

**CARIBBEAN EXAMINATIONS COUNCIL**

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

**MAY/JUNE 2013**

**INFORMATION TECHNOLOGY**

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## GENERAL COMMENTS

This year, approximately 1,070 candidates wrote the Unit 1 examination compared with 960 in 2012. The performance in 2013 was consistent with that of 2012 — 90 per cent of the candidates achieved acceptable grades compared with 91 per cent in 2012. In Unit 2, approximately 560 candidates wrote the examination compared with 610 in 2012. Of these, 90 per cent achieved acceptable grades in 2013 compared with 95 per cent in 2012.

While the performance of candidates on both units was satisfactory, there were questions where performance was below the required standard. These included questions which tested algorithms, programming constructs and problem solving in Unit 1 and in Unit 2, the information technology tools required to solve real-life problems. In addition, candidates continue to interpret terms associated with Information Technology as everyday terms, thereby providing inappropriate responses.

## DETAILED COMMENTS

### UNIT 1

#### Paper 01 – Multiple Choice

The paper comprised 45 items, 15 items per module. Most candidates performed satisfactorily. The marks on this paper ranged from 10 to 44. The mean mark for the paper was 66.56 per cent.

#### Paper 02 – Structured Questions

The paper consisted of nine compulsory questions, three questions per module. The maximum score was 119 out of 150. The mean score on the paper was 32.59 per cent compared with 34.35 in 2012.

### Section I: Fundamentals of Information Technology

#### Question 1

For this question, candidates were expected to demonstrate their understanding of concepts associated with information technology (IT) and the application of IT in various sectors. They were also required to describe the function of programming and databases in IT solutions and distinguish between the terms *qualitative and quantitative* and *sampled and detailed*. The mean mark for this question was 7.13 out of 15.

The majority of candidates answered Part (a) satisfactorily. However, candidates experienced challenges answering Part (b) where they provided definitions of the terms instead of indicating their functions in IT solutions or distinguishing between terms as required in Part (d).

### **Recommendation to Teachers**

Students 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 examined candidates' understanding of the information processing cycle and characteristics of information. The mean mark for this question was 7.28 out of 15.

Generally, candidates were able to correctly answer the parts of the question which required stating the activities in the information cycle and listing the characteristics. However, most candidates could not explain the importance of the characteristics identified to the given situation.

### **Recommendation to Teachers**

Teachers must not only emphasize definitions and functions but students need to be given the opportunity to analyse scenarios which utilize information technology in everyday activities and experiences.

#### Question 3

This question examined candidates' understanding of the characteristics of computer hardware and software and the application of computer software to business and professional needs. The mean mark for this question was 6.94 out of 20.

Many candidates were unable to identify the trends in hardware development. Candidates also struggled to outline the functionalities of various tools in Part (b). Candidates were generally able to identify appropriate software tools for tasks provided. However, some candidates were not clear on the specific use of the tools.

### **Recommendations to Teachers**

Teachers are encouraged to use real-life business scenarios when teaching the application of software tools to business. Teachers should also compile a glossary of hardware items, outlining their definitions and functions.

## **Section II: Information Technology Systems**

#### Question 4

This question assessed candidates' knowledge and understanding of information technology systems including components of the IT system and the role of users. The mean mark for this question was 5.82 out of 15.

In Part (a), most candidates were able to identify the three components of an information technology system. However, a few candidates listed input and output devices instead. In

Part (b), most candidates were unable to state the role of the user and only a small percentage of candidates received full marks for this question.

In Part (c), most candidates were unable to adequately describe the function of the information technology systems. In Part (d), instead of explaining the importance of categories of users, candidates gave responses which related to the roles and functions of each level of user.

### **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 use authentic examples which highlight the importance of maintaining different levels of users and access to information systems. One such example would be in a commercial bank.

### Question 5

This question tested candidates' knowledge of the explanation of terms associated with the security of information technology systems, the adaptation of user interfaces to increase effectiveness and implementation of security mechanisms. The mean mark for this question was 6.26 out of 15.

The responses of candidates to Part (a) were very general and not related to information technology. In Part (b), most candidates listed appropriate responses for the respective parts such as braille, voice recognition, biometrics, alphanumeric and special characters but did not develop their responses to provide descriptions.

### **Recommendation to Teachers**

Teachers should ensure that students are not only familiar with the various technologies but can explain how they function in the information technology environment.

### Question 6

This question tested candidates' knowledge of operations on the World Wide Web. The mean mark for this question was 5.27 out of 20.

In Part (a), candidates were able to correctly write out the acronyms in full but could not explain the functions of the terms. In Part (b), most candidates were able to give an example of a domain name but had difficulty distinguishing between the domain name and the IP address. In general, Part (d) was poorly done since most candidates were unable to effectively give satisfactory explanations of the layers in the protocol.

### **Recommendation to Teachers**

Teachers should thoroughly go through the models, TCP/IP and OSI, noting similarities and differences. Teachers should also highlight that domain name and IP address are completely different.

### Section III: Information and Problem Solving

#### Question 7

This question examined candidates' understanding of the problem solving process as well as the classification and trustworthiness of information sources. The mean mark for this question was 5.61 out of 15.

Candidates were unable to explain clearly why the *analysis of the problem stage* was important and instead gave very vague responses such as 'to understand the problem'. In some instances candidates spoke about the problem definition stage but listed the tools involved in the problem analysis stage. Parts (c) and (d) which dealt with categories of information and trustworthiness were well done.

#### **Recommendation to Teachers**

Many students did not provide supporting statements for the points listed. Students should be given activities that will allow them to differentiate between terms such as *state, describe, explain, outline* and *identify* as defined in the syllabus.

#### Question 8

This question examined candidates' understanding of algorithms, requiring them to explain, decode and write algorithms and to draw a flow chart which represents a given algorithm. The mean mark for this question was 1.75 out of 15.

In Part (a), some candidates stated the functions of algorithms generally and not the function of the specific algorithm given in the question. A few candidates explained the function of each line in the algorithm individually instead of the function of the algorithm as a whole.

In drawing the flow chart, candidates knew the start and stop symbols but did not utilize the correct symbols in the body of the flow chart. Further, they had difficulty illustrating the loop.

In Part (b), although some candidates were able to identify the source of the problem in the algorithm, others gave reasons such as 'temperature should not be 999' and 'the temperature is wrong'.

#### **Recommendations to Teachers**

Teachers should use a standardized way of writing algorithms to avoid confusing students as well use flow charts to illustrate algorithms and vice versa. In addition, teachers should emphasize the use of trace tables to determine the output values of an algorithm.

#### Question 9

This question examined candidates' understanding of different programming paradigms, languages and constructs. The mean mark for this question was 3.80 out of 20.

In Part (a), very few candidates were able to correctly identify the six stages in the program development cycle. Instead, most candidates drew the system development life cycle or the stages in the problem-solving process. In Part (b), most candidates were able to correctly list examples for each programming paradigm but were unable to explain the paradigms using IT terms. For example, the object-oriented paradigm was described as one which uses objects. No mention was made of the data and methods that the object possesses.

In Part (c), some candidates confused assembly language with machine language. In Part (d), although most candidates were able to correctly explain the sequence control structure, the selection and iteration structures proved to be a challenge to the majority of candidates.

### **Recommendations to Teachers**

Students should be given detailed definitions of the various programming paradigms, researching the languages that fall under each paradigm. Teachers should also give students practice in giving detailed explanations of each control structure using acceptable IT terminology.

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

This project required students to demonstrate their skills in using information processing systems to develop a solution to a problem. Students, with guidance from their teachers, should be encouraged to identify a problem in their environment (school or home) and be discouraged from conceptualizing the solution first and then matching a question to it. This year the mean score was 34.87 out of a possible 60.

The majority of projects were concerned with solving problems involving data storage and retrieval, or operational inefficiencies (reduce waiting time in a line). While these in themselves are acceptable problem areas, many of the projects moderated demonstrated a lack of ability to present a coherent description from problem definition to identification of solutions.

It must be noted that too many teachers were found to be very lenient in their awarding of marks. Teachers are encouraged to follow the guidelines of the mark scheme as closely as possible. Critical weaknesses were seen in *all* sections of the project. The following sections highlight the most glaring weaknesses seen in the reports moderated and offer recommendations that may be used to address those weaknesses.

#### Problem Definition

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

Many students

- highlighted multiple problems and therefore were unable to define the scope of their solution
- excluded the background to the problem and as a result had no context in which the problem existed

- 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**

Students should include a background to the environment in which the perceived problem exists. This background may briefly describe the operational procedures of the organization or group. The problem statement that follows should therefore be as succinct as possible identifying the person or organization affected, the reason for the concern and the result of the effect of this concern.

### Gantt Chart

Most students scored full marks for this section. Students were able to produce a Gantt chart which included all stages of the problem-solving process (and any substages) 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 tasks with the use of the Gantt chart.

Students who scored poorly

- used timelines that were unrealistic
- used a table format instead of a chart
- combined tasks and excluded important tasks.

## **Recommendations to Teachers**

Students should be encouraged to create Gantt charts that provide a true reflection of the life of the project. The chart may include the documentation stage that deals with the actual printing, compilation and binding of the project. The charts should have a meaningful heading and axes that are appropriately labelled and scaled. If symbols are used, a legend should be incorporated.

### Analysis of the Problem

The majority of students was unable to score full marks for this section for one or several of the following reasons.

- Some students described the problem in detail, but no cause(s) of the problem was/were established.
- It was seen that of the three fact-finding tools used, not all pointed to the cause of the problem.
- Some students listed advantages and disadvantages of using the tool or gave a definition/description of the tool.
- The questions chosen for the interviews and questionnaires were not always relevant to the SBA and very 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 causes of the problem were not sufficiently established.

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

### **Recommendations**

Students should use fact-finding tools that are suitable for their project. Questionnaires, interviews and observations are good tools but students should be aware of other tools that can aid in their analysis. Examples of other fact-finding tools are:

- Review of documentation
- Surveys
- Focus groups
- Experiments

For those students who chose to utilize observation as a fact-finding tool, it should be noted that observations cannot be properly done in one visit. A good observation should be carried out over several visits to the entity, at different times of the day and be well documented. An effective observation must indicate the date, time and length of the observation and why those time frames were selected. It is recommended that an observation checklist or schedule be created.

### Identification of Possible Solutions

Students who scored partial points or no points:

- Suggested solutions of similar nature without explaining the differences. For example, many students suggested a DBMS and a Spreadsheet as their solutions. Without further explanation or description, these are considered to be one software solution.
- Suggested solutions that only solved specific parts of the problem and not the problem in its entirety.
- Identified non-IT based solutions which were not awarded marks. Flow charts, pseudo-code and data flow diagrams by themselves 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
- Software alternatives
- Hardware alternatives

### Evaluation of the Possible Solutions

This component required that students objectively evaluate two or more identified solutions.

Students who scored poorly

- failed to describe elements such as hardware, software, cost, personnel, training, reliability, time for development and implementation, environmental effects, security and maintenance
- included advantages and disadvantages of the solutions *only*
- presented tables showing weighted elements but failed to elaborate on the elements and the weights allotted to each. Some of the elements used did not relate to the elements specified in the syllabus.
- evaluated solutions that were not identified previously
- proposed more than one solution but only evaluated the one they believed to be the most feasible solution
- presented only pictures of the hardware components of their identified solutions.

### **Recommendations**

- Evaluate all identified solutions.
- Students should employ a weighted, balanced scorecard that addresses the necessary elements accompanied by an elaboration on the elements, the weights assigned to each and the reason for that assignment.

### Selection of Solution

Students were awarded full marks in this section if they identified two unique IT-based solutions and were therefore able to choose one. Students were given no marks if they selected a solution that was not identified in the “Identification of Possible Solutions” section or a manual solution was chosen.

Partial marks were awarded if

- only one solution was identified
- two software solutions were identified without explanation (see Selection of Solution section above)
- one of the solutions identified was a manual solution.

### **Recommendation**

Students should have an explicit section to state the recommended solution. They should refrain from joining this section with the Justification of Solution.

### Justification of Solution

On average, 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 the justification.

Students who scored poorly

- discussed strengths of the solution only without adding issues that may arise from its implementation
- did not identify any issues pertaining to the implementation of the solution
- did not provide any strategies for handling the issues identified
- did not do any 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**

- Students can *enhance* their justification with the use of a strengths, weaknesses, opportunities, threats (SWOT) analysis to justify the solution chosen.
- Suggested strategies must provide a clear indication of how each identified issue will be mitigated or eradicated. It should be noted that issues within this section relate to concerns that would result from an implementation of the solution.
- Students should also defend the chosen solution over the other solutions.

### Presentation and Communication of Information

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

- They did not present an abstract or the abstract was inappropriate.
- References were either missing or not in a proper MLA or APA format.
- Some students had a table of contents but page numbers were missing or did not correspond to the document. Some page numbers were present but the table of contents was missing.
- The document did not have the proper headings and subheadings.
- 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.

- Today's word processors include a wizard to create a table of contents with different levels corresponding to headings and subheadings.
- The abstract should only give an overview of the requirements of the project and not a description of the solution.
- Since the report is in print, it is expected that the page numbers be in print as well
- The cover page should include the following:
  - Title
  - Name of Candidate
  - Candidate Number
  - Territory
  - School Name and number
  - Year of Examination
- The project should reflect in its entirety MLA or APA formats. These formats address:
  - Font style (Times New Roman) and size (12) throughout the document
  - Font size and formatting for headings
  - Page margins
  - Line spacing
  - Justification of the document
  - Presentation of sources used

### **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 21.0 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, in order, 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 or could not say why it was a problem. Two separate discussions were expected.

In Part (c), candidates were required to identify a stage in the problem-solving process, other than defining the problem and identifying the solution. Acceptable steps included:

- Analysis of the problem: Data is collected in this stage using various methods (review of documentation, surveys, focus groups and experiments). The analysis of the data should then identify the major cause of the problem.

- Evaluation of solutions: Information technology based solutions are evaluated based on operational feasibility, technical feasibility, personnel requirements and economic or financial feasibility.
- Recommendation of a solution: A solution is selected from those evaluated.
- Justification of recommended solution: The choice of solution is defended based on how the issues that may arise from its choice are dealt with. Issues are (but not limited to) training of personnel, cost to implement, downsizing of staff etc.

In Part (d), candidates were expected to identify instruments for gathering data for three different scenarios. Most candidates were able to identify the tools correctly but were unable to provide appropriate justifications for selecting the tools. However, most candidates performed satisfactorily in Part (e) where they were required to outline limitations of the instruments. Limitations given included scheduling of and time needed for interviews, challenges collecting completed questionnaires and persons being observed demonstrating expected behaviours.

### 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.

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 IT possible 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 10 to 43. The mean score was 64.21 per cent.

### Paper 02 – Structured Questions

This paper consisted of nine compulsory questions, three questions per module. The maximum score was 109 out of 150. The mean score was 31.90 per cent compared with 36.25 in 2012.

### Section I: Information Management

#### Question 1

This question examined candidates' understanding of the relational model in database systems. It also evaluated their understanding of different access mechanisms. The mean mark for this question was 3.25 out of 15.

In Part (a), candidates were more familiar with the relational model than the hierarchical approach. Most were able to recall that the hierarchical model was represented as an inverted tree with root node and parent-child relationships. However, candidates did not exhibit a depth of knowledge of the various database design models in order to critically discuss their differences.

In Part (b), in distinguishing between the terms *sequential* and *random access*, many candidates were able to state what each term meant and to identify devices and media that used either method of data storage and retrieval.

The vast majority of responses for Part (c) simply listed some of the general benefits of the Internet without clearly articulating how the services on the Internet actually make data handling and processing more efficient. In Part (d), while a considerable number of candidates correctly identified at least one consequence of an absence of timely data, the majority was unable to explain how this would affect the operations of the company in question.

### Recommendations

Teachers should expose students to an in-depth study of the various models of database design. In addition, students need more practice in thinking critically about the impact of ICTs on business processes.

### Question 2

This question examined candidates' understanding of entity-relationship diagrams (ERDs) and the general concepts associated with database design. The mean mark for this question was 6.22 out of 15.

In Part (a), most candidates were able to identify at least one element of ERDs. However, some candidates were unable to draw the correct symbol to match corresponding elements. The majority of candidates defined the term *foreign key* instead of stating its function. Part (b) was well done by most candidates who were able to define the term *normalization* as well as explain its benefits.

### **Recommendations**

Teachers should ensure that students can define terms associated with information management as well as explain the functions and benefits of the various tools and processes.

### Question 3

This question examined candidates' understanding of database design and normalization. The mean mark for this question was 5.84 out of 20.

Candidates experienced challenges attempting to normalize the database table provided in the question. They demonstrated very minimal understanding of standard form. In addition, their misuse of the technical terms suggested that they were not entirely clear about the exact meaning of important database design ideas. Candidates demonstrated very little understanding of structured query language (SQL).

### **Recommendations**

Normalization should be taught with the use of examples and accompanying explanations and students should have adequate exposure to exercises involving SQL.

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

### Question 4

This question tested candidates' knowledge of the major software tools and required them to identify the most suitable tools for given situations. In addition, candidates were tested on the specific functions and features of spreadsheets, databases and presentation software. The mean mark for this question was 8.48 out of 15.

The responses to Part (a) revealed that some candidates were not aware of the features, *find and replace* and *header and footer*, in the word processor productivity tool. In Part (b), most candidates were able to identify two situations when it is more appropriate to use a spreadsheet application instead of a database application but could not explain two advantages of a database application over a spreadsheet application.

Part (c), which required candidates to identify features of presentation software which were appropriate for a specific target group was very well done.

## **Recommendations**

Teachers should incorporate case studies while teaching IT in an effort to familiarize students with the practical use of IT concepts.

### Question 5

This question assessed candidates' knowledge of web development using html and their understanding of blogs. The mean mark for this question was 4.35 out of 15.

Part (a), which required candidates to reproduce a given web page using html codes, was poorly done by candidates. In Part (b), although most candidates correctly stated the longer term of the word *blog*, some gave erroneous responses such as bloggery and blogosphere. In addition, candidates were generally able to give at least one advantage of a blog over a webpage.

## **Recommendations to Teachers**

Students must be encouraged to utilize html codes to create simple web pages. Exposure to the various types of web pages will be beneficial.

### Question 6

This question focused on the use of IT tools to solve real-life problems, information sources and the criteria used to evaluate information. The mean mark for this question was 3.43 out of 20.

Although candidates were able to identify tools that could be used to complete each task, the tools were not always the most appropriate for the unique aspects of the tasks. In Part (b), candidates experienced challenges identifying the most appropriate information sources based on what was required and what the information would be used for.

In Part (c), some candidates correctly stated the criteria to be used but could not fully outline why the criteria was suitable for assessing the appropriateness of the comments and feedback.

Part (d) was poorly done. Most candidates stated recent technological developments but could not link them to the use of IT in health.

## **Recommendations**

Teachers must encourage students to research the use of IT in real-life situations, especially recent innovations in business and industry.

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

### Question 7

This question examined candidates' understanding of the impact of IT on various sectors and job opportunities, the benefits of using IT and procedures for protecting an organization from phishing attacks. The mean mark for this question was 7.17 out of 15.

Although most candidates answered this question satisfactorily, there was limited development of the answers. Candidates were satisfied to simply list the responses without further description or explanation.

### **Recommendations**

Students should be given adequate practice in responding to questions to be able to differentiate between terms such as *state*, *describe*, *explain* and *outline* as defined in the glossary in the syllabus.

### Question 8

This question examined candidates' understanding of risks associated with the use of computers, including environmental and health. The mean mark for this question was 4.06 out of 15.

In Part (a), a number of candidates gave general risks of using computers without focusing on used or refurbished computers as required in the question. In Part (b), some candidates confused environmentally friendly with the term *ergonomic* and hence, most of the responses addressed environmental issues.

### **Recommendations**

Teachers need to ensure that students have a sound understanding of the various terms associated with information technology, to avoid confusing concepts. These terms may be reinforced by examining multiple examples of the terms.

### Question 9

This question tested candidates' understanding of important issues surrounding the access and use of data and information such as trademark, plagiarism and piracy. The mean mark for this question was 6.15 out of 20.

Generally, candidates performed satisfactorily on this question. They provided fair definitions of the term *trademark* and identified examples of plagiarism. In addition, candidates were able to state ways in which software piracy could affect an organization. However, they experienced challenges explaining how the government could deal with software piracy.

In Part (c), candidates were able to state issues to be considered in an email policy document and also stated how information assets could be protected but were generally unable to give an explanation to support their responses.

### **Recommendation to Teachers**

Teachers must emphasize the need for students to distinguish terms such as plagiarism, piracy and copyright.

## **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.

While the majority of students chose to implement a database for their solution, some chose a website. A very small group of students implemented a web-based solution with a database as the back end.

One major shortcoming found in the presentation of solutions was that students did not provide enough evidence of the development of their solutions. Students are encouraged to submit screenshots of all aspects of their project. This problem was further compounded when there was no soft copy of the project. At moderation, marks cannot be awarded or supported if there is no evidence of the development or a working solution.

While there is no penalty for grammatical or spelling mistakes, students are 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’.

### **Report**

#### Problem Definition

Most students were able to score full marks here. Those who did not score full marks lost marks because they did not clearly define the problem (many subproblems identified and hence the scope of their solution was expanded) or provided no background information to place the problem in context.

#### **Recommendations**

Students should be encouraged to

- describe the effects and nature of the problem and whom it affects, in the background
- give a clear description of a single problem
- refrain from including solutions in this section
- state a current problem instead of a problem that is likely to occur.

### Analysis of the Problem

The majority of students was unable to score full marks in this section for one or more of the reasons listed below.

- They did not interpret the results 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.

### **Recommendations**

- 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 used to gather information.
- The use of open-ended questions should be kept to a minimum.
- The analysis of data must point to the major cause of the problem.
- When discussing the findings the students should indicate which fact-finding tools were used to gather the raw data.

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

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

Students who gained partial or no marks

- 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.
- Students should identify the productivity tools and explain how and why they used specific features of that tool 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. 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 Module 3 of the Unit 2 syllabus. While the list of issues may appear quite long, students should be encouraged to discuss at least three issues applicable to their proposed solution.

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

### Appropriate Use of IT Tools and their Features

The majority of students was able to show appropriate use of the IT tools. However, a small number of the moderated samples failed to suggest a tool and its use that was appropriate for the identified problem.

## **Recommendations**

Students should be encouraged to suggest tools that are appropriate for the problem they have identified.

### 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 to include the above mentioned working buttons on each page or form of their solution. All buttons should be appropriately labelled with consistency in font size, style and colour.

### Appropriate Use of IT Tools and their Features

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

## **Recommendations**

The features that are discussed under the identification and justification of tools should be applied in this section. All stages of the development of the project should be submitted for moderation.

- For the database solution:
  - Normalization of the tables, table design, relationships, query design, security features, SQL and so on. Screen shots would suffice for most of these.
- For the webpage 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 the ability to create a functional database application or webpage. 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/password to access the application or the given username/password was incorrect, while some database solutions lacked security features all together.

Further, some students used route relative and/or absolute URL addresses and this posed a problem in accessing the complete website solution.

### **Recommendations**

- Students should be encouraged to include screen shots of their solution, especially those screen shots which would confirm the design of the solution.
- Students should include a text file with the username/password.
- If students customize their database solution 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.

### **Further Recommendations**

- It is strongly recommended that a soft copy 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.
- All samples should be submitted on one storage medium. Care must be taken in packaging the storage media to minimize the risk of damage.
- Students should package their reports 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 exam 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 17.0 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.

None of the respondents was able to succinctly provide a problem statement. Instead, most provided the solution in this question. Further, most candidates provided unnecessary background information in their response to the question. 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 were unable to think globally because they attempted to link their project to the tool under consideration.

### Question 2

In this question, 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. A camera, without a detailed description of the system in which it is being used, is not an acceptable response.

Similarly, the response to software 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. Most candidates were unable to name the level of users of the system or name the users and describe their function/interaction with the system.

In Part (c), candidates were asked to describe their solution in terms of its inputs, processing and outputs. Most candidates seemed unable to correctly identify the inputs to their system. For a security system solution, the inputs for the camera would be either still shot or video of the perpetrator; the processing would be the compression technology used and the output would be the a printed photo or a video on a memory storage card.

### Question 3

This question was poorly done. Candidates showed very little knowledge of entities or the entity relationship diagram. Similarly, responses to Part (c) showed very little knowledge of structured query language.