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

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

MAY/JUNE 2011

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

GENERAL COMMENTS

In May/June 2011, 24,355 candidates from the participating territories wrote the Information Technology Examinations. Performance declined slightly with 79% of the candidates obtaining acceptable grades as compared to 84% in 2010.

DETAILED COMMENTS

Paper 01 – Multiple-Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus. Candidates' performance showed that much more needs to be done by teachers in terms of syllabus coverage.

Paper 02 – Structured Questions

This paper consisted of three sections with a total of 12 compulsory structured questions. Section I consisted of six short-answer questions worth 60 marks and tested the Theory profile. Section II consisted of two structured questions worth 15 marks and tested the Productivity Tools profile. Section III consisted of four structured questions worth 45 marks and tested the Problem-solving and Programming profile.

Section I - Theory

Question 1

Part (a) of the question tested candidates' ability to identify and name the hardware components of a computer that performs three given functions. This part of the question was satisfactorily done by the majority of candidates. However, in Part (a) (iii), many candidates did not state Read Only Memory (ROM) as the hardware component which contains instructions that are used during the booting of the computer.

Part (b) tested candidates' ability to interpret the hardware specifications of a given computer system. This part of the question posed difficulty for the majority of candidates. For the hard drive in Part (b) (i), candidates did identify SATA as the type, 160GB as the capacity and 5400 RPM as the speed. For the memory capacity in Part (b) (ii), candidates did not identify 1GB as the memory capacity. For the resolution of the display in Part (b) (iii), candidates did not identify 1024 x 600 as the resolution.

Part (c) tested candidates' ability to identify the type of data access method used for two given storage devices. This part of the question proved challenging to candidates. They were unable to identify direct access as the method used to access data from a hard drive and sequential access as the method used to access data from a magnetic tape.

Question 2

Part (a) tested candidates' ability to match applications with the most appropriate devices used in the given applications. This part of the question was well done by the majority of candidates.

Part (b) tested candidates' ability to distinguish between types of user interface. This part of the question was satisfactorily done. Many candidates did not identify Operating System software as the type of program that provides the user interface. Some candidates provided the name of the operating system such as Windows XP and Windows 7.

Question 3

Part (a) tested candidates' ability to identify the type of software package used in the given scenario and to provide an advantage and a disadvantage of the software package. This part of the question was poorly done. The majority of candidates could not identify Integrated Software package as the type of software used.

Part (b) tested candidates' ability to indicate the type of processing modes best suited for two given tasks. This part was well done by the majority of candidate who correctly indicated *batch processing* for Part (b) (i) and real-time processing for Part (b) (ii).

Part (c) tested candidates' ability to find the decimal, binary and hexadecimal equivalent of an octal number and to convert a negative integer to Binary Coded Decimal (BCD). This part of the question was poorly done by the majority of candidates who could not provide the correct conversion. An example of a correct response is as follows:

Octal 243 = 163 in the decimal number system
Octal 243 = 10100011 in the binary number system
Octal 243 = A3 in the hexadecimal number system
BCD of -856 = 1011 1000 0101 0110 or 1111 1000 0101 0110
(the negative sign is indicated by 1011 or 1111)

Question 4

This question tested candidates' knowledge of networks, measures to secure data and equipment, and methods of data communication.

This question was satisfactorily done by the majority of candidates. However, some candidates confused network with Internet. Many candidates were able to explain that the benefits of a network were to share equipment such as printers and files and data. Many candidates correctly identified the network as an intranet since it was a private network used within the company/organization. Most candidates described password and encryption as two security measures used to protect data and equipment. Most candidates also identified use of cell phones and sending of text messages as the two ways in which the office could communicate with the gardener.

Question 5

Part (a) tested candidates' understanding of the use of communications technology and the Internet. This part of the question was well done by the majority of candidates. Candidates provided a variety of methods to get the completed order to the agent as well as the disadvantage of each method. Some correct responses are as follows:

- Order made by Email. Disadvantage—email may be tagged as junk mail or sent to the wrong email address or not read by the agent
- Order made by fax. Disadvantage—fax may be faded or sent to the wrong fax number
- Order made by telephone. Disadvantage—typographical or transcription error
- Order collected by the agent personally. Disadvantage—time consuming

Part (b) tested candidates' ability to describe methods of verification and validation of the order. This part of the question was poorly answered by the majority of candidates who were unable to distinguish between verification and validation. A suggested response is as follows:

Verification of the order:

Comparing the order entered at the head office with the original order sheet, or checking the order with the agent, or checking the order with the home owner who made the order.

Validation checks:

- Data type check—check if the correct type of data is entered. For example, numeric data should be entered in the quantity field
- Range check—check if data is within a given range. For example, the quantity should not be less than 1 and not more than 100
- Inconsistency check—check to see if the data on the order are consistent. For example, if the title is Mr then the gender should be Male
- Reasonableness check – check the order to see if it is reasonable. For example, the pattern of previous orders for a home owner can be used to determine if the current order is within the usual order pattern.

Question 6

This question tested candidates' ability to identify the types of file organization and access methods used in a given scenario. This question was satisfactorily done by the majority of candidates. However, the majority of candidates had difficulty in Part (c) which required them to explain the process of deleting the 39-minute interview. Some candidates seemed unfamiliar with the various methods of file organization and access. An example of a correct response is as follows:

Part (a)

Device B is sequential—records are arranged in the numerical order

Part (b)

Device A: 98, 84, 105, 39, 31, 78, 109, 63
Device B: 31, 39, 63, 78, 84, 89, 105, 109

Part (c)

To delete a record in a sequential file:
Copy record 31
Skip record 39
Copy records 78 to 109

OR

1. All the records with key values less than the record to be deleted are written to the new file.

2. When the record to be deleted is encountered it is not written to the new file.

3. All the remaining records are written to the new file.

Part (d)

(i) Index-sequential file access

(ii) Index: 3; keys: 62 and 65

Section II – Productivity Tools

Question 7

This question tested candidates' knowledge of basic features of a spreadsheet program.

Candidates' performance on this question was quite good. For Part (a), many candidates indicated the IF function but were unable to indicate the correct test condition and results. The correct response was

=IF (C2='Junior', 100, 200) or
=IF (C2='Senior', 200, 100)

For Part (b), the majority of candidates provided the correct SUM function as =SUM(F2:F6). In some cases, candidates used the addition formula which is =F2+F3+F4+F5+F6.

In Part (c), the majority of candidates did not indicate currency as the numeric data format applied to column F. In a few cases, candidates indicated dollar or money format which was acceptable.

Part (d) was poorly done. The majority of candidates did not identify STATUS as the primary field and YEARS or RATE or FEES as the secondary field used to sort the data.

Question 8

This question tested candidates' knowledge of basic features of a database management program.

This question was satisfactorily done by the majority of candidates. For Part (a), the majority of candidates provided the correct data type for the Sector field (text or alphanumeric) and the Employees field (numeric).

For Part (b), the majority of candidates identified CID as the primary key for the Company table.

In Part (c), many candidates identified that the company table was sorted on the Employees field in ascending order.

For Part (d), many candidates stated that the *C code* field would be used to join the two tables.

Part (e) proved challenging to the majority of candidates who could not write the correct query. Some candidates provided the results of the query rather than the query itself. An example of a correct query is as follows:

Sector = 'Telecommunications' AND Employees > 200.

Section III – Problem Solving and Programming

Question 9

This question tested candidates' ability to complete a truth table on a given set of rules and to write pseudocode to represent one of the given rules.

Part (a) was well done by the majority of candidates who completed the truth table correctly with the response P, R, R, F.

Performance on Part (b) was satisfactory. Some candidates indicated AND and OR as the Boolean values instead of Y and N.

Part (c) was poorly done as the majority of candidates could not write the correct algorithm for the given rule. An example of a correct response is as follows:

If (test1=Y) and (test2=Y) then grade = P

Question 10

This question tested candidates' ability to write program fragments using the PASCAL programming language for two given tasks.

Many candidates avoided this question. The use of arrays in programming challenged candidates. An example of a correct response is as follows:

(i)
```
For index :=1 to 10 do
Num := Num + LONG[index];
Writeln(num);
```

(ii)
```
For index := 1 to 10 DO
if (LONG[index] < 9)
then writeln(LONG[index]);
```

Question 11

This question tested candidates' ability to complete a trace table based on a given algorithm and to indicate the purpose of the algorithm.

This question was well done by the majority of candidates who completed the trace table correctly. The acceptable result was 2, 4, 6, 8 or for an infinite loop 2, 2, 2, 2. For Part (c), many candidates provided the purpose of an algorithm rather than the purpose of the given algorithm. The purpose of the given algorithm was to multiply each number by 2 or output the number 2, if it is an infinite loop.

Question 12

This question tested candidates' ability to explain commonly used programming concepts.

This question was poorly done by the majority of candidates who were unable to explain the given programming concepts and to provide one example in each case. An example of a correct response is as follows:

(a) Conditional branching gives a choice based on a condition.
E.g. IF -THEN, and IF-THEN-ELSE

(b) Looping structure replicates or repeats the same process until the end or it stops.
E.g. WHILE, REPEAT, FOR

(c) Debug a program finds errors so that the program can be corrected.
E.g. syntax and logic errors

(d) Declaring the variables assigns data types to variables.
E.g. Var x: integer

Initializing variables assigns initial values to variables
E.g. c = 9

(e) Document a program inserts comments within a program so that the program logic is easy to follow. E.g. {This subprogram computes the sum of the numbers in the array}

Paper 03 – School-Based Assessment (SBA)

The SBA consisted of a practical project testing the productivity tools (Word processing, Spreadsheets and Database Management) and problem-solving and programming profiles. Generally the presentation of the SBAs has improved. In most cases, the description of project was not submitted. Each project component should be strictly separated and labelled.

COMMENTS/RECOMMENDATIONS FOR TEACHERS

Sample Uniqueness

- In many cases, there was a lack of uniqueness among SBAs from the same centre. In fact, evidence showed in many samples that one student's work was used for the other students' samples, or an outline provided for the students to insert a few changes prior to submission.

Moderation Sheets

- The samples sent by the school should match that generated by the CXC SIRS system.
- Computer-generated printouts must match the marks and students on the moderation sheet and samples submitted.
- Teachers should mark the SBA and place the grades on the moderation sheet next to teacher's grade.

Mark schemes

- Some teachers failed to adhere to the current CXC guidelines and mark scheme.
- It is recommended that teachers familiarize themselves with the current CXC mark scheme to allow candidates a better chance of gaining marks for the tasks.
- Schools that have more than one teacher did not work together to produce one project and one mark scheme.
- An individual, detailed mark scheme was missing from a number of samples.
- Individual mark schemes need to be submitted for each of the five students.

Hard and Soft copy Submissions

- In more instances this year, teachers submitted only soft copies (CDs and memory sticks) and did not submit hard copy printouts that were required. Only *printouts* will be marked.
- Teachers are therefore advised to submit hard copy and not soft copy samples which must follow CXC guidelines.
- Teachers should make sure that each student's SBA is bounded and properly labelled.

- For teachers who have worked at marking centres, please be advised not to submit samples with 'M's on the pages. This is only done at CXC marking centres and is final.
- Teachers are advised not to use red or green ink when marking the SBA as these are used by the moderators. Black ink or pencil is acceptable.

- Teachers should avoid submitting lengthy, irrelevant data in the SBA. Fifteen to 20 pages for each component is more than adequate.

- Where there is more than one teacher, one common SBA and mark scheme should be submitted.

- No half marks should be awarded for any task.

- Marks should be given for work actually completed by the student.

Word Processing

This year students must be commended for their creativity in the flyers, brochures and invitations.

- SBA questions should be structured to assess skills relevant to the syllabus such as formatting features (inclusive of tables, columns, text formatting e.g. superscript, etc).

- Most students used headers and footers. No footnotes and endnotes were used.

- Too few students used columns.

- Appropriate paper sizes were not used for letters which should be A4/letter size paper.

- Most students inserted tables; however, they seldom used the formatting features for tables.

- Most of the formatting features were used by all candidates. However, superscript/subscript, simultaneous use of single and double line spacing and page numbers were rarely used.

- Transition from single-line spacing to double line spacing should be evident in students documented work.

- There was evidence that mail merge was done; however, most students failed to print the data source and primary document. The data source, primary and secondary documents (between three and five letters) should be submitted as proof/evidence of mail merge.

- Students imported well, however, most of the time the graphic or chart was inserted in the wrong position. The sizes of graphics and charts were also sometimes inappropriate. Teachers should encourage students to properly format all imported files to fit the given location.

- Students should be encouraged to use page numbering features.

Spreadsheets

- Overall the quality of students' submissions was good.

- Widespread lack of formulae sheets worked to the disadvantage of a number of students, leading to a reduction in marks awarded. Teachers must insist that students submit formulae sheets.

- Formulae sheets must be legible. Students should ensure that formulae sheet printouts are at default font size, or 100% zoom.

- Students need to place greater effort in formatting the spreadsheet in order to limit printouts. Too many unnecessary printouts were submitted. It is suggested that there be less than 30 printed pages for a single student's spreadsheet component.

- In some instances, graphs were not printed, or for the graphs which were printed, the axes were not labelled and had no titles.

- Sorted records should be clearly identified by highlighting or labelling the sorted range.

- Teachers and students need to concentrate more on quality of work done which are specific to the tasks, rather than copious quantities of unnecessary printouts.

- In the event of an insertion or deletion of records, records should be highlighted for easy identification.

- Many students failed to successfully perform advanced filtering.

- Students should pay closer attention to the colour scheme of charts, which would make charts more legible, especially if printed in black and white.

- Students need to be able to demonstrate the correct use of absolute cell referencing.

- Students should clearly indicate when a specific task is being executed. For example, if advanced filtering is the task, then a caption should be added to the results to indicate the criteria, if it is not previously indicated. Similarly, if sorting is the task, then a caption (label) indicating the particular field would be useful.

Database Management

General Comments

Overall, the mark schemes were good. The majority of SBA submissions used the mark schemes from the current CXC syllabus. As a result, there was less variation in the moderated marks. Usage of the new syllabus guidelines (effective from 2010) is very important.

- Teachers should try to keep records at the recommended number as stipulated by syllabus.

- Teachers should ensure that structures (design views of tables and queries) are submitted. Printouts of original tables, queries and report results are to be submitted. Screen shots should be used to supply supplementary evidence (primary key, criteria, calculated fields and sorting). Duplications of printouts should be avoided, however, evidence of modifications (sorting, additions and deletions of records) should be provided in 'before' and 'after' printouts.

- Try to fit tables/queries on one page.

- Ensure that formatting is done properly in Spreadsheet if data is to be exported to Database.

- There was an improvement in the presentation of samples. However, one neatly bound sample per candidate should be submitted with clearly defined sections (tables, queries, report) and graded individual mark schemes should always accompany each sample submitted.

Specific Comments

Developing Tables

Most samples showed evidence of two or more database tables. Although, some primary key evidence was seen there is a need for more hard copy evidence of primary keys used in the tables (use screen shots).

Simultaneous use of Two or More Tables/Files

There has been little improvement in this area since 2010. This section has still not achieved as well as required. Hard copy proof of relationship diagrams should be seen in the query design view.

Modifying database tables/files

Again, there seems to be little improvement since the 2010 report. There was not much hard copy evidence of addition/deletion/modification of fields or records. This activity can be evidenced by students submitting printed copies of the *before* and *after* modifications to table/records. Printing of the structure that initiated the modification can also be done. An example here is the *Delete* query or the *Make Table* action.

Queries

In general, simple queries were well done and there was a slight improvement in the ability of students to perform queries with calculated fields. However, more emphasis should be placed on performing complex queries. The design views of all queries should be included to provide evidence of activities performed. The following should be included:

- Simple queries
- Complex queries
- Calculated fields

Sort a Database File

This activity was performed well by most students but a little more emphasis can be placed on sorting in a table.

Generating Reports

This section of the syllabus was well done by many of the students; however, a few samples did not show statistical and/or summary features and grouping. It should be noted that as much as possible an 'appropriate' report title must be used. The design view of the report is not necessary.

Programming

General Comments

1. Project Description

Teachers should ensure that the scope of the project meets the requirements as detailed in the syllabus (P.27–29). The project should be sufficiently substantive to cover all the elements and skill sets measured by the mark scheme. These should include:

- at least three variable types
- use of array data structures
- variations of control structures

Some of the problem descriptions submitted this year were trivial and hence provided limited scope for students to demonstrate a variety of approaches to the problem solving.

2. Student responses

Teachers are encouraged to provide sufficient guidance to allow students to complete their assignment but should resist giving them the solution. In a number of cases, students' responses showed an extremely high degree of similarity. Emphasis should be placed in making students aware of the difference between an algorithm/pseudocode and a source code. Further, teachers need to ensure that students understand the nature of a 'problem statement'. It should not simply be the restatement of the project description. Note also that program solutions should be confined to the program language specified in the syllabus—Pascal.

3. SBA submission

Samples submitted should be properly packaged. That is, ***all*** printouts for each sample must be securely fastened and a mark sheet attached. Sections should be appropriately demarcated. ***Only*** printed copies of students' responses should be submitted. Soft copies on CDs, flash drives, etc. are not required for moderation purposes. Teachers should ensure that all sections of the student's work are submitted.

Specific Comments

Problem Statement/Definition

Generally, the problem statement was submitted along with the student responses. Students must follow the requirements given in the syllabus as stated on page 29. Some students used the IPO chart as a replacement for the problem statement/definition. This practice should be discouraged.

Representing the Solution in Flowchart or Pseudocode

Generally this area was fairly well done. However, the following should be borne in mind so that improvements can be made:

- Clearly indicate the start of the pseudocode with the word START.
- Students are required to do either a flow chart or pseudocode; not both.
- The control structures in flow charts must be clearly defined and used.
- Variables must be clearly identified, declared and initialized. It would be helpful if students create a data (variables) dictionary prior to developing an algorithm. The use of an IPO chart would be helpful in this regard.
- Arrays should be identified in the variable descriptors.

In developing the IPO chart, students should clearly indicate where looping and selection controls will be implemented. Control structures in flow charts were not properly done. For example, Yes/No options were not labelled, three or more flow lines going away from the decision box were used; there was a lack of connectors and inappropriate shapes; the processing box and input/output box were used interchangeably. In the pseudocode, there was little difference seen between that and the programming code. Students showed high proficiency in requesting data for storage and output of information.

Trace Tables

This section was very poorly done, or in some cases, not attempted. The following were observed:

- The variable names used in the algorithm were not identified in the trace table. In some cases, the variable names used were not in the algorithm at all. The variables identified in the trace tables should be mapped directly to the variables defined in either the algorithm or program submitted.
- Some projects did not require the creation of trace tables.
- A clear distinction needs to be made between an IPO chart and a trace table. A trace table cannot be used to replace an IPO chart.
- Students did not correctly show the data flow changes in the table, as sequentially defined by the algorithm.

Programme Working to Specification

The effectiveness with which the program achieved the objective

Generally, this was fairly well done. Most students were able to produce Pascal code but the majority of them did not produce evidence of the program actually running, in the form of screen shots—working programme and compilation—which should be submitted.

Language features used to achieve a working program

This section was generally well done.

Teachers must ensure that the problem design facilitates the use of IF- THEN- ELSE construct. Also, teachers must design the problem to facilitate a variety of looping control structures, especially with the use and manipulation of arrays.

Teachers are reminded that the use of 'Goto' to simulate loops is not allowed. Structured programming is what is required at the CSEC level.

Most students used two or more data types; however greater attention must be paid to variable declaration and initialization. In some projects, students used the actual data as variable names: for example, 4407: integer.

Most students performed the IF-THEN control appropriately but limited use of the IF-THEN-ELSE construct was observed. Some students used many IF-THEN and not an ELSE. Some students did not put the IF controls within a looping construct.

Looping controls were moderately done. Students need to properly initialize the looping controls. An example where a student started a while loop without initializing it is given below.

```
WHILE NAME <> 'END' DO
        READLN NAME
        {The NAME variable is not declared before the WHILE is implemented}
OR
READLN SCOUNT, NAME
WHILE ID <> 0 DO
        {Again, the ID variable is not declared before the WHILE is implemented}
```

Clarity of the program

This section was generally well done. However the following should be noted:
Program documentation should include the Pascal code, the author of the program, date created and a simple statement of the task the program sought to solve.

Screen shots are to be submitted to show program output

Students did not properly use indentation of the program code to enhance readability. Proper indentation of the program for printing of the program code is required. Too many candidates had everything in one margin and no indentation for looping and selection controls.