CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

JANUARY 2012

INFORMATION TECHNOLOGY GENERAL PROFICIENCY EXAMINATION

GENERAL COMMENTS

The January 2012 examination was the second one based on the revised syllabus for private candidates. One thousand and ninety-nine candidates wrote the examination. Approximately 48 per cent of them obtained Grades I-III compared with 32 per cent in January 2011.

DETAILED COMMENTS

Paper 01 – Multiple Choice

This paper consisted of 60 multiple-choice questions testing all areas of the syllabus namely; Theory (Profile 1), Productivity Tools (Profile 2) and Problem Solving and Programming (Profile 3). The mean score on this paper increased from 31.60 in 2011 to 35.74 in 2012; this represented approximately 60 per cent of the total mark obtainable on the paper.

Some areas with which candidates had difficulty and which require attention are:

- Determining the sequence in input-processing-output
- Determining the difference between wired and wireless
- Identifying the method of accessing a record using direct access
- Explaining the function of networks
- Recognizing the base used in a number system
- Identifying the type of processing that involves more than one processor
- Determining the output of an algorithm
- Identifying the data type for a particular value
- Recognizing the steps in solving a problem
- Recognizing page formatting features
- Identifying block operations that can be applied after selecting a paragraph
- Recognizing the steps in creating a website

Paper 02 – Structured Response Questions

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

Section 1 – Theory

Question 1

Part (a) tested candidates' ability to identify and name the hardware components of the central processing unit (CPU) of a computer. This part of the question was fairly well done by the majority of candidates. Candidates were able to identify each component namely, input or output device, control unit, ALU, main memory or secondary storage, with some even giving examples. A few candidates misinterpreted the question and gave incorrect responses such as hardware, software, SATA, command interface and BIOS.

Part (b) tested candidates' ability to interpret the hardware specifications of a given computer system. This part of the question posed difficulty for the majority of candidates. Some candidates simply rewrote the entire question while others identified the line numbers only without associating it with the optical drive or the processor.

Part (c) tested candidates' ability to differentiate between the access time of a moving head disk drive and a fixed head disk drive. This part of the question proved challenging for candidates. Many candidates tried to guess the answer by stating that the 'moving head moved' but did not say why it moved, where it moved or that there is a time factor involved. What was required was for candidates to indicate that the access time for a moving head is greater because the read/write head has to be moved to the track containing the data.

The mean score on this question was 4.27, which is less than half of the maximum mark obtainable.

Question 2

This question tested candidates' ability to convert a decimal number to its binary, octal and hexadecimal equivalent, then add and subtract two binary numbers. Some candidates failed to show any working and where the answer was also wrong, no mark at all was obtained. In cases where candidates showed working but got the answer wrong, some credit was awarded.

Part (a) was poorly attempted by the majority of candidates. The conversion from decimal 25 to binary for Part (a) (i) was well done, while most candidates stumbled with Parts (ii) and (iii) which required the conversion of decimal 25 to octal and hexadecimal respectively.

Parts (b) and (c) tested candidates' ability to add and subtract two binary numbers. Many candidates confused the question with 'Subtract 101_2 from 11011_2' as two's complement. In some cases, candidates subtracted 11011_2 from 101_2.

The mean score on this question was 3.68 out of the maximum of 10.

Question 3

This question tested candidates' ability to match a given device with the most suitable professional who uses the device. This question, attempted by the majority of candidates, was generally well done. Part (a) comprised seven devices to be matched. Some candidates appeared confused between the use of a web camera and a digital camera. In some instances, candidates did not follow the directives given in the question to "write the numbers 1 to 7 on separate lines in your answer booklet…and write the letter next to the correct number in your answer booklet." Many candidates rewrote the questions and drew lines to match the correct responses. Teachers are encouraged to remind their students to read through instructions to questions carefully.

Part (b) required candidates to describe the use of biometric systems. Most candidates were able to identify where biometric systems are found; others gave examples instead of pointing out that these systems are used at security points. Few candidates were able to identify the benefits of using biometric systems over traditional methods of collecting data.

Performance on this question had the highest mean score of 6.50 out of 10.

Question 4

This question tested candidates' knowledge of some applications and their associated media requiring them to indicate whether they were text, audio, visual or hypertext; Candidates also had to identify technical terms associated with networks and web-based applications.

Part (a) was well done. Most candidates were able to state that VoIP is associated with audio or visual media, IRC with text, and www with hypertext.

Part (b) required candidates to identify seven technical terms in a paragraph on networking. This question was attempted by the majority of candidates, and there were many correct variations for the technical terms.

The mean performance however fell below half of the 10 marks obtainable.

Question 5

Part (a) tested candidates' understanding of methods used in preventing unauthorized access to computer facilities. Its subsections also tested candidates' knowledge of data integrity, data security and firewalls.

Many candidates who attempted this part received full marks. Some candidates listed restrictions that prevented access to the software instead of restrictions on physical access to the computer facilities.

Most candidates who attempted Part (b) explained data security correctly but could not properly explain or even attempt to explain data integrity.

Many candidates attempted Part (c) (i) which required a definition of 'firewall'. Most of the definitions given were inaccurate although candidates were able to explain a firewall's uses. Part (c) (ii) was attempted by most candidates. Although many of them listed viruses and Trojans as possible answers which were incorrect, some candidates correctly identified hacking as an unwanted incident that a firewall could prevent.

The mean performance on this question was 4.03 out of a maximum of 10.

Question 6

This question tested candidates' ability to identify given documents that were either hard copy, soft copy, source, turnaround or machine-readable.

Part (a), which dealt specifically with hard copies, was well answered although in some cases candidates used their own letters such as X, Y, or Z as well as the names of the forms instead of the required letters A, B, C, or D given in the question.

Part (b) required candidates to identify one form or document which was an example of a soft copy, source document or turnaround document. This was well answered, although some candidates wrongly listed 'flash drive' as a response. Some candidates could not explain the concept of a turnaround document.

Part (c) required candidates to give one example of data that would be found in one or more given documents concerning car registration. Many candidates were unable to appreciate the differences in the various documents and hence had difficulty correctly stating what data they contained.

The mean performance on this question was 5.67 out of 10.

Section 2 – Productivity Tools

Question 7

Many candidates seemed to have difficulty with this spreadsheet question.

In Part (a), candidates were asked to state the range of data containing a certain area of the spreadsheet. The use of the word 'range' or phrase 'range of data' appeared to present difficulty for some candidates.

For Part (b), candidates were asked to write a function to find the average value of a range of data. Most candidates had difficulty with the 'function' feature. It was confused with the

formula use of SUM, AVERAGE. For example, in summing, candidates wrote =A3+A4+A5 instead of =sum(A3:A5)

In Part (c), candidates were asked to identify the formatting feature that was applied to a set of values. Many candidates used formatting features for word processing (for example 'data was centred' or 'right-justified') instead of using the spreadsheet formatting feature, for example, *comma, currency*.

For Part (d), candidates were asked to state the column heading that was used to sort a set of data. This was fairly well done although some candidates responded with the column label (for example, column B) not the actual heading (for example, POPULATION).

In Part (e), candidates were required to write an 'IF' function to be inserted in a specific column. Most responses to this question indicated a good knowledge and use of the IF statement, however, many responses revealed that candidates had difficulty with the correct format and syntax of this function.

The mean performance on this question was 3.15 out of a maximum of 7.

Question 8

This question was based on database management. Candidates were asked to identify data types of fields, the primary key in a table and write queries.

In Part (a), candidates were asked to identify the data type of a field. The majority of candidates responded well to this question.

In Part (b), candidates were asked to state the name of the primary key from data in the table. This was mostly well done although some candidates identified the incorrect item as the primary key suggesting lack of knowledge. The majority of candidates were able to correctly extract the record as required in Part (c).

For Part (d), candidates were asked to write a query. Many candidates had problems identifying the criteria for REG_DATE. Many of them gave the results of the query rather than the query itself, while others did not use the '>=' operator effectively suggesting a lack of knowledge on operators.

In Part (e), candidates were asked to state the name of the field that was used to group a set of records. This was mostly well done, although some candidates wrongly stated that the primary key was the answer.

In Part (f), candidates were asked to state which record would be first in a sorted list. This was mostly well done, although some candidates gave a different ENGINE_CC number (a different number in the *same column* or the highest number in the series). Some candidates were not able to solve this problem in order to yield the correct answer. Some gave the value

in the top position while others gave the value at the bottom of the Vehicle table. This suggested that candidates confused 'ascending order' and 'top of sorted list' with 'top' referring to the 'first record'.

The mean performance on this question was 3.13 out of 7.

Section 3 – Problem Solving and Programming

Question 9

This question tested candidates' ability to complete a truth table on a given set of rules. It also tested their understanding of logical operators.

In Part (a) (i), candidates had difficulty completing the truth table. A few candidates wrote the algorithm into an input-processing-output table. In Part (a) (ii), candidates seemed not to know the differences among DIV, MOD and /. Answers included the division symbol, the word divide, X and ADD.

Part (b) was well done although some responses revealed that some candidates had difficulty providing examples that used relational operators <, >, <>, and =. In some cases, the symbols were not used while some candidates wrote out the expressions.

The mean performance was 8.26 out of the maximum of 15 attainable.

Question 10

This question tested candidates' understanding of the components of a Pascal program as well as their ability to identify appropriate Pascal code from the program for given conditions such as loop, assignment statement, and declaration.

Part (a) required candidates to indicate what the four programming symbols below represent. Candidates gave responses such as:

(i) ; semicolon *instead of* end of statement
(ii) { curly bracket or open bracket *instead of* start of comment
(iii) := equal sign *instead of* assignment statement
(iv) . full stop *instead of* end of program

Part (b) asked candidates to identify the type of error produced by a specific line in the program. Candidates could not differentiate between a logic error and a syntax error. Some candidates gave responses like grammatical errors, procedural errors and typing errors.

Part (c) required candidates to write appropriate Pascal code to illustrate a loop, assignment statement, declaration, program header and condition from the program provided. Candidates did not interpret the question properly as they did not refer to the given program, but wrote

their own program to answer that question. In Part (c) (i), very few candidates were able to identify a loop from the given program; some drew an actual loop  or used a flow chart. In Parts (c) (ii) and (iii), candidates wrongly used the assignment and declaration terms interchangeably. In Part (c) (iv), some candidates wrote the program header as SumNumbers and not Program SumNumber. In Part (c) (v), many candidates wrote while (i <= 3) and not (i <= 3) for condition.

Teachers are encouraged to remind students that when answering programming questions, responses should reflect the programming language; answers should not be composed as though students are responding to an English Language paper.

The mean performance on this question was 2.97 out of a maximum of 10. This means there is still a long way for both teachers and students to go on this aspect of the syllabus.

Question 11

This question tested candidates' ability to identify the components of an array, write statements and fragments of code to return 'write' values to and retrieve values from the array.

In Part (a), candidates were asked to state the size of the array illustrated in the question. About half of the responses suggested that candidates did not understand the basic concept of an array. Some candidates stated 14 cm, 4 kg, rather than the correct response of 4.

For Part (b), candidates were asked to write the order of index numbers that would output the letters CAT from the illustrated array. This was well done as candidates were able to trace the letters and identify the index.

Part (c) required that candidates write a fragment of Pascal code to output the contents of the array at index number 1 of the illustrated array. The majority of candidates did not attempt this part.

Part (d) asked candidates to write a fragment of Pascal code to write the letter 'Z' into each cell of the array. Again the majority of candidates did not attempt this part; however there were some candidates who received full marks.

The mean performance on this question was 3.75 out of a maximum of 15.

Question 12

This question tested candidates' ability to write a simple algorithm to perform three tasks: prompt for a letter; write a line to read the letter into a variable called CHECK and if the letter is equal to 'A', then output the word 'Good'.

Many candidates wrote a Pascal program or drew flow charts instead of writing an algorithm.

In Part (a), many candidates wrote the instructions 'Prompt for a letter' directly from the question or used a variable 'Letter' instead of prompting the user for the input of the letter while for Part (b), many candidates used the variable 'LETTER' instead of 'CHECK' for the input of the letter.

Part (c) was done well by most candidates.

The mean performance on this question was 2.75 out of a maximum of 5.

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

This paper is the alternative to the SBA and consisted of four questions testing the Productivity Tools and Problem-Solving and Programming profiles.

Question 1 – Word Processing

This question tested candidates' knowledge of the various features from a given letter presented in a word-processing application.

In Part (a), candidates were asked to state the justification that was used in the first paragraph of the body of the letter. Most candidates misinterpreted this part by actually giving a justification for the content of the letter instead of stating that the paragraph was fully justified. A few candidates stated left or right justification which was also wrong.

Part (b) required candidates to indicate whether a header, footer or footnote was used in the letter. Most candidates stated both header and footer when only footer was used in the letter.

In Part (c), candidates were asked to identify the line spacing used in the second paragraph of the body of the letter. This part was well answered although some candidates answered that the line spacing was '1.5 points' instead of 1.5

For Part (d), candidates were asked to describe how the hyperlink shown in the letter could be removed. Many candidates obtained only one of the two marks for correctly stating *highlight/select/click on the hyperlink*, but failed to get the second mark because they did not state the *Remove Hyperlink* option.

Part (e) required candidates to explain how the web address stated in the letter could be given a red colour font. This was correctly answered by the majority of candidates. Similarly, Parts (f) and (g) which concerned formatting features were also well answered with some candidates earning full marks.

In Part (h), candidates were asked to identify three illustrated icons used in a word-processing application. Part (h) (i) illustrated the icon to insert bullets; responses such as bullets, points

and lists were the popular answers. For Part (h) (ii), many candidates were able to correctly identify the UNDO icon, however few candidates were able to correctly identify the line spacing icon for Part (h) (iii).

In Part (i), candidates were required to name two documents required to perform a mail merge. Some candidates were not able to identify these two documents as primary/main and data source/secondary. A few candidates correctly identified the secondary document as Excel and a table in Database.

Part (j) was about merge fields. Merge fields seem to be a source of much confusion amongst candidates. This question was poorly done.

The mean performance for this question was 10.81 out of 20.

Question 2 – Spreadsheet

This question tested candidates' knowledge of the various features of a spreadsheet application. The question was based on a range of spreadsheet data and a chart. Most candidates knew what a range was and gave the correct responses in Part (a). Not many candidates understood numeric formatting such as the comma feature, hence Part (b) was poorly done. Although Part (c) on alignment was well handled, a few candidates wrote right justify instead of right align.

In Part (d), candidates were asked to write functions or formulas to calculate the total, minimum and average values in given ranges. The total and minimum values were correctly given; however writing the average was poorly done. Most candidates did not know how to write average and some wrote *ave*, or *avg* with or without a range.

Part (e) required candidates to identify which value would be at the top of a given range. This was well answered by the majority of candidates.

In Part (f), candidates were asked to state the spreadsheet feature that would cause Row 1 to remain visible as users scrolled down the rows. This was poorly done. It was quite apparent from the responses that candidates were either not taught this feature or had never applied it.

Most candidates knew about relative and absolute cell referencing in Part (g); in Part (h), the majority of candidates seemed not to know how to complete a select query. Part (i) was very well done. Though some candidates did not know how to create the query, they knew what records would be extracted.

Candidates were able to name the given chart in Part (a) (i); however, in Part (a) (ii), many of them were unable to state the range of data that was used to create the chart. Part (a) (iii) was fairly done as candidates were able to state that the purpose of the chart was to show the percentage of elderly persons in given regions.

This question had the lowest mean score of the four questions on the paper (6.29 out of 20).

Question 3 – Database Management

This question required candidates to answer questions based on two tables and a report produced from a database.

For Part (a), it seemed as though candidates were unfamiliar with the different data types and in Part (b), they were unable to demonstrate a good understanding of the concept of a primary key.

In Part (c), most candidates who attempted this question were able to complete the table.

For Part (d), candidates were required to identify various aspects of a given report. Many candidates were able to state the title of the report. Many of them were unable to identify the field on which the records were grouped. Some candidates were also unable to identify one or more fields that were sorted in a report. However, the majority of candidates were able to extract information from the report such as the total number of reported cases. Teachers are asked to provide more examples of grouping in reports during theory and practical lessons to help candidates identify fields that are grouped.

In Part (e), most candidates did not know how to create a calculated field although they knew how to write the calculation. Some could not apply the calculation to the correct field name such as ROC:[conviction]/[reported cases] *100

For Part (f), many candidates were able to accurately identify the field needed for the query; however, they were unable to correctly write the criteria. Many of them were unable to distinguish among >, <, <=, or >=. Candidates were also unable to write the result of the query; instead many of them rewrote the data in the table.

The mean performance on this question was 7.64 out of a maximum of 20.

Question 4 – Problem Solving and Programming

This question tested a wide range of problem-solving skills, from basic knowledge to analysis and interpretation. Candidates were asked to answer questions based on a fragment of Pascal code.

In Part (a) where candidates were asked to identify a constant from the Pascal code, some confused a constant with a variable and where they were required to write an appropriate data

type for a particular variable, some of them were unable to correctly state the data type as *real*. Emphasis should be placed on the distinction between integer and real value. In the subsection where candidates were asked to write an appropriate variable name to replace MISC, many of them did not understand how to use appropriate variable names to replace other variables. Where they were required to indicate the location of the cursor after a statement was executed, candidates seemed unable to differentiate between write and writeln statements in Pascal. The majority of candidates stated that the output would appear at the end of the line instead of at the beginning of the next line.

Where candidates were asked to explain the purpose of using -99 in a statement, some of them were able to identify -99 as the sentinel or dummy value but many of them could not explain the purpose of that particular value, which is *to stop the execution of the loop*.

In the subsection where candidates were asked to draw a flow chart to represent the fragment of code, the number of responses was very high which suggests that teachers spent a lot of time on flow charts and flow charting symbols. However, many candidates could not correctly draw the flow chart for this question; some of them used symbols in incorrect locations. Many candidates also used a graph or even pie chart to answer the question which was quite strange.

Where candidates were asked to indicate whether certain operations and statements were found in the given code, many of them could not identify whether the fragment of code contained a logic operation or a conditional statement — neither of them were in the code. Teachers are advised to concentrate on distinguishing between logic and arithmetic operations, conditional statements and loops.

In Part (b), candidates were asked to copy and complete a truth table by representing 1 as passing a subject or passing the SBA and 0 as failing a subject or failing an SBA.

In Part (b) (i), candidates could not correctly give the result of AND (the relational operator) in the truth table. Many candidates seemed unable to understand what the term *condition* meant when they were asked to write two conditions necessary for passing a subject. The correct answer was *to indicate 1 for passing the SBA and 1 for passing the exam*.

The mean performance on this question was as low as 8.76 out of the total of 30 attainable.

Observations and Recommendations

Although candidates' performance on Profile 3 (Problem Solving and Programming) seemed to have been much better than last year, problem solving with Pascal continues to pose problem for candidates. The ability to complete a trace table, write an algorithm, write fragments of code in Pascal and analyse a Pascal program are specific areas in which mastery remains elusive.

As has been previously recommended, the Ministries of Education of the participating territories are advised to continue to run teacher training workshops in Information Technology to prepare teachers to be able to address the deficiencies identified in particular and all areas of the syllabus in general.