns should be shown in before and after printouts of the particular sections of the workbook.

Spreadsheet Formatting

- Formatting was generally well done with respect to the use of currency, decimal place, comma and percentage features. However, advanced formatting features such as merging cells and wrapping text needs improvement.

Sorting

- This was generally well done but there needs to be clear evidence of which field the data is sorted on.

Extraction of Data and Criteria Range

- SBAs should include a filtering component. Many students did not successfully perform advanced filtering with two or more criteria. Teachers must ensure that the advanced filter is part of the SBA. Evidence of the criteria used must be shown, as well as the results. The criteria range and the results must appear on the same page. A caption (heading) should be used to clearly indicate the presence of the criteria range filter. Alternatively, a screenshot can be presented if the filter buttons are used but the criteria must be seen.

Charting Operations

- Graphing was generally well done. There were issues in the legends, titles and labelling of the *x*- axis and the *y*-axis. Legends should be meaningful. Graphs should show a comparison of at least two series of data, and be of a reasonable size so that all information can be clearly identified.

Database Management

- Overall, the mark schemes were good. Students should print screenshots of the design view for tables, queries and reports
- Printouts of original tables, queries and reports results are to be submitted. Screenshots should be used to supply supplementary evidence (primary key, criteria, calculated fields and sorting).
- Duplications of printouts should be avoided, however, evidence of modifications (sorting, additions and deletions of records) should be provided in 'before' and 'after' printouts.
- Try to fit tables/queries on one page.
- Ensure that formatting is done properly in spreadsheet if data is to be exported to database.
- Teachers should supervise all printing as some students printed a lot of unnecessary work. For example, it is not necessary to submit properties for the tables and queries.
- Teachers should also inform students to separate each section and label all sections and file properly.
- When recording the marks, teachers must submit a breakdown of all marks given with the marking scheme. It should be accurately recorded on the moderation form, half marks are not allowed.
- The SBA should be limited to a maximum of 20 pages per section and should be printed on one side only.

Tables

Most samples showed evidence of two or more database tables. Although some primary key evidence was seen, there is need for screenshots of table structures (design views) to provide clear evidence of the existence of primary keys and the modification of field sizes. In some cases the database documenter was used. However, when used, the documenter should only present relevant data, that is, field names, field type, primary keys, field sizes, and relationships should be displayed. There is no need to show field properties.

Though some samples included printed joined tables with relationship diagrams, there is still much room for improvement.

Modifying Database Tables/Files

Most samples provided no evidence of additions/deletions/modifications of fields or records. Evidence of these tasks being done can be provided by before and after hardcopies of tables/records/fields. The structure that initiated the modification can also be done and clearly stated.

Queries

Generally, simple queries were well done. However, evidence again (design views via screenshots or SQL statements) should be provided to show how queries were done. More emphasis needs to be placed on performing complex queries and calculated fields.

Sorting

Although this activity was performed well by many candidates, more emphasis can be placed on sorting tables. Candidates need to provide clearly labelled before and after copies of the table(s) which have been sorted (indicating the type of sort and which field or fields have been sorted).

Reports

Some samples did not show reports. Also, some reports were only provided in the Word Processing section. More emphasis should be placed on grouping in reports showing more than one record per group. Summary/statistical features should be included. Evidence of sorting must be shown in reports. Reports should show appropriate titles.

Programming

Generally, there was an improvement in the quality and quantity of submissions by students this year over last year. Although there were a number of no-responses, there seems to be an improvement in the marks obtained for his component of the SBA.

Problem Statement

Some students only gave one short line or rewrote the assignment task given or the actual details of the project. Students should give at least three or four lines stating what the designed program will do. This section was generally not well done.

Note that problem statements should

- be well defined
- precede the algorithm

Algorithm

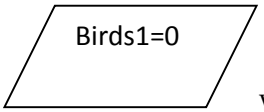
A number of students provided identical algorithms; this action is penalized by the Council.

Flow Chart

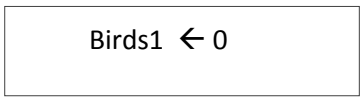
In creating the *flowchart*, students must use the correct symbols, especially input/output and processing. The directional lines should clearly indicate the flow of data (direction) and should not intersect. It is suggested that flowcharts be used if the solution to the task is a simple and short one, which will fit on one or two pages.

Specific Concerns Regarding Flowcharts

- Flow lines need to show direction.
- Make use of correct symbols.
- Decision symbol should indicate whether it represents a loop or conditional statement.
- Decision symbols need to be labelled so as to indicate the next step.
- Input/output symbol should indicate clearly whether data is being accepted or displayed.
- Failure to initialize variables when doing flow chart.
- Correct symbol and syntax should be used for initializing, for example,



was used rather than



Pseudocode

- Definition of Variables
  Most students attempted this section but did not complete it correctly. It is suggested that appropriate data types be used with the ones identified in the problem solution and an explanation of those variables given where necessary.

- Initialization of variables
  The majority of students was able to initialize the variables correctly, however, there was little evidence of the array being correctly initialized.
- Request/Storing data
  The majority of students attempted this section and was able to adequately demonstrate this. Few students showed how to store data in the array.

- Appropriate and Logical Use of Structures
  - Selection — this construct was well utilized.
  - Looping – many candidates failed to use looping constructs efficiently.

The following are the key concerns regarding pseudocode:

- The use of complete Pascal code for the whole algorithm is not advisable
- Pascal code and the pseudocode describing the algorithm should be distinct. That is, students should avoid submitting the Pascal program code as their algorithm. Algorithms should be done before the Pascal program and should serve as the basis for the development of the actual program code.
- Variable names should be a continuous string; not separated with a space, for example,
  the instruction ***Read First Name*** should be ***Read First Name***

- Incorrect representation of control structures, for example,
  IF without END IF,
  FOR without END FOR
  WHILE without END WHILE
- Failure to initialize variables and arrays within the pseudocode.
- Inconsistent variable names as it relates to their use in trace tables.

Trace Table

- This section was poorly done by the majority of students. This clearly demonstrates that there was a lack of knowledge in developing trace tables. It should be noted that a trace table is not
  - the spreadsheet component
  - the database component
  - a defining diagram or IPO chart
  - test data.

- A trace table is used to test or 'keep track' of the main variables in an algorithm. It is used to test the sequential/logical steps in an algorithm, using the main variables identified and to show the changing values of those variables throughout algorithm execution.

- The narrated steps are not needed within the trace table.

- Data used to test the variables within the trace table must be robust, that is, the data should test for valid and invalid conditions.

- Students should be encouraged to submit both the test data and the trace table as separate documents within their SBA.

- Students should submit only a flowchart *or* pseudocode, as both are *not* required.

Specific areas of concern are as follows:

- Variables incorrectly represented in trace tables; trace tables should show the exact variables from the algorithm or flowchart to execute the dry run.
- Changes in values should be correctly and adequately demonstrated after the use of test data.
- It is not necessary to include the formula sheet from Excel in trace tables.

Program Implementation

Compilation: Generally, most students did not submit evidence of program compilation and output for the program that was submitted. It is recommended that screenshots be submitted along with the sectional components to obtain full marks for this section.

Appropriate Data Types: This section was well done by most students.

Control Structures

- Variable Initialization: Many students did not perform a complete variable initialization, but some variable initialization was done. Students should be encouraged to initialize all variables and arrays as necessary.
- Sequencing: This section was well done
- Selection Constructs: The majority of students demonstrated that they can use the IF statement, but not correctly (for example, efficiently). Students should be encouraged to use IF..THEN and IF.. THEN ..ELSE statements in their solutions.
- Looping (Repetition) Constructs: Most students attempted looping constructs but did not implement these constructs effectively. Approximately 15 per cent of the students used only one loop and enclosed the entire program within that loop. It is suggested that students use more than one type of loop in the creation of the solution, for example, repeat ..until, for, while and so on. In some cases, it was noted that although the loop was used, there was little evidence of arrays being used within the loop. Arrays can be manipulated in various ways including:
    - Comparison, for example, finding the highest or lowest value
    - Calculation, for example, finding averages or total

Students should be encouraged to follow the appropriate format for both selection and repetition constructs:

- Making good use of begin and end pairs.
- Appropriate termination of constructs.
- Good documentation was seen by a low percentage of the students, however more students should be encouraged to improve on this aspect of the syllabus.
- Students should adhere to CXC's guidelines for program documentation, as this should include author of program, date created, and a simple statement of task.
- Indentation: Many students attempted this section.
- User-friendliness: This was well done.

Recommendations to Teachers

- Projects set by centres should ensure that they test all of the components of the syllabus.
- Packaging of samples should be done in a proper manner, indicating the starting of the sections.
- Individual mark schemes should be submitted with each sample and reflect CXC's assessment criteria.
- Students should be encouraged to be creative and submissions should show individuality. The work submitted for a student should only be submitted with that student's number.
- The use of templates for solutions is discouraged.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

JANUARY 2016

INFORMATION TECHNOLOGY
GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The Information Technology examination is offered in January and May/June each year. In January 2016, 733 sat the examination. Approximately 60 per cent of the candidates earned Grades I–III.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1) 15 questions tested Productivity Tools (Profile 2), and 15 questions tested Problem Solving and Programming (Profile 3).

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem Solving and Programming profile.

Section I – Theory

Question 1

This question tested candidates' ability to match certain features with specifications of a laptop. Candidates performed well on this question. A few candidates confused drive size with memory size, processor type with available interfaces and utilities.

Question 2

This question tested candidates' ability to represent data within a computer using various number systems. More candidates made errors with the binary addition than with various conversions from binary to decimal and decimal to binary. Many candidates had problems using negative numbers to find two's complement and even dividing by two.

Question 3

This question tested candidates' ability to state the meaning of six acronyms as well as state the similarity and difference between the internet and an intranet, and a podcast and a blog. The question was poorly done by the majority of candidates. Most candidates were not able to identify IRC as Internet Relay Chat and provided incomplete or partially incorrect answers for the remaining terms. Many candidates were also

unable to identify similarities between intranet and the internet although they were able to identify some differences. A few candidates were able to identify differences between a blog and a podcast.

Question 4

This question tested candidates' ability to describe one threat that each of five security options prevents. Candidates seemed not to have read that they were required to state what each security option prevented rather than try to explain the meanings of the terms or phrases. The majority of candidates was able to identify the purpose of a password and to provide suitable examples. Candidates were able to identify the use of encryption but were unable to relate the purpose of encryption in protecting data. The majority of candidates was able to identify the purpose of a firewall and provided broad examples of applications of a firewall. Most candidates had challenges explaining what a biometric system is and how it is used. Many candidates wrote to prevent illegal immigrants. Candidates did not to identify biometric systems as a means of protecting facilities and equipment. Overall, however, candidates were able to score average marks on this question but many responses were too vague.

Question 5

This question tested candidates' ability to identify and describe one example of input, processing and output from a scenario, and to describe the advantages of using an automated information processing system over a manual system. Many candidates wrote password instead of PIN for input to the system. However, many candidates were able to secure average marks on this question. This question was very clear but, candidates had problems describing the processing that used the input to generate the output in the automated system. Only a few candidates identified the three processes in this question. The processing at an ATM machine can be used as an area for discussion in class and the need for real life applications to the content emphasized. Candidates correctly stated accuracy and speed as the popular advantages of an automated information processing system.

Question 6

This question tested candidates' ability to explain how validation and verification related to a scenario regarding data collection. Even though many candidates were able to identify the correct categories for which the various data checks can be conducted inadequate explanations of the associated check were provided.

Question 7

This question tested candidates' ability to write functions and formulas for a template used to generate students' grades. Many candidates did not know the default alignment for numeric data. More attention must be paid to the *accurate* writing of all functions and formulae. Attention must be paid to the spelling of words for predetermined functions to avoid using AVG, for *average* and the writing of functions without

including brackets. Some candidates did not apply the IF formula. They also did not use the *average* function but added the cells and divided by the total cells.

Question 8

This question tested candidates' ability to state the primary key and data type of specified fields in a database table, and write criteria to extract specific records in a database. The question was satisfactorily done by the majority of candidates. Candidates were able to identify the primary key, data type and surname of the member with MemberID = 003. Some candidates did not correctly state the number of members who were born before 19/10/94. Candidates were able to identify an additional field that could be included in the table but struggled to state the criteria to find the member with surname 'Balloo'. Some candidates incorrectly stated 'surname' instead of *Member Surname* as the name of the field used in the query.

Question 9

This question tested candidates' ability to explain the purpose of a help feature in a programming application, complete a trace table and identify various technical terms in programming. The question was poorly done by most candidates. Few candidates were able to identify the use and purpose of the Help feature in the LookToME network. The majority of candidates was able to correctly complete the trace table for each of the four options. Most candidates were unable to identify the technical term given to the code and also could not state the name of the document that explains how a user can send a message. Candidates were able to identify 'THAT' as the error and were able to identify the type of error that was generated. Few candidates were able to identify the relational operator and that the 'Writeln' statement would move the cursor below the statement.

Question 10

This question tested candidates' ability to write Pascal code to declare, initialize and assign a value to an array. It was poorly done by most candidates. Some candidates interchanged the content of the array with the name of the array, resulting in the incorrect result. Those who were able to declare an array correctly were unable to initialize it to 0. Others omitted the code for the loop and as such provided an incomplete answer. However, most candidates were able to identify both index and assigned value in the array.

Question 11

This question tested candidates' ability to identify errors in two flowchart diagrams. Candidates' answers were much too vague. Although candidates were able to circle the errors, they were unable explain why they were errors and were unable to identify the flowchart symbols.

Question 12

This question tested candidates' ability to write Pascal statements using correct syntax. A few candidates had problems with this question. The majority of candidates was able to identify the correct syntax to START and STOP a program. However, when assigning a value to a variable candidates placed the colon (:) before the equal sign (=). They also omitted the semicolon (;) at the end of the statement. Candidates confused Readln and Writeln and many basic programming standards were not implemented while writing the code. Candidates used incorrect syntax statements and also wrote code in an incorrect order in the program.

Paper 032 – Alternative to School-Based Assessment (SBA)

This paper consisted of four questions testing the Productivity Tools and Problem Solving and Programming profiles.

Question 1 – Word Processing

In this question, candidates were provided with a letter and required to identify formatting features, icons, text alignment and justification, and merge fields. The question was fairly well done overall. However, most candidates did not demonstrate familiarity with the term 'word wrap'.

Question 2 – Spreadsheet

This question tested candidates' ability to identify a range of cells, text alignment, use of relative and absolute cell addressing, data formats and features, use of functions, sorting and identifying criteria in extracting records from a range of data. They were also required to identify a chart and state appropriate labels for the various axes and title of the chart.

Many candidates did not state the type of cell addressing used or the reason for it. Also, many candidates could not provide appropriate labels for the given chart. Candidates had difficulty labelling the axes correctly. Some candidates identified the chart as a bar chart instead of a line graph. Most candidates included a dollar sign ($) with the criteria.

Question 3 – Database Management

This question comprised two database tables to test candidates' ability to state the data type, the number of records in a table, suitability of a field as a primary key, writing a calculated field, extracting data from queries, and identifying parts of a report. The question was reasonably well done. An area of concern was candidates' inability to write a formula for a calculated field.

Question 4 – Problem Solving and Programming

This question comprised a Pascal program that candidates were to use to identify various aspects of the program, identify the line number of a loop, arithmetic statement, conditional statement and logic operation. Candidates were asked to explain the purpose of some aspects of the code, identify errors, complete a trace table and draw a flowchart.

Most candidates were unable to identify the line number of an operator in the Pascal code, the purpose of the code in line 6 and complete the trace table. They were also unable to explain the purpose of the program or to construct the flowchart.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2016

INFORMATION TECHNOLOGY
GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The General Proficiency Information Technology examination is offered in January and May/June each year. The number of candidates entered for the examination was approximately 23 350 in May/June 2016 and approximately 77.6 per cent of the candidates earned Grades I–III.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem Solving and Programming (Profile 3). Performance on Profile 1 was lower than that of 2015 with a mean percentage score of 41 per cent compared with 52 per cent for 2015.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks which tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem Solving and Programming profile.

Section I – Theory

Question 1

This question tested candidates' ability to differentiate between and categorise application software and system software as well as provide examples of utility software.

Part (a) was generally well done by the majority of candidates. However, while they were able to give a difference between the two types of software, some candidates instead provided examples of software, whilst others provided insufficient explanation. Also, many candidates did not specify that application software was primarily for the "user", while system software was mainly for the "computer".

Part (b) tested candidates' ability to categorise two examples of software as either system or application software. The majority of candidates were able to correctly answer this part of the question.

Part (c) tested candidates' ability to provide two examples of utility software and outline the purpose of each. Some candidates seemed unaware of the term 'utility software' and offered examples such as "light bill" or "phone bill". Other candidates confused examples of application software with utility software or incorrectly wrote "virus" software.

Question 2

This question provided a scenario of a company using a robot (or robotic arm) to package thousands of eggs per day.

Parts (a) (i) and (ii) tested candidates' ability to state advantages and disadvantages of using the robot (or robotic arm) as against using a manual method. While this part was answered by the majority of candidates, more focus needs to be placed on scenarios that depict the advantages and disadvantages of automation. Popular responses for advantages were *fast*, *efficient*, and *less time-consuming*, while *malfunction* and *maintenance* were the most popular disadvantages identified.

Part (a) (iii) tested candidates' ability to state a type of sensor that would be useful for the robot (or robotic arm) to have when packaging the eggs. Candidates mostly stated "touch" rather than *pressure* as the suitable sensor, but many candidates had even more difficulty identifying the corresponding reason. The popular response was *to prevent eggs from breaking* for every type of sensor stated.

Part (a) (iv) tested candidates' ability to state types of data contained in a barcode. The majority of candidates incorrectly stated price or cost, while a few misinterpreted 'types of data' as 'data types' and also incorrectly stated "numeric", "string", "date/time". Some also wrote "human-readable" or "machine-readable".

Recommendation to Teachers

Since the barcode is widely used, it is recommended that more teachers demonstrate its function to candidates. Expected responses include: 'date of packaging', 'manufacturer', 'package quantity', 'grade of eggs' and 'country of origin'.

Part (b) tested candidates' ability to state one industrial application that uses a robot (or robotic arm). Some candidates were vague by stating "factories" or "bank", and providing an example of how the robot is used. The most popular response was *car assembly*.

Part (c) tested candidates' ability to outline a critical job function resulting from the implementation of robotics in industry. Some candidates were able to explain a job function but could not identify a job title, while others provided a title such as technician, but could not explain its function.

Question 3

This question tested candidates' ability to convert various representations of decimal, ASCII code and two's complement numbers.

Part (a) required the binary coded decimal (BCD) representation of a decimal number. A fair number of candidates correctly answered this part. Common errors included dividing the number repeatedly by two, representing each digit as 3 bits instead of 4, and not converting the negative sign (–) to BCD.

Recommendation to Teachers

It is recommended that teachers explain the purpose of BCD and the difference when dividing a number repeatedly by 2.

Part (b) required candidates to determine the decimal number of its two's complement 8-bit representation. Most candidates lost marks because they failed to show the result as a negative number. Others were unaware of how to properly convert the two's complement representation to decimal. Some candidates inverted the bits, then added 1 or subtracted 1, but generally did not demonstrate knowledge of the procedure.

Part (c) provided candidates with ASCII code in hexadecimal, and required candidates to determine the binary representation of another ASCII code. Many candidates recognized that the required code was 4 positions from the one provided. However, few were able to correctly convert to its binary representation. Other candidates incorrectly treated the hexadecimal numbers as decimal numbers when attempting to convert to binary.

Question 4

This question provided candidates with a scenario about connecting computers and peripherals in a network.

Part (a) tested candidates' ability to identify the type of network in the scenario. Most candidates were able to identify the network and an appropriate reason. Other candidates confused the network type with a network topology.

Part (b) tested candidates' ability to list benefits of networking computers and peripheral devices. Many candidates were correctly able to list the benefits of networking the computers and peripheral devices in the computer laboratory. Others confused the purpose or use of computers with the benefits of a network.

Part (c) tested candidates' ability to explain the purpose of a firewall. Most candidates had an idea of a firewall but not its function, since they seemed unaware of exactly what it protects against and how it does this. Some candidates incorrectly wrote that it was used to protect against an actual fire.

Part (d) tested candidates' ability to list transmission media used to link computers in a laboratory. Candidates demonstrated good knowledge on this topic. Some candidates, however, confused transmission media with network types and topologies.

Part (e) tested candidates' ability to list measures that could be used to secure a file containing confidential data that was sent via the Internet. This part was done well by most candidates. *Password* and *encryption* were the most popular correct responses.

Question 5

This question tested candidates' ability to state the name of computer personnel who performed specific tasks.

Part (a) was poorly done by the candidates who were unable to name computer personnel who performed the stated tasks. Candidates often confused personnel, for example, webmaster and web designer. More emphasis needs to be placed on jobs in Information Technology and their roles.

Part (b) tested candidates' ability to identify, with reason, the most suitable file access method in the given applications. Candidates generally confused the meaning of 'sequential' with 'indexed

sequential' in their explanation of how they related to a payroll or POS system. It is recommended that direct access be demonstrated to show that one can access a record 'directly' without having to go through other records. Also, teachers' explanations or demonstrations of what POS represents and how cashiers at supermarket check-out use the POS should assist in clarifying any misconceptions that candidates may hold.

Part (c) tested candidates' ability to differentiate between a 'website' and a 'webpage'. While some candidates answered this part very well others provided very poor responses. While they had an idea of the concept of a website, they were unable to clearly differentiate it from a webpage. A few candidates therefore answered only one aspect, with responses such as, "A website is a location, the other is not."

Question 6

This question tested candidates' knowledge of data entry errors, verification and validation checks based on entering data from a paper-based form to computer-based form.

Part (a) tested candidates' ability to list types of data entry errors based on the scenario. Some candidates wrote data entry error as the answer instead of giving examples of data entry errors. *Spelling errors* and *grammatical errors* were popular correct responses that candidates supplied. Other candidates incorrectly wrote syntax, logic or runtime errors and approached it as a programming question.

Part (b) required candidates to state suitable verification checks for the scenario. This question was challenging for most candidates who were not familiar with the differences between 'verification' and 'validation'.

Recommendation to Teachers

It is recommended that teachers place more emphasis on explaining the differences between these terms.

Part (c) required candidates to state validation checks that could be applied only to one field – an age field – used to store the age of a student. Most candidates responded favourably on this question. However, highlighting examples of a reasonableness check seems to be necessary since this appears to be unclear for many candidates. Candidates lost marks in their explanations because they gave responses that had nothing to do with the 'age' field. It is important to emphasise the difference between a field containing a date and one containing a number.

Question 7

The question tested candidates' knowledge of basic features of a database, more specifically data types, sorting and grouping data, determining the most appropriate primary key, and the number of records output from a query. The question was generally well done.

Most candidates identified a possible primary key based on the data given and not based on the purpose of a primary key and were unable to state the reason why EmpNo was an appropriate primary key. Other candidates were able to identify the correct number of records from the query. Sorting and aspects of a report also seemed to pose a problem for some candidates.

Question 8

This question tested candidates' knowledge of basic features of a spreadsheet, more specifically the use and application of cell referencing, ranges required to create a chart, and the average and maximum functions.

Absolute cell referencing continues to be a challenge for candidates. Emphasis must be placed on why and when a cell is made absolute. Also, the meaning of functions and their relationship to formulas should be given more attention. For example, a formula for the average can be explained then its function can be compared to demonstrate the similarities and differences. Teaching these mathematical concepts is necessary to help candidates appreciate and understand functions and formulas. Candidates also omitted critical aspects, such as ranges, where the word TO was used, as well as the incorrect use of shortened formula names such as AVG instead of AVERAGE.

Question 9

Part (a) tested candidates' ability to identify the type and generation of programming language for three examples of programming instructions as well as place a list of program implementation activities in its correct order.

Most candidates were able to identify the type and/or level of assembly and machine code. Many candidates failed to obtain full marks for this question for simply identifying the code in the last row by its actual language, Pascal, rather than identifying it as a *high level language*. Candidates are urged to pay more attention to the question being asked.

Part (b) required candidates to reorder a list of program implementation activities. Many candidates seemed not to know the correct sequence. More emphasis needs to be placed on the sequence of writing a program from creation of source code to producing executable code.

Question 10

This question tested candidates' ability to complete a trace table based on an algorithm and also write the correct statements in the symbols of a flowchart.

In Part (a), many candidates did not complete the trace table correctly, with some deriving large values as a result of wrong calculations. It is recommended that candidates be made aware that the value of a variable should be written in every line even if it has not changed since it retains the value previously assigned.

In Part (b), some candidates did not seem to know the purpose of the different flowchart symbols, especially the decision symbol. Other candidates interchanged the statements for the 'Yes' and 'No' options of the decision symbol.

Question 11

This question tested candidates' ability to apply Pascal data types to given values, rewrite Pascal statements using correct syntax, and indicate the type of Pascal error in lines of code.

In Part (a), candidates were required to state the correct Pascal data types for given values. Many candidates were able to correctly identify each data type, while some confused 'real' with 'integer' data type, and others wrote "char" instead of *string* for the text value.

In Part (b), candidates were required to rewrite Pascal statements using correct syntax. Most of them were able to identify the errors in the program but not necessarily correct them accurately, even renaming the variables or adding additional syntax or data types to the statements. While most candidates understood that an array includes square brackets in its declaration, they did not recognize the missing quotation marks in a character string, and that Const does not need a colon. More practice is recommended on correcting syntax in fragments of programming code.

The correct results were:

*Firstletter := **'M';***

*Const rate **=** 0.20;*

*Taxrate := **0.05**;*

*Var scores: array**[**1..5**]**of integer;*

*probability := **0.35**;*

In Part (c), candidates were required to indicate the type of Pascal error in two lines of code. Some candidates confused the types of errors, by stating "runtime" for Part (c) (i) and "syntax" for Part (c)(ii). Although incorrect, many candidates also wrote "logical" error instead of 'logic' error.

Question 12

This question tested candidates' ability to write a Pascal program to enter two integers into two variables, check if one integer is greater than the other, and output a statement and the values as well as swap them accordingly.

There was a significant improvement in the number of candidates who attempted this question compared with previous years. Most candidates were able to write input and output statements. They knew to include the brackets and semicolons. However, they confused the use of double and single quotation marks, as well as the greater than and less than symbols, and wrote print and "prompt instead of 'write' or 'writeln'. Some candidates wrote the word, swap, instead of writing the code to swap the integers. A few candidates drew flowcharts or wrote an algorithm instead of a program. Teachers may need to further explain the use of the 'TEMP' variable.

Paper 03 – School-Based Assessment (SBA)

Syllabus Guidelines

Teachers are strongly urged to strictly adhere to CXC's mark scheme as provided in the syllabus. The assignment details should also be submitted. The same recommendations provided in previous years unfortunately still hold this year for the SBA, and are reproduced here for ease of access.

Word Processing

Commendations

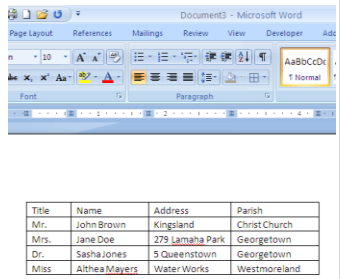
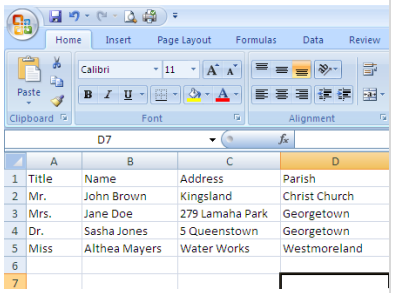
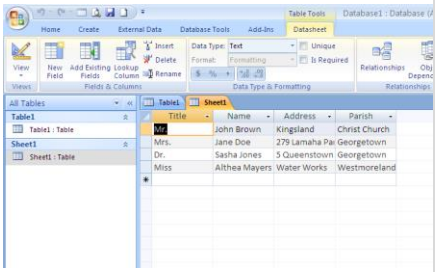
- There has been an increase in the number of teachers who utilized the CSEC mark scheme.
- Teachers must be commended for highlighting the areas in candidates' projects which demonstrated the skills for which marks were awarded.
- Candidates must be commended for showing documents which showed evidence before and after insertions, deletions and block operations.
- There has been a decrease in the number of duplicates in the word processing component.

Findings

- Formatting for presentation generally was well done. Formatting for emphasis – bold, italics, font and font size – was extensively used; however, borders and shading to highlight and give emphasis were rarely used.
- It was difficult to detect the use of the spell and grammar check and the find and replace function.
- While candidates frequently demonstrated the skill of changing page orientation, text orientation was rarely demonstrated.
- Headers and footers were very popular among candidate projects; however, the application of the endnote was very rarely observed.
- Many candidates obtained marks for tables in their projects. However, most of these were tables imported from Excel or from a database.
- Some candidates attempted to give the impression that they used the column facility but instead textboxes and graphics were used.
- There were also some projects which did not contain any columns/book folds/multiple pages. However, some candidates were found to use other software facilities, such as MS Publisher to produce requested tasks, for example, book folds.
- Graphics were used extensively by candidates.
- Itemizations, such as text insertions and deletions as well as block operations, were rarely evident.
- While the majority of candidates indicated good use of merge fields, some candidates attempted to incorrectly show them by typing inequality symbols. **See the examples below:**

Correctly inserted fields	These are NOT merge fields
«Title» «Name» «Address» «Parish»	<Title> <Name> {Address} <<Parish>>

- In many cases, excessive amounts of merged letters were presented. A large percentage of candidates did not include the data source and did not understand it to be the secondary document. For example, data source as evidence of the mail merge could be either of the following:

A table in Word	A worksheet in Excel	A database table
		

- In many cases, marks awarded to candidates exceeded the CSEC suggested maximum marks.
- Screen shots were often not legible.
- Evidence of marks on the moderation sheet was often different from marks given by the teacher on individual projects.
- Some teachers created SBA projects which failed to assess the required word processing skills relevant to the CXC syllabus.
- Some projects were presented without itemized mark schemes, and in some cases submitted projects were not marked.
- Overall, the quality of projects was fair in comparison with projects submitted in previous years.

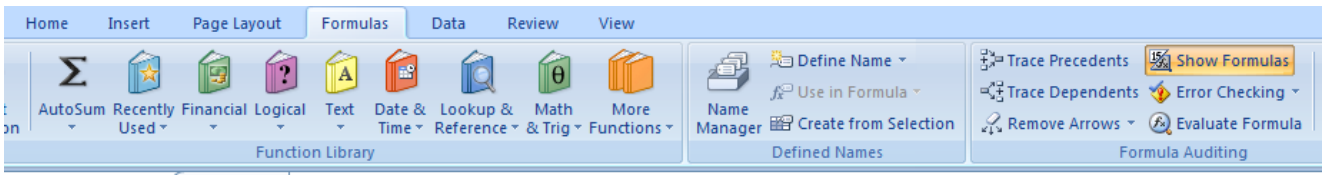
Recommendations

- Project questions should provide opportunities for candidates to demonstrate skill in changing page margins, page orientations, paper size and text orientation.
- Candidates should be encouraged to create tables, as well as book folds and columns using the word processing facilities ONLY.
- Candidates must be encouraged to insert page numbers where documents consist of multiple pages.
- Candidates should provide evidence of insertions, deletions and block operations by printing the 'before' and 'after' documents displaying changes.
- Teachers must ensure that candidates print the primary document with correctly inserted (NOT TYPED) merge fields.
- The data source document (secondary document) MUST be included in order to give evidence of mail merge.
- Teachers and students are reminded that at least three, or no more than five merged documents are required.
- It is recommended that a table of contents with page numbering be included.

Spreadsheet

Formula Sheets

- Formula sheets were not submitted for some samples. This proved to be to the detriment of the candidates, as marks were not awarded. The formula sheet provides evidence to the authenticity of formulas. Formula sheets need to be printed from the formula view in Microsoft Excel. They should also have a reasonable font size. The font sizes of some formula sheets were too small and therefore made the scoring difficult.



Formula view in Microsoft Excel

- Formula sheets must be legible. Candidates should ensure that formula sheet printouts are at default font size, or 100% zoom.
- Candidates need to be able to demonstrate the correct use of absolute cell referencing (F2).
- Teachers are encouraged to use naming of ranges.
- Teachers are encouraged to use a variation of both system and arithmetic functions in the SBA project.

Appropriate Formulas and Functions

- Teachers need to ensure that candidates use correct formulas and functions to produce the correct answers. It was observed that although the right function was used (for example, =sum) the function contained **incorrect** information, for example, **=SUM(F9*G12).** Functions from the syllabus should be primarily used.
- Formulas should be developed independent of predefined functions, for example, =(A2*B2)/100. Spreadsheets should include the use of relative and absolute addressing with more absolute addressing being used in the preparation of the school-based assessments.

Range Names

- It was noted that the proper usage of range was not understood by the candidates. Candidates were confused over a range and range names. Generally, range names were not utilized much.

Operations on Rows and Columns

- There needs to be clearer evidence of spreadsheet manipulation. Copying, insertions and deletions between existing rows and columns should have 'before' and 'after' printouts of the particular sections of the workbook.

Spreadsheet Formatting

- Formatting was generally well done with respect to the use of currency, decimal place, comma and percentage features. However, advanced formatting features such as merging cells and wrapping text need improvement.

Sorting

- This was generally well done but there needs to be clear evidence of which field the data is sorted on.

Extraction of Data and Criteria Range

- SBAs should include a filtering component. Many candidates did not successfully perform advanced filtering with two or more criteria. Teachers must ensure that the advanced filter is part of the SBA. Evidence of the criteria used must be shown, as well as the results. The criteria range and the results must appear on the same page. A caption (heading) should be used to clearly indicate the presence of the criteria range filter. Alternatively, a screen shot can be presented if the filter buttons are used, but the criteria must be seen.

Charting Operations

- Graphing was generally well done, but some candidates did show some weakness in their legends, graph titles and labelling of the x- and y-axes. Legends should be meaningful. Graphs

should show a comparison of at least two series of data, and be of a reasonable size so that all information can be clearly identified.

Database Management

- The mark schemes were generally good. Candidates should print screen shots of the design view for tables, queries and reports.
- Printouts of original tables, queries and report results are to be submitted. Screen shots should be used to supply supplementary evidence (primary key, criteria, calculated fields and sorting). Duplications of printouts should be avoided; however, evidence of modifications (sorting, additions and deletions of records) should be provided in 'before' and 'after' printouts.
- Candidates must try to fit tables/queries on one page.
- Candidates must ensure that formatting is done properly in their spreadsheet if data is to be exported to a database.
- Teachers should supervise ALL printing as some candidates printed a lot of unnecessary work. For example, it is not necessary to print and submit properties for the tables and queries.
- Teachers should also inform the candidates to separate each section and label ALL sections and file properly.
- When recording the marks, teachers MUST submit a breakdown of ALL marks given with the mark scheme. Marks should be accurately recorded in the moderation form and half marks are **not** allowed.
- The SBA should be limited to maximum 20 pages per section and printed on one side only.

Tables

Most samples showed evidence of two or more database tables. Although some primary key evidence was seen, there is a need for screen shots of table structures (design views) to provide clear evidence of the existence of primary keys and modification of field sizes. In some cases the database documenter was used. However, when used, the documenter should only present relevant data. Thus, field names, field type, primary keys, field sizes, and relationships should be displayed. There is no need to show field properties.

Though some samples included evidence of joined table by hardcopy proof of relationship diagrams, there is still much room for improvement.

Modifying Database Tables/Files

Most samples provided no evidence of additions/deletions/modifications of fields or records. Evidence of these tasks being done can be provided by 'before' and 'after' hardcopies of tables/records/fields. The structure that initiated the modification can also be done and clearly stated.

Queries

Generally, simple queries were well done. However, evidence (design views via screen shots or SQL statements) should be provided to show how queries were done. More emphasis needs to be placed on performing complex queries and calculated fields.

Sorting

Although this activity was performed well by many candidates, more emphasis can be placed on sorting tables. Candidates need to provide clearly labelled 'before' and 'after' copies of the table(s) which have been sorted (indicating the type of sort and which field or fields have been sorted).

Reports

Some samples did not show reports. Also, some reports were only provided in the word processing section. More emphasis should be placed on grouping in reports to show more than one record per group. Summary/statistical features should be included. Evidence of sorting must be shown in reports and reports should have appropriate titles.

Programming

Generally, there was an improvement in the quality and number of submissions by the candidates this year compared with last year. Although there were a number of no-responses, there seems to be an improvement in the marks obtained for this component of the SBA.

Recommendations to Teachers

- Teachers should ensure that projects set in their centres, test all of the components of the syllabus.
- Packaging of samples should be done in a proper manner, indicating the start of each section.
- Soft copies of solutions should not be submitted. (It is noted that there were fewer CDs, DVDs and flash drives submitted this year.)
- Individual mark schemes should be submitted with each sample and these should reflect CXC's assessment criteria.
- Candidates should be encouraged to be creative and their submissions should show individuality. The work submitted for a candidate should be submitted with only that candidate's registration number.
- The use of templates for solutions should be discouraged.

Although there is a reduction in the duplication of samples moderated this year, teachers are advised of the following points taken from the CSEC Information Technology syllabus:

Page 7: Tutors must also monitor candidates' project to determine the veracity of work submitted. Tutors should not accept projects which were not monitored during development.

Page 24: The teacher should use the mark scheme provided by CXC and include any comments pertinent to the conduct of the assessment.

This implies that if teachers observe collusion by candidates or receive samples that are identical, then the teacher must document this on the candidates' samples and award zero marks for the identical components for the candidates involved. The Principal should be notified as it has implications for the candidates of the centre. If, on moderation, candidates' samples are found to be identical, the centre will first be given a warning and zero marks awarded for the identical components. All candidates'

grades will be cancelled from the centre on receiving a second set of samples the following year with this irregularity.

Problem Statement

Some candidates only gave one short line or rewrote the assignment task given or the actual details of the project. Candidates should write at least three or four lines stating what the designed program will do. This section was generally not well done.

Candidates should note that the problem statement should be well defined and should precede the algorithm.

Algorithm

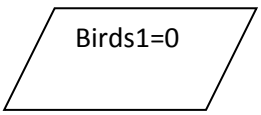
A number of candidates provided identical algorithms and will be penalized by the council.

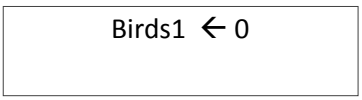
Flowchart

In creating the flowchart, candidates must use the correct symbols, especially input/output and processing. The directional lines should clearly indicate the flow of data (direction) and should not intersect. It is suggested that flowcharts be used if the solution to the task is a simple and short one, to fit on one or two pages.

Specific concerns regarding flowcharts:

- Flow lines need to show direction.
- Correct symbols must be used.
- Decision symbol should indicate whether it represents a loop or conditional statement.
- Decision symbols need to be labelled so as to indicate the next step.
- Input/output symbol should indicate clearly whether data is being accepted or displayed.
- Variables should be initialized when drawing a flow chart;
- Correct symbols and syntax should be used for initializing.

e.g. 

was used rather than 

Pseudocode

- **Definition of variables**
  Most candidates attempted this section but did not complete it correctly. It is suggested that appropriate data types be used with the ones identified in the problem solution and explanation of those variables given where necessary.

- **Initialization of variables**
  The majority of candidates were able to initialize the variables correctly; however, there was little evidence of the array being correctly initialized.

- **Request / storing data**
  The majority of candidates attempted this section and were able to adequately demonstrate the request/storing of data in the pseudocode. Few candidates showed how to store data in the array.

- **Appropriate and logical use of structures**
  - Selection – this construct was well utilized.
  - Looping – many candidates failed to use looping constructs efficiently.

The following are the key concerns regarding pseudocode:

- The use of complete Pascal code for the whole algorithm is not advisable.
- Pascal code and the pseudocode describing the algorithm should be distinct. That is, candidates should avoid submitting the Pascal program code as their algorithm. Algorithms should be done before the Pascal program and should serve as the basis for the development of the actual program code.
- Variable names should be a continuous string; not separated with a space. For example, the instruction ***Read First Name*** should be ***Read FirstName***
- Incorrect representation of control structures; for example,
  IF without END IF,
  FOR without END FOR
  WHILE without END WHILE
- Failure to initialize variables and arrays within the pseudocode.
- Inconsistent variable names as it relates to their use in trace tables.

Trace Table

This section was poorly done by the majority of candidates. This clearly demonstrates that there was a lack of knowledge of developing trace tables. It should be noted that a trace table is **not**:

- the spreadsheet component
- the database component
- a defining diagram or IPO chart
- test data

A trace table is used to test or keep track of the main variables in an algorithm. It is used to test the sequential/logical steps in an algorithm, using the main variables identified, and show the changing values of those variables throughout algorithm execution.

The narrated steps are not needed within the trace table.

Data used to test the variables within the trace table must be robust; that is, the data should test for valid and invalid conditions.

Candidates should be encouraged to submit the test data and the trace table as separate documents within their SBA.

Candidates should submit only a flow chart or pseudocode, as both are **not** required.

Specific areas of concern are as follows:

- Variables incorrectly represented in trace tables. Trace tables should show the exact variables from the algorithm or flow chart to execute the dry run.
- Changes in values should be correctly and adequately demonstrated after the use of test data.
- It is not necessary to include formulae sheets from Excel in the trace table.

Program Implementation

Compilation: Generally, most candidates did not submit evidence of program compilation and output for the program that was submitted. It is recommended that screen shots be submitted along with the sectional components to obtain full marks for this section.

Appropriate data types: This section was well done by most candidates.

Control Structures

- Variable initialization: Many candidates did not perform complete variable initialization, but some variable initialization was done. Candidates should be encouraged to initialize all necessary variables and arrays.
- Sequencing: This section was well done.
- Selection constructs: The majority of the candidates demonstrated that they can use the IF statement, but not correctly (that is, efficiently). Candidates should be encouraged to use IF..THEN and IF..THEN ..ELSE statements in their solutions.
- Looping (Repetition) constructs: Most candidates attempted looping constructs but did not implement these constructs effectively. Approximately 15 per cent of the candidates used only one loop and enclosed the entire program within that loop. It is suggested that candidates use more than one type of loop in the creation of the solution. These may include, for example, *repeat ..until, for*, and *while*.. . In some cases, it was noted that although the loop was used, there was little evidence of arrays being used within the loop.
- Indentation: Many candidates attempted this section.
- User-friendliness: This was well done.

Arrays can be manipulated in various ways including:

- comparison (for example, finding the highest or lowest value)
- calculation (for example, finding averages or total).

Candidates should be encouraged to follow the appropriate format for both selection and repetition constructs by:

- making good use of begin and end pairs
- appropriately terminating constructs
- documenting, which was seen in the work of only a small percentage of the candidates, and is an area of the syllabus in which candidates need to improve
- adhering to CXC guidelines for program documentation, which should include the author of the program, date created, and a simple statement of the task.

CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

JANUARY 2017

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The General Proficiency Information Technology examination is offered in January and May/June each year. There was a candidate entry of approximately 603 in January 2017 and 63.5 per cent of the candidates earned Grades I–III.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem-solving and Programming (Profile 3). The mean score on this paper was 38.22 out of 60.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem-solving and Programming profile. Teachers and coordinators are advised to pay special attention to verification and validation, and to use examples to illustrate the various types.

Section I – Theory

Question 1

This question tested candidates' ability to identify the IT professional who performed specific functions, describe various functions, and sketch the relationship of units found in a computer system.

Most candidates were able to identify the roles of database administrator/administrator and computer technician/technician, although quite a few wrote only administrator or technician. Candidates should be encouraged to learn the correct titles of IT professionals.

While candidates seemed to know the functions of the units, they were not able to adequately articulate them. Most wrote that the 'control unit controls', the 'arithmetic and logic unit carries out mathematical instructions' and the 'central processing unit processes'.

Candidates were able to correctly identify the parts of the unit and show the relationship between them although most of the diagrams were poorly drawn.

Question 2

This question tested candidates' ability to convert data in given number systems to their decimal equivalent.

While most candidates were able to correctly convert the binary number to decimal, many did not show all the steps in the conversion. Candidates should be encouraged to show all working and to use the correct method when practising questions of this type.

Candidates seemed unaware of the octal and hexadecimal number systems and how to perform the conversion. Most candidates, however, were able to correctly perform the conversion to binary coded decimal.

Question 3

This question tested candidates' ability to state the specification for certain components in a computer. This question was well done. Most candidates were able to correctly state the specifications of each of the computer components, although a few incorrectly named SATA as a storage device and hard drive (HDD) as a device interface.

Question 4

This question tested candidates' ability to identify input or output devices that were useful in four situations, draw and label a sector and a track on a diagram, and identify a suitable secondary storage device and device interface for a given description.

While candidates were able to correctly identify a range of input and output devices used for the visually and hearing impaired, there were challenges with identifying devices for flying a simulation program or producing an electronic signature. Candidates need to review devices suited for various purposes such as those stated in the question.

Candidates were able to correctly state the sector and track on the diagram despite the poor illustrations on the diagrams. Teachers need to ensure that students review data storage and access. Candidates also seemed to be unaware of the different device interfaces and thus were unable to identify the appropriate one used to connect internal storage devices.

Question 5

This question tested candidates' ability to identify and describe one example of data or information input and output from a scenario, and to state, with reasons, the type of processing that occurred. Candidates were also tested on another example of automated information processing systems and their advantages.

Candidates seemed unable to identify an example of data or an input device that could be used for the scenario given. The temperature of the heat generated would have been a suitable example of data, and could have been entered using a keyboard, touch pad, or even a thermometer. Most candidates entered many input devices but not those that were suited for the scenario given. They were also unable to identify an example of information produced or a suitable output device. Suitable responses would have been *a warning sound, printed message, or attempts to adjust the temperature if the reactor started to generate too much heat*. Suitable responses for the output device included speaker, monitor and printout.

The majority of candidates gave the correct type of processing and was able to provide another example of an automated information processing system. There were mixed responses for the advantages of using such a system, with *faster, greater storage capacity,* and *efficiency* noted as the more common advantages.

Question 6

This question tested candidates' ability to explain how validation and verification related to a scenario regarding machine- and human-readable documents. Candidates were also tested on file organization structures and their corresponding storage devices.

While few candidates were able to identify the original document as a source document, many were able to correctly state that it was a human-readable document. Again, few candidates were able to correctly state the term for re-entering the data into the system as double entry. However, most candidates were able to name the file organization structure as random, although they were unable to recommend a hard (disk) drive as the storage device *most* suitable to store the data. Candidates were able to correctly explain a validation check, although there were some instances where candidates explained a verification check.

Question 7

This question tested candidates' ability to identify word processing formatting features such as the difference between cut and paste and copy and paste in a given document, and to explain the cause of spelling errors, and the search and replace option.

The question was fairly well done. Candidates were able to give correct responses on formatting features such as *italics, font size, full justification* and *bold*.

Candidates were tested on the number of resulting paragraphs if a particular paragraph were to be cut and pasted in another location compared to being copied and pasted. Some candidates wrote the location of the specific paragraph instead of the final number of paragraphs after the cut or copy process.

Candidates were asked to explain why a word in the document was underlined. Many candidates were not able to state that the word was spelt incorrectly and was therefore flagged. Candidates

were also tested on the search and replace options. The majority of candidates incorrectly tried to explain what took place or just wrote 'cybercrime' instead of giving the response as *cybercrimes crimes* or *cybercrimescrimes*.

Question 8

This question tested candidates' ability to state the primary key and data type of specified fields in a database table, and to write criteria to extract specific records in a database.

This question was satisfactorily done by the majority of candidates, who demonstrated a fair knowledge of database management.

Candidates were tested on their ability to name three data types for the fields used in a table. The majority of candidates provided the correct data types while others confused the data types with variable types in programming such as 'real' instead of *number* or 'currency', and 'string' instead of *text*.

Candidates were also tested on their ability to identify an appropriate field to use as a primary key, which most were able to correctly identify as *barcode*. They were also able to correctly state the appropriate field size and correctly identify the criterion used for a query given.

Candidates were asked to identify the field on which a table was sorted and the order in which it was sorted. The majority of candidates was able to correctly state *barcode* but few were able to correctly identify the order as *descending*. Some candidates wrote alternative responses like Z → A and reverse alphabetical order.

Question 9

This question tested candidates' ability to identify the lines in an algorithm that correspond to its specific terms, complete a trace table and write suitable data types for given variables.

While most candidates were able to correctly identify the line numbers where an assignment statement, output statement, condition and relational operator were located, they were generally unable to indicate the line number for the start of a loop. A few candidates were able to complete the trace table, although many attempted it. The majority of candidates was able to correctly state *integer, char* and *real* as suitable data types for the given variables, although they were unable to correctly state array or recognize that it was not an elementary data type.

Question 10

This question tested candidates' ability to complete a Pascal program using the correct code.
This question was attempted by many candidates who were able to insert the correct code to read in and also output a variable. However many candidates incorrectly stated 'programme' or 'algorithm' instead of *Program* as the header for the Pascal program.

Question 11

This question tested candidates' ability to identify programming language generations and their generic names, identify and correct errors in a fragment of code, and state the technical term associated with a set of descriptions.

A few candidates were able to correctly state the programming language as first generation and identify their generic names as *assembly* and *machine* languages. They were also able to identify and correct the error in the given code. However, many were unable to state the technical terms *debugging, syntax errors* and *compiling code* based on the descriptions. Candidates were able to rewrite the code using the required instructions but others rewrote the code using the incorrect programming language instructions.

While candidates seemed to know the output from the instructions, they did not *state* the result as required in the question, but *explained* what should be output or what the instructions required the user to output.

Question 12

The question tested candidates' ability to identify and explain the purpose of some elements of a Pascal array.

The question was fairly well done. Candidates were able to correctly state the size and data type of the array. Most were able to indicate which row of the array represented its index. However, few candidates were able to explain the meaning of the values in a specific column of the array.

Paper 032 – Alternative to School-Based Assessment (SBA)

This paper is the alternative to the SBA and consisted of four questions testing the Productivity Tools, and Problem-solving and Programming profiles.

Question 1 – Word Processing

This question provided a notice that candidates referred to in order to identify formatting features and aspects of the notice that could have been imported from another application. Candidates were also required to describe the steps to insert a graphic at a particular location on the notice.

The question was generally well done. Candidates seemed to be challenged by the word *feature*. It is suggested that teachers point out the different types of word processing features. Additionally, some candidates struggled with identifying *word wrap* and a footnote in the document. Candidates seemed not to be able to recognize the difference between a footnote and footer.

Question 2 – Spreadsheet

This question tested candidates' ability to identify and justify the use of a chart, create a worksheet of the data that was used to create the chart, explain formatting features and write functions used to extract results.

This question tested candidates' knowledge of the various features of a spreadsheet application. The question was based on the chart provided.

In Part (a), the majority of candidates were able to name the type of chart illustrated in the question. For Part (b), candidates were able to name another type of chart that was not appropriate for representing the data but not all of them were able to give a proper explanation.

In Part (c), many candidates were able to name the char, and *x*- and *y*-axes titles, although a number of them wrote *viruses* for the *y*-axis instead of '*sources of viruses'*. For Part (d), many candidates inaccurately transferred the data from the chart to the spreadsheet. Some wrote the data in reverse order, exchanging the data in the *x*-axis and *y*-axis.

In Part (e), many candidates were able to name the right function (SUM) but gave inaccurate addresses. For Part (f), the majority of candidates were not able to explain how to format a cell for currency.

In Part (g), most candidates were able to state the two functions as *Min* and *Count* or *Counta* but were unable to identify the correct results. Some candidates incorrectly wrote '6' as the result for Count instead of *3*. Part (h) was fairly well done. Some candidates wrote the number instead of *Internet* that would be at the top of the list.

In Part (i), many candidates had difficulty writing down the requirements of a criterion for filtering data. Some attention should be paid to teaching this topic. Many candidates also wrote $400 instead of *400* for the criteria.

Some candidates understood how to obtain the results of the criterion, and responded appropriately to Part (i), although it seems that many did not understand the concept as they failed to provide a response. The majority of candidates entered the results for 2015 only.

Question 3 – Database Management

This question comprised two database tables to test candidates' ability to state the number of records in a table, identify data types, justify the suitability of a field as a primary key, write queries, and identify parts of a report.

Candidates were able to correctly state the number of records and fields in the table for Part (a). In Part (b), although most candidates were able to identify the data type and size of the PC_NUM field, they were unable to correctly complete the Frequency or Repair Cost fields.

In Part (c), the majority of candidates were able to correctly state why the ID field was not a suitable primary key and recommended PC_NUM as the field that would be most appropriate for the primary key. For Part (d), most candidates were able to correctly write a simple and complex query, but had difficulty writing a calculated query. Many candidates were unable to convert 5 per cent to 0.05 in the calculated query and instead wrote 0.5 or 5.

In Part (e), most candidates were able to correctly write the labels Repair Code, Internet and Sum in the appropriate locations.

Question 4 – Problem-solving and Programming

This question tested candidates' ability to reorder a list to show the steps in selecting a solution to a problem, identify the generation and level of programming language in a set of examples, identify symbols and justify the existence of the characteristics of a flow chart, and complete a trace table.

In Part (a), many candidates were able to indicate the statement to correctly define the problem, test and validate the solution. Many were unable to correctly identify the statements corresponding to proposing a solution or selecting the most efficient solution.

For Part (b), few candidates were able to correctly state the programming language generation and level, for most examples. Others wrote the level in the column for the generation, suggesting that teachers may need to review this topic using a variety of examples.

In Part (c), most candidates were able to correctly state whether the flow chart given contained certain symbols. However, there were mixed responses on whether the flow chart given represented the characteristics of an algorithm. Many candidates were able to correctly complete the trace table while others did not use the flow chart to derive the results required in the trace table. The majority of those who were able to complete the trace table seemed able to write the fragment of code using the IF-THEN-ELSE statement.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2017

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The General Proficiency Information Technology examination is offered in January and May/June each year. There was a candidate entry of approximately 23 500 in May/June 2017 and approximately 88 per cent of the candidates earned Grades I–III. The mean score for the examination was approximately 62 per cent.

DETAILED COMMENTS

Paper 01 — Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem Solving and Programming (Profile 3). Performance on Profile 1 was higher than that of 2016 with a mean score of 50.5 compared with 40.7 for 2016.

Paper 02 — Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem Solving and Programming profile.

Section I – Theory

Question 1

This question tested candidates' ability to identify input and output devices from a given list. They were also required to write the path to locate files in the folder and then state the number of files remaining, if files were copied onto another folder.

Most candidates seemed to know the differences between input and output devices and thus were able to select the appropriate devices form the set given. Very few students, however, seemed familiar with microfilm and plotter and placed these two in the incorrect group. Several students also included the light-pen and optical reader as a form of printer.

Most candidates were not able to differentiate between a file and a folder. They also found it a challenge to write the path correctly. The majority of responses explained how the path is reached instead of using the path syntax such as c:\SBA\Finished. Candidates also seemed unable to distinguish between copy and cut, and therefore had issues with copying a file to an alternate location and the number of files remaining in the original directory/location.

Question 2

This question tested candidates' ability to state the most appropriate terms for each example of data manipulation or storage method. It also tested candidates' ability to calculate the ASCII code for a letter.

Candidates were first asked to identify the method of data storage or manipulation rather than completing steps according to a method. Candidates recognized the grouping of digits

but, in some cases, were not able to write the correct term as BCD. In most cases, candidates correctly identified the binary and octal representations correctly. However, many did not know two's complement and instead stated one's complement.

Most candidates were able to find the ASCII for the letter D. However, others were unable to show the steps of conversion using ASCII. Candidates need to be reminded of the steps including deriving the placement of the letters in the alphabet to find the number of letters between them, then converting the number to binary and also choosing whether to add or subtract depending on what the question is asking. Some candidates derived the correct ASCII code by continuously adding 1 from C until they reached H.

Question 3

This question tested candidates' ability to complete a table by stating the most suitable term for each description of specific use of the Internet and data communications.

Most of the candidates demonstrated good understanding of the key concepts associated with Internet-related terms. Some candidates confused upload and podcast. More focus is needed on teaching students about podcasts, bulletin boards, VOIP and FTP. Some candidates seemed unaware that *Voice over Internet Protocol* was one term, and wrote '*Voice Over*' as one answer, and *Internet Protocol* for another.

Question 4

This question tested candidates' ability to identify security measures and types of restrictions represented by three images.

Candidates seemed to have understood the types of restrictions more than the security measures. The image of the encrypted document seemed to be most difficult. A common example of incorrect answers regarding one security measure included *fingerprint* as opposed to *fingerprint scanning* or *fingerprint recognition*. Some candidates inaccurately identified *encryption* to represent *code* or *coding*. Teachers are encouraged to explain and/or demonstrate the differences between the two concepts.

Emphasis also needs to be placed on differentiating among Back up, Recovery and Archiving.

Question 5

This question tested candidates' ability to explain the characteristics of online and real-time processing modes, as well as specify the most applicable processing mode for a set of scenarios.

This question sought to extract candidates' understanding of the basics in Data Processing technology and techniques. However, the majority of them seemed not to be able to differentiate between online and real-time. Candidates seemed to confuse the responses or not read the instructions carefully.

Question 6

This question tested candidates' knowledge of data entry checks based on entering data from a paper-based form to a computer-based form.

While most students were able to provide an example, and identify each type of data check, the challenge seemed to be an inability to explain how the data check worked, especially for the consistency/inconsistency check. It is advised that teachers provide students with scenarios to identify and describe the checks.

Question 7

This question tested candidates' knowledge of basic features of a spreadsheet, more specifically the reasoning for the display of some formatted values in a cell, and determining which cells would be updated if one value in the sheet was changed.

This question was well done by most candidates. However, some candidates seemed unaware on how to properly explain number formatting in Excel. Most candidates recognized that the cells were either not formatted for percentages or that the values were so small that they were expressed as decimals. Some candidates did not realise that a formula copied across a column affects only the row and not the column.

Question 8

This question tested candidates' knowledge of the basic features of a database. More specifically, identifying the number of records in a table, the appropriate field that could be used as a primary key, data types, sorting, criteria used and the resulting number of records output from a query.

Many candidates were accustomed to the use of ID or CODE as a primary key and not based on the uniqueness of a field across records. Thus, a few candidates were unable to select

SchoolName as a primary key. Many candidates also wrote the result of the query and not the actual criterion when required.

Question 9

This question tested candidates' ability to identify an error in a series of codes, explain the process of debugging, complete a truth table, and draw a flowchart.

The majority of candidates were able to successfully respond to this question. In Part (a), most candidates correctly identified the error in the code. A few candidates wrote that the phone number should have 10 digits without specifying that the error in the given phone number was that it had only 8 digits.

In Part (b), a few candidates wrote *syntax error* or *compiling* instead of debugging as the process that locates and fixes errors in code.

In Part (c), several candidates simply put a *Yes, No, Yes, No* pattern of responses to complete the Truth Table, without much thought on the requirements of the question.

For Part (d), candidates showed significant improvement in attempting the flowchart. They demonstrated that they knew the symbols but seemed to be confused with what statements were applicable to the appropriate symbol. The Decision symbol was included in many responses. A few candidates were unclear as to the structure of the flowchart and its symbols. For example, they used the incorrect symbols to perform the input/output operation, or did not label the alternative YES/NO or TRUE/FALSE flow lines. Others interchanged the processing symbol with the input/output symbol, or the associated information required for each.

Question 10

This question tested candidates' ability to identify the index location or contents of an array, as well as write Pascal code to declare and initialise an array, and print the contents of the array at a particular location.

Arrays continue to prove challenging for students and teachers need to place emphasis on this topic. Most candidates were only able to correctly identify the index location for a specific value, and the value found at another index location. They also had difficulty in writing Pascal code to declare an array and initialise the array to 0.

Few candidates were able to get full marks for declaring an array. Many mixed up the order of the statement or chose the wrong size and/or data type. They did not show the use of a loop to initialize the array. Some repeated parts of the declaration.

Many candidates were also unable to write Pascal code to print the value in an array location. Some used Print instead of Write or Writeln.

Question 11

This question tested candidates' ability identify aspects of a fragment of Pascal code.

Part (a) was correctly assessed by most candidates, with the popular response being *while loop* for the type of loop used in the pseudocode.

In Part (b), many candidates seemed unsure of the term *relational operator* and gave a variety of incorrect responses including, *semicolon*, ***, *write*, *:=*, and areacode. Some candidates treated the equal sign (=) and the assignment operator (:=) as having the same meaning.

In Part (c), many candidates wrote *integer* not realizing that currency (money) can carry decimal places. Some candidates identified INTEGER as the data type, where others identified data types from productivity tools such as CURRENCY and NUMBER. Others seem to have been confused between the 'Real' and 'Integer' data types.

In Part (d), many candidates seemed to visually know where the cursor would be located but could not express this in their responses. Others identified the location relative to the program itself such as *at the WHILE* or *after the semicolon*.

Part (e) was answered well by a few candidates. Most wrote responses such as *generates an error*, *program ends* or *876*, while others wrote the line of Pascal code instead of the result that would be output.

Question 12

This question tested candidates' ability to state the purpose of a fragment of Pascal code, and complete a trace table.

The trace table was attempted by the majority of candidates and, in several instances, they had difficulties in tracing the code to find the output for the money [index]. Incorrect values were written by many candidates. A few correctly completed the first four lines but did not process the code correctly for the final two values.

Part (b) was answered well by the majority of candidates who were able to correctly state the purpose of the code on a given line.

Part (c) was also correctly answered by most candidates. However, several instances of *syntax error* and *run-time error* were seen.

Part (d) was incorrectly answered by the majority of candidates. Several did not state that the value was in an array location identified by the variable index. Many candidates identified the symbol '<>' incorrectly as *greater than and less than* as they seemingly did not know that it meant *not equal to*.

Paper 03 — School-Based Assessment

Syllabus Guidelines

Teachers are strongly urged to strictly adhere to CXC's mark scheme as provided in the syllabus. The assignment details and completed mark schemes should also be uploaded.

Word Processing

Most students used most of the formatting features except page numbering and superscript and/or subscript. In many cases, students included only one page layout feature. More features can be included in the document.

Tables were not used correctly in many submissions. Students used text boxes or the tab key to align their information and lost marks. Columns were rarely used and again were replaced with text boxes and the use of the tab key. Columns must be used correctly to gain maximum marks. Most students inserted graphics but few inserted or imported charts.

Most students did not gain the maximum marks for the mail merge because DATASOURCE was not shown or included in the documents that were uploaded. In other instances, the primary document or merged letters were absent. The data source, primary document and merged letters must be included and uploaded to gain the maximum marks for the mail merge.

Spreadsheet

It would be helpful if worksheets were labelled with text boxes or otherwise to suggest what is being shown and to make it clear to the moderator what is being demonstrated.

It is also recommended that a single spreadsheet workbook be submitted with several worksheets instead of multiple workbooks containing single sheets.

Most samples demonstrated the requirements outlined by making use of formatting features for both text and numeric data, formulae functions and graph construction.

There are still instances, however, where the samples do not include a before and after worksheet to demonstrate insertion and deletion of rows and columns.

Advanced filter using criteria extraction was hardly seen in many samples, but instead the use of simple filtering of the data in place was used.

Many bar and column graphs did not include suitable titles or horizontal and vertical axes' labels but marks were awarded on the mark scheme by the teacher.

The majority of samples also did not make use of wrap text or cell merging as a part of the layout of data.

Database Management

Teachers at some centres are re-using the same SBA project each year without modification, and therefore students lose marks at the moderation stage for the same issues.

When recording the marks, teachers **must** submit a breakdown of **all** marks given with the Marking scheme. Marks should be accurately recorded in the Moderation form and half marks are not allowed.

It is not known whether the teachers may be directing students to use specific formats. However, in some cases, the students used sequences such as 100667, 101667, 102667, etcetera. If there are five tables, then all five of them are typically in the same order or sequence, hence there is no indication of a sort. In many cases, the IDs and the first & last names in the table(s) follow the same sequence, that is, A - Z, small to large.

In most cases, there is no evidence of addition or deletion of records or fields. In these instances, two tables are required for comparison.

In the majority of samples, text fields in tables remained at 255 characters. Teachers are reminded that this is a waste of memory and makes the database inefficient. This also affects the database reports where it can cause the last field of the report to 'disappear' because the text fields are taking up too much space for a typical letter-sized orientation.

In many samples, students seemed not to know how to create the relationship (link) between common fields in two tables, and also to make use of referential integrity. A related problem

is the absence of primary keys, or too many primary keys which results in 1:1 relationships. In a few cases, some students created as many as three relationships (links) between two tables, without any primary keys. There were also some cases where primary keys were added to tables but described as foreign keys.

In many samples, the questions included more than the recommended four queries, yet none of the queries required the use of more than one table. However, the students were given the full three marks for using three tables in a query. Again, in some samples, with many queries completed, none of them included a calculated field; and in other cases, with as many as seven queries, none of them required the use of a complex criterion.

For the reports, several teachers gave the students full marks, yet in some samples, there was no sort and in other samples, no summary data was present. In many samples, there was no evidence of the students specifically formatting or adjusting the title.

Problem Solving and Programming

Many students demonstrated consistency in developing their algorithms. They also showed evidence of problem definition, initialization, use of variables, control structures, and program sequencing. There was evidence that more students are attempting to translate the algorithm to Pascal code, and more students are including their trace tables. Teachers should remember to create a problem solving and programming component from the project description that is sufficient to develop the concepts as described from the syllabus.

However, there are still too many non-submissions of this component and evidence of students submitting pseudocode for the Pascal code. With regard to the Pascal programs, many samples did not show evidence of at least two different types of loops, no evidence of an if-the-else construct, or evidence of the use of arrays. There was also no test data or evidence that the program had compiled successfully.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MAY/JUNE 2018

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

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GENERAL COMMENTS

The General Proficiency Information Technology examination is offered in January and May/June each year. There was a candidate entry of approximately 24 265 in May/June 2018 and approximately 90.7 per cent of the candidates earned Grades I–III.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Thirty questions tested Theory (Profile 1); 15 questions tested Productivity Tools (Profile 2) and 15 questions tested Problem-Solving and Programming (Profile 3). Performance on Paper 01 was consistent with that of 2017 with a mean score of 36.23 compared with 36.78 for 2017.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured response questions. Section I consisted of six questions worth 60 marks and tested the Theory profile. Section II consisted of two questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four questions worth 45 marks and tested the Problem-Solving and Programming profile.

Section I – Theory

Question 1

This question tested candidates' ability to identify suitable examples of software applications based on a scenario, and to provide advantages and disadvantages for using two hardware devices while travelling.

In Part (a), some candidates wrote examples of either application software or system software that were unrelated to the scenario.

In Part (b), most candidates lacked knowledge about the process that involves the transmission of data and the devices used to transmit the data. Their responses seemed to suggest that telecommunication only dealt with chatting (video or voice) over the Internet and no other type of data transfer or media. Some candidates also confused telecommunication with telecommuting.

In Part (c), most candidates seemed to have a good understanding of the advantages and disadvantages of using laptop computers and mobile devices, but many responses were unrelated to the scenario. In Part (d), a majority of candidates were able to explain the processes involved in printing a document from a mobile device.

Teachers are encouraged to provide more activities involving the key terms in the section on the application and implications of ICT, so that students can become aware of how they are used in ICT.

Question 2

This question tested candidates' ability to provide examples of hardware interfaces, and to recommend various specifications of computer devices for a series of scenarios.

Many candidates seemed not to be able to distinguish between a hardware user interface and a software-based user interface. Their responses also incorrectly suggested that most input devices are hardware user interfaces. For example, some candidates stated keyboard instead of Braille keyboard as a hardware user interface. Candidates also incorrectly listed different types of connector interfaces such as SATA and IDE but not hardware interface examples as required. However, they displayed a good understanding of the terms involved in computer specifications.

Question 3

This question tested candidates' ability to identify the most suitable device used to capture data from a set of three illustrations and to provide an example of data that is captured.

Most candidates were able to correctly identify the device used in the first image as a barcode reader; however, a majority incorrectly suggested that the price of the item was an example of data captured. Many were also able to correctly identify OMR as the second device, but others incorrectly stated OCR as the device. Again, many incorrectly described the data captured by the device. Only a few candidates were able to correctly identify the image as MICR, and therefore many could not describe the type of data captured by the device, providing responses that ranged from binary coded data, hexadecimal data to encrypted data.

While some candidates could identify the OMR and MICR, they could not state what they were used for, while others stated where they could be used but not examples of data that would be captured. A few candidates stated that they never saw an MICR and had no idea what it was. It is recommended that teachers provided exercises that help students to understand the purpose of various input devices, whether outdated or current.

Question 4

This question provided candidates with a diagram comprising decimal, binary and hexadecimal representations of three characters. Candidates were required to write various representations in required areas of the diagram. They were also required to shade in appropriate circles that corresponded with a set of decimal digits in order to represent the time on a digital clock.

In Part (a), the majority of candidates was able to correctly determine the hexadecimal number, while a few were able to calculate the binary number. Many candidates seemed not to understand that they were to count the number of letters *between* 'I' and 'M' and hence

they included M, resulting in an answer of 4 and not 3. Few candidates were able to derive the decimal number in the last part of the question.

In Part (b), most candidates were able to represent the conversion of the time to BCD on the diagram provided.

Question 5

This question tested candidates' ability to determine the input, output and hardware devices used, based on an sketch of an online game, and to the most suitable network terms in order to complete four statements relating to the scenario.

The question was well done by most candidates. In Part (a), most candidates correctly stated mouse and keyboard as examples of input devices, and listed speakers and monitor as suitable output devices. However, only a few candidates correctly identified touchscreen monitor as a hardware interface while others incorrectly stated GUI.

Most candidates applied their general knowledge of gaming applications and communicated effective responses for Part (b). They mentioned the use of sound, vibration, changing colours, and a screen notification to suggest that the user was gaining points in the game.

In Part (c), many candidates selected on-line processing as the processing mode, which suggested that they could not differentiate between the characteristics of real-time processing and on-line processing. For the Internet protocol, VoIP was the popular and correct response. Many candidates did not state backup as a method of data security, but wrote copy, encryption and saving as a means of securing the data in case the computer crashed. Most candidates stated Wi-Fi and Bluetooth, with a few stating WLAN and hotspot as other correct responses for wireless communication methods.

Question 6

This question tested candidates' ability to determine the most suitable validation checks used in online banking when transferring money from one account to another.

Candidates seemed to have general knowledge of the terms associated with different validation checks.

Part (a) was satisfactorily done. Many candidates provided the correct field and explanation for the three validation checks. However, the consistency check was challenging for some candidates who were unable to provide the correct fields or reason to justify the validation check.

In Part (b), candidates seemed not to have based their responses on the information in the scenario. Instead they provided general responses. A few candidates were able to provide a reasonable explanation for the error while others were unable to provide two factors for errors caused by the technology or by customers.

It is recommended that teachers make use of everyday scenarios to bring clarity to the meaning of the various validation checks, and provide examples where students can determine which validation checks are most suitable.

Question 7

This question tested candidates' knowledge of the basic features of a spreadsheet, more specifically identifying functions used in a spreadsheet, writing the IF statement as well as the range of cells required for a chart.

The question was satisfactorily done. Many candidates were able to provide the sum and average functions, while a few wrote Total, Add and AVG as the function.

Part (b) required candidates to write an IF function. It was poorly done. Many candidates were unable to provide a syntactically correct function, and instead wrote the function using pseudocode.

Part (c) required candidates to state a range of cells required for a chart. Many candidates were able to provide only part of the range, but did not understand the range needed for the first two columns (A2:B7). Candidates should be encouraged to practise writing the proper selection of ranges as well as the accurate format for cell references. For example, A2-7 is not a valid range nor is A2-A7, while A2:A7 or A2.A7 are correct ranges. Also, the heading of the column of data should be included in the range selected.

Question 8

The question tested candidates' knowledge of basic features of a database containing data related to schedules for four flights. Candidates were required to identify the primary key field, size of a field, the result of a query, and the order in which records were sorted.

Part (a) was correctly answered by the majority of candidates. Incorrect responses such as TEXT for the data types were mostly provided for the DEPARTURE and ON TIME fields. In Part (b), most candidates were able to correctly state the primary key field, as well as a suitable size for the FLIGHT field in Part (c), although a few gave smaller or larger field sizes. In Part (d), most candidates only stated one or two fields in the record though they were required to state all three fields in the record.

In Part (e), many candidates correctly identified the sort field and order. However, some suggested FLIGHT as the field used for the sort and seemed to confuse the ascending and descending sort order. Some candidates preferred to state a.m. to p.m., or morning to evening as opposed to ascending. It is recommended that teachers provide examples so that candidates have a clear understanding of ascending vs descending and the difference between field and record.

Question 9

The question tested candidates' ability to complete a trace table based on a sequence of statements; and then to write an IF statement using pseudocode.

Part (a) was satisfactorily done, as many candidates were able to complete the table correctly, accurately showing the calculations, or stating the correct number of points for each step in the table.

Part (b) required candidates to write an IF statement using pseudocode. Many candidates provided the correct pseudocode. However, some candidates were unable to correctly construct the statement. For example, some were unable to create the condition required for the IF statement while others wrote 'add 10' but did not specify to *add 10 points* in the THEN segment.

Question 10

This question tested candidates' ability to identify a programming language along with terminology associated with the translation of a programming language. It also examined candidates' ability to identify and correct an error in a programming language instruction.

This question proved challenging for some candidates. In Part (a), they were unable to identify the programming language used in the sample as second generation. In Part (b), candidates were unable to distinguish between the assembly language and machine language and wrote 'binary' as the generic name for the programming language.

In Part (c) (i), candidates were able to correctly identify *JNP* as the error, while in Part (c) (ii), some candidates incorrectly wrote 'logical error' instead of *syntax error* when identifying the error in the instruction. In Part (c) (iii), most candidates were able to correctly replace *JNP* with *JMP* when correcting the error, while in Part (c) (iv), most candidates seemed not to realize that debugging was the term required when locating the error in the program.

In Part (d) (i), many candidates did not state *source code* as the general name given to the original set of code, but a few instead wrote 'instructions'. In Part (d) (ii), candidates were unable to correctly identify compiling or interpreting as the type of translation that produced the output of the program. Some candidates mentioned 'object codes'. In Part (d) (iii), candidates correctly provided a wide range of programming languages, including Pascal, Java, FORTRAN, C, while others did not give the example but wrote 'high level programming language'.

Question 11

This question tested candidates' ability to identify a set of statements as input, processing, output, or storage, and then to sketch a flow chart for a control structure.

This question was somewhat challenging for candidates.

Part (a) was done well since most candidates were able to correctly state whether each operation was input, processing, output, or storage. However, Part (b) required candidates to sketch a flow chart. Many candidates found it challenging to complete the flowchart correctly. The symbols were mostly not drawn properly as the lines were not straight, and in most cases it could not be determined whether a symbol was a process, or for input/output. Many candidates also did not know when to draw or identify a loop in a flow chart. Others were not familiar with representing an algorithm using a flow chart. A few seemed to have no knowledge of the symbols or what the symbols represented. Others attempted to write pseudocode. It is recommended that teachers continue to use activities that help students to identify the meaning of the symbols, and encourage students to practise drawing flow charts.

Question 12

This question tested candidates' ability to write a sequence of steps required to move from one location to another given an outline of an office with internal walls, and to write a complete Pascal program based on a given algorithm.

It was encouraging that more candidates seemed to have attempted the programming part of this question.

Part (a) required candidates to write a sequence of instructions required to move from one location in the office to another location. The terms to be used were Start, Stop, Left, Right, Up, Down. However, many candidates described the instructions using sentences, and very often they did not use the specific terms. START was often included in the sequence but not STOP. A few candidates exchanged the left and right terms, while others used the numbers in the diagram or sketched flow charts.

In Part (b), candidates did not write programming code as requested in the instructions. Instead they wrote pseudocode or even drew flow charts. However, the proper structure was still lacking for many of those candidates who wrote their solution in Pascal.

The following points illustrate the typical programming errors that were made by a majority of candidates:

- Program Maze was often written as Program Name Maze or Program: Maze
- Candidates did not use boolean as a data type but instead declared the variable as string.
- Instead of the Begin/End keywords, candidates wrote Begin/Stop or Start/Stop.
- Candidates did not include DO as part of the WHILE DO syntax.
- Candidates were not placing begin/end keywords in the while loop.
- The assignment statement (:=) was often used but the equal sign (=) was also used without the associated colon (:).
- In many cases candidates wrote 'not equal to' instead of the symbol < >.
- Write/Writeln was not used in required locations but was used anywhere in the program. For example, Writeln While..., or Writeln step:=
- In some cases Readln was used incorrectly instead of Writeln.

It is recommended that teachers provide simple exercises showing the difference between pseudocode and programming language code, and ensure that students understand the various constructs, including the use of the Begin/End keywords for compound statements. It is also recommended that exercises be given to help candidates recognize the use of various relational operators.

Paper 03 — School-Based Assessment

This was the second year in which SBAs were uploaded to the RM for moderation. Unfortunately, there were too many submissions that comprised *only* the cover page, mark scheme or description of the assessment, with **no** submission of the student's work for moderation. The Council has made every effort to notify centres to submit the students' SBAs, and this cannot continue. Centres are asked to ensure that students' samples are uploaded along with the mark scheme.

The files for the four components should not be designed to become very large files, and therefore teachers are asked to be aware of the content generated when they create the assessments. It is recommended that they complete the SBA in order to determine whether the final files are within the required limit for upload.

It is advised that files for each component (WP, SS, DB, PSP) be placed in a separate folder. All folders should then be zipped and placed into one folder using the naming format provided by the Council. Some samples that were compressed using WINRAR were often corrupt on download, and therefore that option should not be used. The compressed option using the Windows OS can be used (right-click on the folder; select **Send To**; select **Compressed (Zip) Folder**).