

**CARIBBEAN EXAMINATIONS COUNCIL**

**REPORT ON CANDIDATES' WORK IN THE  
CARIBBEAN ADVANCED PROFICIENCY EXAMINATION®**

**MAY/JUNE 2014**

**INFORMATION TECHNOLOGY**

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## GENERAL COMMENTS

This year, approximately 1 190 candidates wrote the Unit 1 examination compared with 1070 in 2013. Performance in 2014 was consistent with that of 2013 — 91 per cent of the candidates achieved acceptable grades compared with 90 per cent in 2013. In Unit 2, approximately 620 candidates wrote the examination compared with 650 in 2013. Of these, 95 per cent achieved acceptable grades compared with 88 per cent in 2012.

While candidates' performance on both units was satisfactory, there were questions where performance was below the required standard. These included questions which tested candidates understanding of qualitative and quantitative data and information sources in Unit 1 and in Unit 2, the data management concepts used in databases.

## DETAILED COMMENTS

### UNIT 1

#### Paper 01 – Multiple Choice

The paper comprised 45 items, 15 items per module. Most candidates performed satisfactorily; marks ranged from 9 to 44 and the mean was 57.69 per cent.

#### Paper 02 – Structured Questions

The paper consisted of nine compulsory questions, three questions per module. The maximum score was 104 out of 150. The mean was 31.47 per cent compared with 32.59 per cent in 2013.

### Section I: Fundamentals of Information Technology

#### Question 1

This question assessed candidates' ability to distinguish between key terms in manual and automated information systems. The mean mark was 2.23 out of 15.

The majority of candidates experienced challenges with Part (a) where they were expected to list corresponding steps in manual and automated information systems and then describe negative impacts of an automated information system (AIS). In Part (b), candidates were asked to identify the type of AIS described in a scenario and outline an advantage and a disadvantage of the identified AIS. The majority of candidates correctly identified the AIS described but candidates struggled to outline one advantage or disadvantage of the AIS.

#### **Recommendations**

Candidates should be able to identify corresponding phases of the two processes. Candidates should also be able to identify and discuss different types of AIS. In addition, candidates preparing for the examination should use the glossary provided in the syllabus to become familiar with terms used in

constructing questions. This would provide assistance in determining the quality of response expected.

### Question 2

This question assessed candidates' understanding of the characteristics of data and information, knowledge of the characteristics of information sources, and the identification and function of tools used in data collection. The mean mark was 5.25 out of 15.

In Part (a), instead of discussing issues that may affect the quality of the data collected using online questionnaires, many candidates outlined issues with using questionnaires in general. Other candidates only stated the issue that may affect the quality of the data but did not discuss its effect or impact.

In Part (b), candidates were provided with stimulus that presented a real world situation from which they were to extract examples of qualitative and quantitative data. The responses of some candidates suggested that they confused the terms qualitative and quantitative data.

### **Recommendations to Teachers**

Teachers should explore scenarios where qualitative and quantitative data are used and work with students to identify and discuss these different types of data. Teachers should also highlight data quality issues associated with the use of different data collection instruments.

### Question 3

This question assessed candidates' understanding of electronic sources of information available on the Internet and examined the tools used to retrieve and store information online. The mean mark was 6.10 out of 20.

Part (a), which required candidates to list electronic sources of information, was generally well answered by candidates. However, in Part (b) (i), candidates misinterpreted the question and gave responses which related to the characteristics of information rather than the sources themselves. When responding to Part (b) (ii), candidates gave general responses such as 'in case of a natural disaster' but failed to mention the key term *backup*.

In Part (c), candidates failed to differentiate between the mailing list and mailing in general. The term 'manual post office' was mentioned on more than one occasion as well as one word responses such as cost, quick and faster, without sufficient explanation.

### **Recommendations to Teachers**

Teachers should utilize the glossary to help students identify and use IT terms correctly in responding to practice questions.

## Section II: Information Technology Systems

### Question 4

This question assessed candidates' knowledge and understanding of the operating system and open source software. The mean mark was 4.23 out of 15.

In Part (a), candidates were expected to list three types of operating systems (OS) and discuss three functions of the OS. Most candidates were able to identify at least two types of operating systems. Candidates could not be awarded marks for listing types of application software, versions of the Windows operating system or listing the components of the Central Processing Unit. Part a (ii) presented some challenges as candidates were unable to clearly identify the functions of the operating system and lost marks for vaguely identifying the functions of the OS.

In Part (b), most candidates were unable to list types of open source software and instead listed antivirus software as an example of open source software. Other candidates misinterpreted the question and gave varying types of Management Information Systems (MIS).

In addition, while most candidates were able to state at least one benefit of the software, responses were incomplete and hence full marks could not be awarded.

### **Recommendations to Teachers**

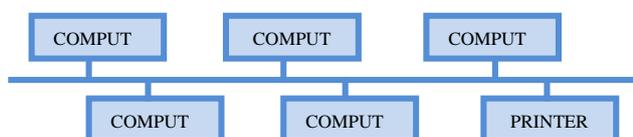
Students must be encouraged to read all questions thoroughly, paying special attention to key words and phrases in an effort to understand the requirements of the question. Teachers should incorporate more student-centred approaches to ensure that students understand and retain the knowledge learnt.

### Question 5

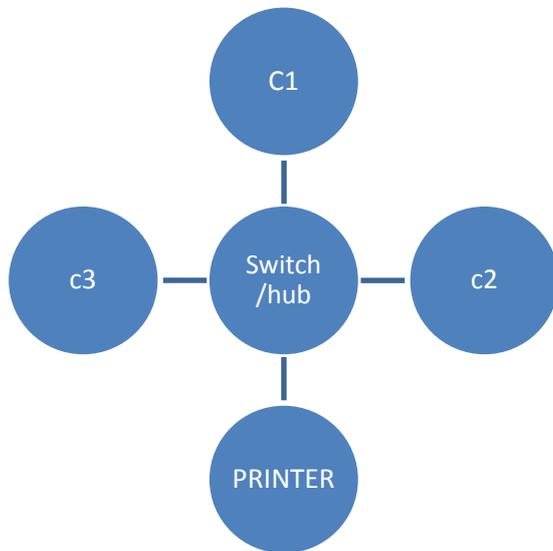
This question assessed candidates' understanding of the purpose of computer networks. It also tested their ability to differentiate between the different network topologies and to apply that knowledge to a given situation. The mean mark was 6.42 out of 15.

Responses to Part (a) were unsatisfactory. Many candidates were unable to give three clear responses with suitable explanations. The most common answers given were resource sharing and communication; some candidates were able to show the relationship between sharing hardware and cost. It was noted that many candidates repeated themselves and gave three examples that illustrated either resource sharing or communication/transfer of data.

Responses to Part (b) (i) were generally satisfactory. However, when illustrating the bus network, many candidates did not clearly show that the computers were separate from the backbone. They also did not label the diagram properly to show the individual nodes and printer attached to the backbone.

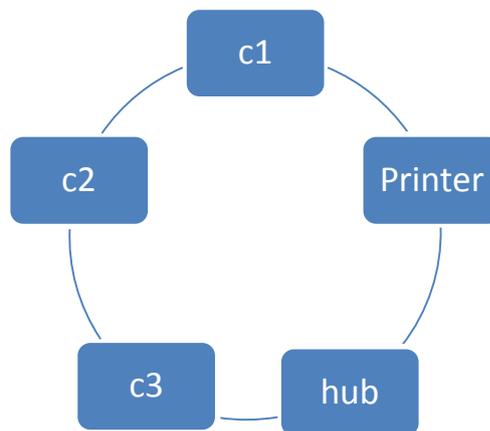


In drawing the star network, some candidates either labelled the diagram incorrectly or did not label it to reflect the given situation. The printer was also placed as the central hub of the network instead of as a node attached to the network.



Part (b) (ii) was very well done. The majority of candidates correctly identified that the computers were not directly connected to each other, but to a central node called a hub or switch, to prevent the network from failing in the event of one computer or cable malfunctioning.

In Part (b) (iii), the majority of candidates illustrated the ring network. Most who drew the ring, however, failed to label the diagram or did not state that data travelled in one direction in the ring network.



### Recommendations to Teachers

Teachers should work with students, carefully identifying different network topologies. Further, students should be able to identify a particular topology for a given scenario.

### Question 6

This question was designed to assess candidates' understanding of the systems development life cycle (SDLC) and the tools used during the stages of the SDLC. The question also assessed candidates understanding of the World Wide Web (WWW). The mean mark was 7.37 out of 20.

Some of the candidates who attempted Part (a) (i) lost marks for not correctly stating the order of the steps or for excluding critical steps. Further, some candidates stated the advantage without providing enough information to support their response or compared the interview to the questionnaire although the questionnaire was never a part of the question.

For Part (b), some candidates lost marks because they merely stated the description of what a prototype is and not the benefit of using it.

Part (c) was poorly done as candidates were unable to identify and describe client and server software for the WWW. Candidates who attempted this part of the question lost marks because they gave examples of protocols instead of software, described common IT terms which are not related to software or gave examples of URLs and hardware.

### **Recommendation to Teachers**

Teachers need to assist students in developing a clear understanding of the different tools used during the SDLC and the appropriateness of these tools. The concepts related to the WWW should also be emphasized.

## **Section III: Information and Problem Solving**

### Question 7

This question assessed candidates' understanding of the problem solving process as well as refereed sources of information. The mean mark was 3.76 out of 15.

In Part (a) (i), candidates gave incorrect responses such as the first and the last steps in an algorithm or the system development life cycle or simply 'start' and 'stop' or 'planning and testing'. It was evident that some candidates confused the problem solving process with the programming process. In Part (a) (ii), many candidates were able to identify appropriate questions but did not provide a detailed description as required.

Most candidates misinterpreted Part (b), providing information about the animals' disease rather than the three pieces of information needed when searching for refereed sources. Acceptable responses include *author credentials*, *title of journals*, *cost of accessing the sources* or *the location of the sources*.

### **Recommendations to Teachers**

The difference between the problem solving process and the programming process needs to be emphasized, supported by authentic examples of each.

### Question 8

This question assessed candidates' understanding of data flow diagrams (DFDs), object-oriented and other programming paradigms. The mean mark was 4.89 out of 15.

Part (a) was generally well done by candidates. However, in Part (a) (i), some candidates referred to the Context Level Diagram and the Level 0 Diagram as different diagrams.

Part (b) was poorly done by candidates. Most candidates experienced challenges using the appropriate jargon and identifying the benefits or features of the object-oriented programming paradigm.

### **Recommendations to Teachers**

Teachers should explore the use of examples where different programming paradigms can be used and discuss with students the benefits of selecting a particular paradigm for a given task.

### Question 9

This question assessed candidates' understanding of programming, the programming process and the program development cycle. The mean mark was 7.64 out of 20.

Part (a) was generally well done. However, many candidates gave responses such as 'while', 'for', and 'if-then' instead of *Sequence*, *Selection*, and *Iteration* or *Looping*.

While most candidates agreed that it was useful to draw a flowchart, they failed to explain why it was advantageous. An example of a suitable answer would be: *A flowchart is easier to understand since it is a pictorial representation of the algorithm.*

Part (b) was satisfactorily done by most candidates. However, some candidates failed to represent the *while loop* correctly in the diagram and did not clearly indicate the flow of instruction. A few candidates drew the flowchart symbol with the instruction at the side of the symbol. It should be noted that the instruction should be placed inside the flowchart symbol. Also, there was confusion between flowchart symbols and data flow diagram symbols.

In Part (c) (i), candidates correctly identified answers such as *Implementation* and *Evaluation*. However, a few candidates identified steps that came before the testing stage. In keeping with a practice noted throughout the examination, candidates correctly stated problems in Part (c) (ii) but omitted an explanation.

### **Recommendations to Teachers**

Teachers should ensure that students are able to differentiate between the verbs *list* and *explain*. Students should be reminded that they should use the correct symbols when constructing flowcharts and more focus needs to be placed on representing loops in flowcharts.

## **Paper 031 – School-Based Assessment (SBA)**

This project enabled students to demonstrate their skills and competence in using information processing systems to develop a solution to a problem. Students, with guidance from their teachers, were expected to identify a problem in their environment. In contrast to 2013, most candidates clearly defined a background to the problem. However, many teachers were lenient and awarded marks that could not be justified at moderation. Teachers are therefore encouraged to follow the guidelines of the mark scheme as closely as possible. While improvements were seen in the reports, there are still critical weaknesses in some major sections of the project. The following sections highlight some of these weaknesses and offer recommendations that may be used to address them.

### Problem Definition

Students who scored poorly lacked clarity in how they presented the problem statement. Students

- highlighted multiple problems and therefore were unable to define the scope of their solution
- stated the causes of the problem in this section, instead of the effects the problem had on the organization or individuals
- included solutions in this section of the report.

### **Recommendations**

In defining the problem, students should develop a clear and concise problem definition that is limited to two or three sentences and includes one clearly defined problem, the person or organization affected, the reason for the concern and the effect on the person or organization.

### Gantt Chart

The Gantt charts were an improvement from 2013 as students were able to produce Gantt charts which included all stages of the problem solving process from analysis of the problem to justification of the solution. Although a table design showing successor and predecessor tasks may be useful, marks were awarded solely for representation of the required tasks with the use of the Gantt chart.

Students who scored poorly:

- Had timelines that were unrealistic. For example, it is very unlikely that the three data collection methods can be employed and analysed in less than one week.
- Used inappropriate units of measurement which made it difficult to determine the length of a task.
- Used a table format instead of a chart.
- Combined tasks.
- Excluded important tasks.
- Had axes that were not clearly or correctly labelled.

## **Recommendations**

Students should be encouraged to use appropriate productivity tools to produce the chart instead of drawing them manually. The charts should provide a true reflection of the life of the project including the documentation stage that deals with the actual printing, compilation and binding of the project. The units should be clearly defined and applied consistently across tasks.

### Analysis of the problem

Students were able to identify and use fact-finding techniques outside of the traditional techniques as well as gather data using the appropriate tool. Most students effectively used the observation technique by reporting multiple visits. Some students listed advantages and disadvantages of using the tool or gave a definition. The majority of students was unable to score full marks for this section for one or several of the following reasons:

- The questions asked were leading questions and students were therefore unable to interpret the information to show the problem. For example, when looking at an operational inefficiency, many questions were of the form ‘Do you think that an automated system would speed up this process?’ A more meaningful question may be ‘What do you think is the main cause of these long lines?’
- It was seen that of the three fact-finding tools used, not all pointed to the cause(s) of the problem.
- Development of the analysis was primarily on one tool rather than the three tools being used.
- The questions chosen for the interviews and questionnaires were not always relevant to the SBA and often added no value to the analysis.
- Some students did not interpret the findings obtained from the fact-finding tools and as a result the cause(s) of the problem were not sufficiently established.

Students who earned full marks showed the causes that led to the effects that the person or organization were experiencing, with appropriate use and analysis of three fact-finding techniques.

## **Recommendations to Teachers**

The teacher should provide guidance in the structuring of questions and checklists. Students should only include graphs where appropriate. For example, it is unnecessary to provide a pie chart to summarize the responses to a question requiring a yes or no answer. Students are encouraged to thoroughly analyse the possible causes, utilizing the data tools to gather information on the causes for future interpretation, rather than approach the data capturing techniques with preconceived ideas of how the problem should be resolved.

### Identification of Possible Solutions

Students who scored partial or no points

- listed solutions without supportive details.
- suggested solutions of similar nature without explanation of the differences. For example, many students suggested a DBMS and a spreadsheet as their solutions without a detailed explanation of how they would be utilized.
- suggested solutions that only solved specific parts of the problem.
- identified non-IT based solutions. Images or graphics of hardware and software are not suitable solutions.

### **Recommendations**

Solutions identified should be relevant and realistic to the problem and describe a complete IT based system. For example, a barcode reader is a hardware component of a point-of-sale system, and therefore, cannot be accepted as a solution. Ideally this section should include a brief description of the features of each suggested information processing system, showing how they will solve the problem. The features to be considered are:

- Procedures
- Personnel and end users
- Network technology (if any)
- Software alternatives and
- Hardware alternatives

### Evaluation of the Possible Solutions

This component required that students objectively evaluate two or more identified solutions. In the evaluation of a solution, it was expected that students would address issues that may arise from the implementation of each proposed solution. Students who scored poorly on this section

- failed to describe all the elements, besides hardware and software that may be associated with a particular solution. Elements such as *cost, personnel, training, reliability, time for development and implementation, environmental effects, security and maintenance* were excluded.
- included advantages and disadvantages of the solutions only.
- failed to show the relevance of the attributes or criteria being evaluated. For instance, in terms of measurements, students failed to show what constitutes high, medium, low, and why a certain rank was selected.
- evaluated solutions that were not identified previously.
- proposed more than one solution but only evaluated the one they believed to be the most feasible.

## **Recommendations**

Students are expected to evaluate all identified solutions. All the necessary elements as they relate to their implications on the economic, social, political, technical, operational and schedule feasibility for an organization or individual should be examined. Students should also elaborate on the elements and the weights assigned to each.

### Selection of Solution

Students were awarded full marks in this section if they identified two unique IT based solutions and further selected one of these solutions. No marks were awarded if they selected a solution that was not identified in the 'Identification of Possible Solutions' or a manual solution was chosen. This year, more students were able to properly select an IT solution compared with previous years. Partial marks were awarded if

- only one solution was identified in the 'Identification of Possible Solutions'
- two software solutions were identified without explanation
- one of the solutions identified was a manual solution.

## **Recommendations**

Students should refrain from combining this section with the Justification of Solution since an important component of the project is clearly identifying the solution.

### Justification of the Solution

Generally, most students performed poorly in this section. This component required students to thoroughly analyse the issues related to the implementation of the chosen solution, propose strategies for dealing with the issues, and provide an appropriate justification for all the strategies recommended. Many students repeated information from the evaluation section as justification. However, some students identified issues pertaining to the implementation of the solution and used SWOT (strengths, weaknesses, opportunities, and threats) and cost-benefit analyses. Students who scored poorly

- discussed strengths of the solution only, without adding issues that may arise from its implementation
- did not provide any strategies for handling the issues identified
- did not do comparison to show why the solution chosen was better than the one(s) rejected in relation to solving the problem identified
- listed advantages and disadvantages of the solution without explaining the applicability to their choice.

## **Recommendations**

While students utilized SWOT analysis, the elements of the analysis needed to be better developed to justify the solution chosen. The suggested strategies should provide a clear indication of how EACH identified issue will be mitigated or eradicated. Students should also defend the chosen solution over the other solutions identified if the other solution(s) appeared to be the better choice.

### Presentation and Communication of Information

This section required students to present their report in a format and style to meet the minimum standards of papers for academic purposes. Most students provided headings and subheadings throughout the document. While not included in the criteria being tested, it is expected that students will communicate their findings using correct grammar and utilizing the spell check feature found in most word processors. Many students did poorly in this section for one or more of the following reasons.

- They did not present an abstract or the abstract was inappropriate.
- References were either missing or not in the MLA or APA format.
- Some students included a table of contents but page numbers were missing; or page numbers were present but the table of contents was missing.
- Some students presented a table of contents but the page numbers within the document did not correspond to the page numbers in the table of contents.
- There were inconsistencies in font style, size and spacing.
- The cover page was incomplete.

## **Recommendations**

If questionnaires, interview questions and charts are placed in the appendix they should be referenced in the body of the document. Students should utilize the features of the word processor such as the wizard for creating the table of contents with different levels corresponding to headings and sub-headings. Since the report is word processed, it is unacceptable at this level to insert handwritten page numbers or titles. The cover page should include the following:

- Title
- Name of Candidate
- Candidate Number
- Territory
- School Name
- Center Number
- Year of Exam

### **Paper 032 –Alternative to School-Based Assessment (SBA)**

This paper is provided for those candidates who did not have the opportunity to register for the examination through an established institution or were unable to attend the scheduled classes and wished to prepare themselves through self-paced study. The paper consists of three equally weighted, related questions, which reference a research paper the candidate should have prepared over the year. This year the mean score was 25.72 out of a possible 60.

#### Question 1

In Part (a), candidates were required to write a description of a problem they researched. The majority of candidates responded by defining the problem. A description of the problem should outline the steps involved when interacting with the process or system, who interacts with the system and at what point this interaction occurs.

In Part (b), candidates were asked to discuss two causes of the problem. Most candidates responded by saying who or what caused the problem, but did not state why it was a problem. Two separate discussions were expected. In Part (c), candidates were required to identify the appropriate use of three data gathering tools, while in Part (d), candidates were expected to discuss how each of the tools in Part (c) could be implemented using the Internet.

#### Question 2

This question required candidates to discuss three solutions to the problem described in Question 1, evaluate the feasibility of each solution and explain the benefit of identifying more than one possible solution before deciding on the final solution.

Some candidates identified solutions that were not IT based while others gave solutions which were incomplete and unclear, without further description or explanation. For example, if the problem identified is limited security, identifying a camera as the solution is not satisfactory. A more acceptable response would be *a camera with a motion detector which can record a digital image and save it to a hard drive where it could be retrieved later.*

In Part (b), most candidates identified cost as a factor to consider when evaluating the feasibility, while training in the use of the solution was also considered. In Part (c), candidates had to explain the benefits of identifying several solutions prior to selecting a final solution. Most candidates recognized that by identifying several possible solutions the user had a better opportunity to select the best solution using objective means.

#### Question 3

This question tested candidates' ability to select the most appropriate solution or the next alternative, with justification, and to identify the disadvantages of using the alternative solution.

Candidates who had suggested two or more possible IT solutions were able to identify which solution was most feasible. They gave appropriate reasons for selecting the next best solution although very few candidates could state disadvantages of using this solution over the first.

## UNIT 2

### Paper 01 – Multiple Choice

This paper comprised 45 items, with 15 items per module. Most candidates performed satisfactorily. The marks on this paper ranged from 12 to 44. The mean score was 62.76 per cent.

### Paper 02 – Structured Questions

This paper consisted of nine compulsory questions, three questions per module. The maximum score was 119 out of 150. The mean score was 38.40 per cent compared with 31.90 in 2013.

#### Section I: Information Management

##### Question 1

This question assessed candidates' ability to distinguish key terms in data management such as data warehouse, data mart and data mining. Candidates were asked to draw a diagram to illustrate an example of a data warehouse and explain three other characteristics of a data warehouse. The mean mark was 2.20 out of 15.

In Part (a) (i), most candidates received one out of the two marks because they did not provide adequate descriptions of the terms. The responses appeared incomplete. In Part (b), candidates experienced challenges drawing a suitable diagram to illustrate an example of a data warehouse while in Part (c), candidates were unable to explain the characteristics of a data warehouse.

#### Recommendations to Teachers

Teachers should ensure that students develop an appropriate glossary of data management terms and an understanding of the difference among the terms. The completion of the SBA project would help students clarify these terms.

##### Question 2

The focus of this question was to assess candidates' ability to describe the various types of file organizations and to construct a database, more specifically, to demonstrate an understanding of primary keys, data types, the not null property and writing queries using SQL. The mean mark was 5.20 out of 15.

In Part (a) (i), candidates were able to identify the purpose of the primary key. Most candidates stated that it is *a unique identifier for the records in a table*. However, a few thought that the primary key uniquely identifies the tables in a database. In Part (a) (ii), candidates were also able to adequately state the purpose of *not null*.

Part (b), which required candidates to explain the use of *char* in the database design, was the best answered part of this question. Almost all candidates correctly explained that *the type of data to be entered in the field had to be alphanumeric/text/characters*.

In Part (c), candidates were asked to perform SQL operations on a given table. The operations included writing an update query, a delete query and a select query. Although these queries are considered basic knowledge, it was evident that most candidates had limited experience in writing SQL statements and as such candidates were unable to write the required statements. In Part (d), most candidates were able to describe the serial file and direct file organization but experienced challenges describing index-sequential file organization.

### **Recommendations to Teachers**

Teachers should utilize project-based assignments using SQL to teach DBMS.

### Question 3

This question assessed candidates' understanding of concepts on database design. In particular, candidates were expected to demonstrate their understanding of normalization and ER diagrams. The mean mark was 5.69 out of 20.

In Part (a), candidates were asked to explain the process of normalization using 1N, 2N, 3NF. Candidates struggled to explain normalisation using these sub-concepts. In Part (b), candidates were expected to explain, using appropriate examples, different anomalies associated with database design. Many candidates were unable to clearly explain these anomalies or provide examples. In Part (c), some candidates were unable to identify and describe the relationships of the ER diagram shown or describe other types of relationships that may exist in an ERD.

### **Recommendations to Teachers**

Teachers should guide students to develop an outline of the normalization process and highlight all the normal forms required. A practical exercise, involving the development of a database to resolve a problem, should be explored.

## **Section II: Use of Information Technology Tools**

### Question 4

This question assessed candidates understanding of the utilization of IT tools in an organization. This question was fairly well answered by candidates. The mean mark was 7.12 out of 15.

Part (a) assessed candidates understanding of the reasons for using IT tools in organizations. While most candidates scored satisfactorily on this question, some candidates lost marks for not fully explaining how these benefits directly enhanced the business. Additionally, candidates lost marks for generally stating the use of computers in the business without focusing on the use of IT tools.

In Part (b), candidates were expected to state three features of a database management tool and state reasons why Microsoft Access is a more appropriate tool for managing company data, as compared with a word processing tool. Although the majority of candidates attempted this part of the question and knew the functions of both Microsoft Access and a word processing tool, they failed to highlight the features of Access that would make it more suitable for data management.

### **Recommendations to Teachers**

Teachers should work with students to develop an understanding of the appropriateness of various software tools for different scenarios or situations.

#### Question 5

This question assessed candidates understanding of the criteria used for selecting an IT tool for a particular problem. The question also examined candidates' understanding of emerging technologies, types of web pages and their operations. The mean mark was 6.44 out of 15.

The responses to Part (a) were unsatisfactory. Many candidates misinterpreted the question and gave answers that related to the purpose of the tools. The candidates who scored full marks stated the required criteria such as:

- Nature of the problem
- Type of data
- Type of storage or access method
- Type of process required

Part (b) was well done by most candidates as they were aware of emerging technologies relating to visually impaired persons. However, some candidates supplied a Braille keyboard as an emerging technology which was not awarded full credit. A more appropriate response would be the use of voice recognition technology in GPS systems, smart phones or intelligent appliances like refrigerators and washing machines.

In Part (c), most candidates were able to identify three types of web pages and correctly describe the operations of the respective web pages. However, some descriptions lacked detail, while in a few instances the description was matched with the incorrect web page.

### **Recommendations to Teachers**

Teachers should ensure that students are familiar with the criteria for selecting IT tools for various tasks. Further, authentic scenarios would assist students in understanding the importance of these criteria.

#### Question 6

This question was designed to examine candidates' understanding of Information Technology Systems. The mean mark was 7.62 out of 20.

In Part (a), candidates were required to describe two characteristics of an information source. As in previous questions, some of the responses lacked sufficient detail. Some candidates stated the characteristics of information instead of information sources. In Part (b), candidates were required to explain two advantages of presenting information in a graphical format. Some expected advantages are:

- keeps the audience interested
- appeals to persons of all ages
- allows visualization of concepts
- supports easier interpretation of data
- allows easier analysis of data

In Part (c), candidates were expected to explain the purpose of hyperlink in an HTML document. Most candidates were awarded one of the two allotted marks since they simply stated ‘to move from one place to another’. The response should have provided additional information such as how to navigate between HTML documents. One of the better responses was: *A hyperlink is a word, group of words, or image in an HTML document that you can click on to move to a new section within the document or to a new document.*

In Part (d), candidates were expected to write the code snippet to create a hyperlink to the URL *ww.cxc.org*. One appropriate response was:

```
<a href = "http://www.cxc.org" /> click here </a>
```

Candidates would have received marks for

- ✓ Use of the anchor tag (<a> </a>)
- ✓ Use of the href attribute
- ✓ Use of the link text (*Click here* – or any other phrase)

Some candidates lost marks for

- Not including a link text
- Incorrect spelling of the attribute href
- Omitting the anchor tag.

In Part (e), candidates were required to write the HTML code to update a web page with the given content. Responses to this part of the question were satisfactory. However, some candidates did not recognize the paragraph section or used the ol tag instead of the ul tag.

One appropriate response was:

```
<p> Our motto is: </p>
<ul>
  <li> Spirit </li>
  <li> Energy </li>
  <li> Innovation </li>
</ul>
```

## Recommendations

Teachers should highlight the difference between information characteristics and information source characteristics. In addition, students should be encouraged to write HTML code using a text editor.

### **Section III: Social, Organization and Personal Issues**

#### Question 7

This question tested candidates' ability to discuss two ways in which information technology impacts positively on employment and to discuss three health risks associated with improper computer usage in the work place. The mean mark was 8.61 out of 15.

Overall, responses to this question were good. However, some candidates provided the failed to answer this question directly as it relates to the negative impact IT on employment. In Part (b), candidates were able to identify the health risks required.

#### **Recommendations to Teachers**

Teachers should continue to use case studies as authentic examples of the impact of information technology on various aspects of life since they would assist students in developing an understanding of the associated issues.

#### Question 8

This question assessed candidates understanding of the need to protect information systems from natural disasters and human interference. The mean mark was 7.22 out of 15.

While responses to Part (a) were satisfactory, some candidates were unable to state how the organization's information was compromised by unauthorized access. Responses to Parts (b) and (c) were unsatisfactory since candidates failed to provide ICT solutions.

#### **Recommendation to Teachers**

In teaching, teachers must address the impact of natural disasters as well as risks associated with the environment and human interference since these are critical issues that may need to be addressed by businesses and home users.

#### Question 9

This question assessed candidates understanding of virtual organizations, computer crimes and policies to safeguard information assets. The question also examined candidates' understanding of software piracy in the context of software developers. The mean mark was 8.35 out of 20.

In Part (a), most candidates were able to state that a virtual organization operates on the World Wide Web or the Internet but failed to properly define the concept. In addition, they were able to identify at least one advantage of a virtual organization. However, in some instances, candidates gave advantages of using the Internet instead of providing a comparison between a traditional and a virtual organization.

In Part (b) (i), some candidates incorrectly defined a computer crime as 'the unauthorized accessing of a computer', which is the definition of hacking. Some candidates also stated that 'it is doing harm to the computer'. An appropriate response would have been: *using the computer and other technology to*

*commit a crime*. However, although the definition proved challenging, candidates were able to identify examples of computer crimes.

In Part (c), some candidates only identified the policies but did not provide a discussion. A number of candidates gave specific examples such as firewalls, passwords, biometrics, while the expected response was general strategies such as Internet policies that focus on Internet use, website access, attachments, downloads and so on.

In Part (d), candidates failed to properly discuss the consequences and instead they stated what the consequences were. Many candidates misinterpreted the question and gave the consequences as it related to the pirate and not the software developer.

### **Recommendation to Teachers**

Teachers should use actual case studies on computer crimes to teach these concepts since they would engage students in a more real and practical way.

### **Paper 031 – School-Based Assessment (SBA)**

This project enabled students to demonstrate their skills in using IT tools to identify and develop a solution to a problem identified in their environment. The structure of the two year course is such that students can identify a solution in the first year (Unit 1) and continue to develop that solution in the second year (Unit 2). Students may, however, choose to solve a new problem in the second year without penalty.

The SBA is divided into two sections.

1. The Report — identifies the problem, gives the analysis of research carried out in relation to the problem and lists the tools used to develop the solution.
2. The Solution — the design and development of an application that when implemented can solve the problem identified in the Report section

The majority of students scored full marks in the problem definition and the analysis of the problem. However, the sections ‘Identification and Justification of IT Tools Used in the Solution’ and ‘Assessment of the Implications of the Solution’ were not completed satisfactorily by a number of students.

As in previous years, students did not provide enough evidence of the development of their solutions. Students are encouraged to submit screenshots of all aspects of their project as well as a soft copy of the project. This will assist in the moderation activity as supporting evidence of the development or a working solution.

Another shortcoming identified in the projects submitted for moderation was that of communication. While there is no penalty for grammatical or spelling mistakes, it is strongly suggested that students be encouraged to communicate their findings and analyses using Standard English. Dialect or Creole

is unacceptable for a Technical Report, so too are text messaging shortcuts such as ‘u’ for you and ‘2day’ for today.

Teachers are encouraged to

- carefully follow the marking scheme suggested by the CXC
- guide students to design unique solutions and not impose a method of design
- ensure all cover pages have
  - project titles
  - candidate numbers
- generate, for students, a checklist for the use of the storage media to include
  - files copied
  - files open
  - storage media attached
  - correct password attached

## **Report**

### Problem Definition

Most students were able to score full marks in this section of the report. However, some did not clearly define the problem and omitted the background information needed to place the problem in context.

### **Recommendations**

Students should:

- give a clear description of a single problem as well as a clear definition of the scope of their problem
- provide adequate background information to show who or what is affected by the problem identified
- refer to the Unit 1 SBA report ‘Problem Definition’ section for guidance.

Students should also note that solutions should not be included in this section.

### Analysis of the Problem

A significant number of the projects which were moderated were unable to score full marks in this section because

- the results were not interpreted using the fact-finding tools;
- some students discussed findings but did not show the cause(s) of the problem
- questionnaires and interview questions were designed to confirm the solution rather than lead to the discovery of the cause(s) of the problem.

The role of the teacher remains critical in this section of the project. Students should be guided in designing their questionnaires, interview questions and any other tool being used to gather information. On questionnaires, the use of open-ended questions should be kept to a minimum.

### **Recommendations**

- When discussing the findings, there should be an indication of which fact finding tools were used to gather the raw data.
- The analysis of the data must point to the major cause of the problem.
- Within the body of the report, reference should be made to the use of tools which are placed within the appendix.

### **Identification and Justification of IT Tools used in the Solution**

This section asked students to identify and justify the use of productivity tools and features of the tools that were used to complete the project.

No marks or partials marks were given to students who:

- Identified only one tool.
- Identified hardware or networking tools.
- Did not create the solutions themselves but instead used off-the-shelf solutions such as an existing Patient Monitoring System.

### **Recommendations**

- The SBA requires the use of more than one productivity tool (c/f Unit 2 Module 2 Specific Objectives 1 – 6 of the Syllabus).
- Students should identify the productivity tools and explain how and why they used specific features of the tool or tools to develop their solution to the problem identified.

### **Assessment of the Implications of the Solution**

The majority of students was able to identify issues involved in the implication of the solution. However, many of them failed to thoroughly discuss all the issues or suggest strategies to address the issues sufficiently. Some students discussed strengths or benefits of the proposed solution and a few students discussed issues that were not relevant to the proposed solution.

### **Recommendations**

Students should be encouraged to tie issues relevant to their proposed solution to the objectives found in Unit 2, Module 3 of the syllabus. While the list of issues may appear quite long, students should be encouraged to thoroughly discuss at least three issues applicable to their proposed solution.

## **Solution – Implementation of the Solution**

### Appropriate use of IT Tools

The majority of students was able to show appropriate use of the IT tools. Some students justified the use of tools but this is not required in this section.

### **Recommendations**

- Students should be encouraged to implement tools that are appropriate for the problem they have identified. For instance, a problem focused on marketing or advertising is better suited for a web site solution, whereas a problem involving inventory, storage, and retrieval is better suited for a database solution.
- The blanket use of website templates should be strongly discouraged. However, if templates are used, students should demonstrate the ability to customize the templates to sufficiently exhibit their ability to construct a website solution.

### Human Computer Interface

The majority of students was able to develop applications with proper navigational features, that is, working buttons linking to pages (next, previous, home and exit buttons on each page or form).

While most students were able to create a switchboard for their database application, some of the switchboards had limited navigation, and in some cases, it was impossible to return to the switchboard because there was no active ‘menu’ button to achieve this.

### **Recommendations**

- Students should be encouraged, as part of the user-friendliness of the solution, to include the above mentioned working buttons on each page or form of their solution.
- All buttons must be appropriately labelled with consistency in font size, style and colour.

### Appropriate use of Features of IT Tools

Some students were unable to gain full marks under this section because there was no evidence, in hard or softcopy, of their work.

### **Recommendations**

The features that are discussed under ‘Identification and Justification of the Tools’ should be applied in this section.

All stages of the development of the project should be submitted for moderation.

- For the database solution:
  - Use of screen shots would suffice for normalization of the tables, table design, relationships, query design, security features and SQL
- For the web page solution:
  - Layout of the pages showing how the pages are linked together
  - HTML code for the home page and unique features of subsequent pages

### Working solution

The majority of students demonstrated their ability to create a functional database application or web page. However, all applications or web pages did not effectively solve the problem identified in the problem definition section. Some solutions with security features were inaccessible because there was either no username or password to access the application or the given username or password was incorrect, while some database solutions lacked security features all together. Further, there were students who used absolute URL addresses instead of relative addressing, resulting in a problem accessing the complete website solution.

### **Recommendations**

- Students should be encouraged to include screen shots of their solution, especially those screen shots to confirm the design of the solution.
- Students should include a text file with the username or password, as well as the version of the software used, for instance, Microsoft Access 2010.
- If students have customized their database solution so as to restrict access to the design view (back end), a copy of the administrator's version of the database should also be included to facilitate proper assessment.

### **General Recommendations**

- It is strongly recommended that a soft copy of the project be submitted. In the absence of a soft copy, screen shots of every web page or form along with the design view (all aspects of the database) should be provided.
- Submit all samples on one storage medium, preferably a flash drive for database files, since optical discs, which are read only (ROM) storage, affect the functionality of some database features. Care must be taken in packaging the storage medium to minimize the risk of damage to the medium.
- Students should package their report properly to minimize the chance of pages coming loose.

### **Paper 032 – Alternative to School-Based Assessment (SBA)**

This paper is provided for those candidates who do not have the opportunity to register for the examination through an established institution or are unable to make the scheduled classes and wish to prepare themselves through self-paced study.

The paper consists of three equally weighted, related questions, which reference a research paper the candidate should have prepared over the year. The paper attempts to mirror the SBA. This year the mean score was 26.33 out of a possible 60.

#### Question 1

This question required candidates to write a problem statement, discuss possible causes of the problem, identify data-gathering tools and state phases of the problem-solving process. Instead of limiting their responses to a succinct problem statement, most candidates provided unnecessary background information, while some candidates provided a problem and solution that was not IT based. An example of a good problem statement is: *The ABC High School requires assistance to reduce the occurrence of break-ins it has experienced in the last two months.*

In identifying the use of a particular data-gathering tool, most candidates were unable to make the connection between the sample size and the data gathering tool to be used. Further, in stating the limitations, candidates did not respond globally but attempted to link their project to the tool under consideration.

#### Question 2

In this question, candidates were asked to summarize their solution to the problem identified in Question 1 and discuss the likely impacts this solution may have on the organization. In addition, candidates were asked to identify elements of their computer system, that is, the hardware, software and users. Some candidates gave hardware components that could not be considered essential such as speakers. Similarly, responses to software components must also be appropriate. An acceptable response must state the name of the category of software as well as list the specific features of the software.

In Part (c), where candidates were required to describe their solution in terms of its inputs, processing and outputs, candidates experienced challenges correctly identifying the inputs to their system. To use the camera as an example, *the inputs would be still shot or video of the perpetrator; the processing would be the compression technology used and the output would be a printed photo or a video on a memory storage card.*

#### Question 3

Very few candidates completed Question 3 satisfactorily. Candidates displayed little knowledge of entities, the entity relationship diagram or the structured query language.