CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE CARIBBEAN ADVANCED PROFICIENCY EXAMINATION MAY/JUNE 2008

INFORMATION TECHNOLOGY (REGION EXCLUDING TRINIDAD AND TOBAGO)

INFORMATION TECHNOLOGY

CARIBBEAN ADVANCED PROFICIENCY EXAMINATION

GENERAL COMMENTS

The number of candidates sitting this year's examination decreased when compared with the number entered for the examination in 2007. The overall performance for this year was slightly higher than 2007.

Despite suggestions and recommendations from the Examining Committee in previous years' reports, the quality of candidates' responses on Paper 02 continues to be of major concern to the examiners. Questions, which assessed the high order skills, such as, Application and Analysis (AA) and Synthesis and Evaluation (SE), have posed a challenge for the majority of the candidates as evidenced by the low scores on questions that use such verbs as explain, justify, discuss, examine and distinguish. In addition, a number of candidates have failed to provide appropriate responses based on a given scenario. Their responses oftentimes completely ignore the scenarios and therefore are unacceptable.

To address the concerns regarding the poor quality of responses to questions, which use such verbs as **explain, justify, evaluate, examine and distinguish**, teachers are encourage to include more of such questions on internal examination papers and for homework assignments.

A few candidates scored full marks on Questions 1, 3 and 6 of Paper 02. An analysis of candidates' performance by module revealed that candidates did better on the questions in Module 1, followed by Module 2, then Module 3.

Improved performance was seen in the quality of responses for questions on Paper 03/2 when compared with performance on previous examinations.

INTERNAL ASSESSMENT

The Council received a vast number of Internal Assessment (IA) reports. A wide range of emerging technologies were examined, including:

- Blue Ray Disc
- HD DVD
- Graphene FET
- Micoach Personal Trainer
- Smart Phones
- Bionic Contact Lens
- Video Glasses
- VoIP
- Fly by Wire
- DSL
- WiMAX
- Wi Fi
- GPS Shoes

Most of the topics were well chosen and researched. However, in some instances, topics were examined that cannot be considered emerging in the territory of the candidates as they have been in existence for more than two years. Some of these topics are:

- ADSL
- GSM
- Bluetooth
- Wireless technology

In addition, some topics examined clearly cannot be considered an emerging technology in the field of Information Technology.

There were instances where topics chosen by candidates were so new to the market that very little researchable information existed, hence candidates found it very difficult to fully describe the technology, give a relevant comparable existing technology and/or give potential uses of the technology.

Overall, effort was made to ensure most projects were organized and well presented. There was obvious evidence of research, and guidance from teachers.

PAPER 01

A new format for Paper 01 was introduced: a shift from a series of short answer responses to multiple-choice format.

The paper was comprised of 54 items, with 18 items per module.

PAPER 02

SECTION I

INFORMATION SYSTEMS

Question 1

This question examined candidates' knowledge and understanding of the hardware subsystems – input, processor, memory, (auxiliary or secondary storage), communication, and output – of the computer system, and the relationship between subsystems, as well as, the health problems that could arise from the use of the computer system. The question was attempted by approximately sixty-five percent of the candidates and was generally done by most candidates. Approximately 65 per cent of the candidates scored 20 or more marks.

In Parts (a) and (b) most candidates correctly stated and gave long appropriate examples of the other subsystems of the hardware component of a computer system: **storage (main/primary and auxiliary/secondary), input, output and communication**. A few candidates confused the stages in data processing (data entry, collation, collection, analysis, documentation) as sub systems of the hardware component of a computer system. In addition, a few candidates gave CD and hard drive as an example of primary storage.

For part (b) (ii), some candidates lost marks for providing inadequate responses regarding the function of the subsystems. For example, the input subsystem not only accepts data but also converts the data into a form suitable for processing.

In Part (c) for the block diagram, some candidates used a single one-directional arrow rather a bi-directional arrow between main memory/primary storage or auxiliary/secondary storage and the processor. A few candidates drew diagrams on which the arrows were (1) pointing in the wrong direction between input and processor, or processor and output, and (2) connecting wrong pairs of subsystems e.g. input and output, and input and communication. Teachers must ensure that the candidates are made aware that these subsystems **cannot be directly linked to each other.** In addition, the role and function of the processor within the hardware component of a computer system must be underscored.

In Part (d) a number of candidates could not identify three health problems that could arise from the use of computer systems. A number of poor responses were given such as:

- Radiation Poisoning
- Repetitive Eye Injury
- Epilepsy
- Obesity
- Wrist Fracture
- Arthritis
- Finger Sprain
- Rising blood pressure
- Rising blood pressure due to malfunctioning

Examples of good responses were:

- Health Problem – Repetitive Strain Injury
  Cause –repeating the same hand movements frequently or over prolonged periods of time
  How the risk can be reduced – providing wrist support, varying work or taking regular breaks

- Health Problem – Headaches
  Cause – the glare from the screen, a faulty monitor or light shining on the screen
  How the risk can be reduced – use of anti-glare filter, adjusting or replacing faulty monitor, use of blinds or correct lighting, adjusting the distance between the monitor and line of vision.

Question 2

This question was designed to test candidates' knowledge and understanding of the software engineering process, data flow diagrams and types of information systems. Approximately thirty-five per cent of the candidates attempted this question. Most candidates performed below the acceptable level. Only four per cent of the candidates scored 20 or more marks.

In Part (a) the majority of the candidates scored on average three out of a total of six marks. They did not seem to have fully grasped an understanding of each phase in the software engineering process.

> It is recommended that teachers carefully distinguished among the phases when transferring knowledge to their student. The teachers could also state/identify specific tasks and allow candidates to determine which phase is being implemented.

In Part (b) nearly all of the candidates were able to state four of the phases in the software engineering process. Some candidates mentioned feasibility study as one of the phases of the process; but were unable to articulate the difference between the feasibility study and the analysis phase. Also, most of the candidates were unable to explain clearly the function of each phase identified.

> It is recommended that the teacher ensure that candidates understand that:
>
> "The feasibility study focuses on how viable the information system is and if it is needed in the organization", whereas, "The analysis phase focuses on gathering data on the current system to determine the problem that needs to be solved and the requirements of the proposed system."
>
> Additionally, teachers need to use learning strategies/methods that will allow candidates to be able to distinguish among the phases.

In Part (c) most candidates performed poorly. Many of the candidates answered the questions using a Level 1 data flow diagram. This was evident as the candidates included data stores and more than one process symbol in their diagrams. Additionally, a number of candidates used verbs in naming the data flows when only nouns were to be used. The candidates showed that they did have an understanding of how data should flow in the system.

> It is recommended that the candidates be carefully taught how to distinguish between a Context Level diagram and a Level 1 diagram

In Part (d) the majority of candidates correctly identify each type of information system. However, a few candidates gave responses such as 'Regulate and Control System' or 'Control System' rather than 'Monitor and Control system'. Most candidates were not able to fully justify their choice.

> It is recommended that the teachers ensure that candidates fully appreciate the function and need for the various types of information system.

SECTION II

INFORMATION PROCESSING AND PRESENTATION

Question 3

This question assessed the candidates' knowledge and understanding of the purpose and features of software productivity packages and of the different types of information systems. The item was attempted by approximately eighty percent of the candidates and was generally done at an acceptable level by most candidates. Approximately seven per cent of the candidates scored 20 or more marks.

In Part (a) (i), some candidates did not provide the generic names of the two other productivity tools such as spreadsheet, databases, graphics, etcetera that could be found in Office suites but rather they gave named examples of these tools – Microsoft Access, Microsoft Excel, being two examples. Candidates' responses should be guided by the information given in the stem of a question, which cited word processor as an example. A few candidates listed tools that are generally not a part of any office suite - desktop publisher.

For part (ii), most candidates could not name office suites: Corel's WordPerfect Office, Open Office, Star Office, and Lotus Smart Suite. Rather, they named productivity tools that make up part of a suite such as Lotus 1-2-3, Microsoft Access, Microsoft Excel, etcetera. A few candidates gave answers such as general purpose, customized software packages and operating systems.

> It is recommended that teachers should ensure that candidates know at least four suites and what is contained within each suite. This can be done through research or via presentations.

In Part (b) generally well done by most candidates. However, a number of the candidates provided responses expected at the CSEC level rather than at the CAPE level. For example, the use of different font sizes to make the advert appealing. A more appropriate response is "insert images of bouquets/balloons in the advert to make it eye catching and to depict the type of arrangements that are available to customers" or "use of the spelling and grammar feature to ensure that the advert would be error free and show professionalism"

Part (c) was generally poorly done by the majority of candidates. Most candidates' responses revealed their lack of exposure to and familiarity with the desktop publishing package and, as a result, their inability to distinctly state the advantages and disadvantages. In addition, this unfamiliarity caused them to confuse the advantages and disadvantages, using them interchangeably. Most responses indicated that the candidates did not realize that there ought to be a comparison between the two packages as they stated the same features for both software packages. Only a few candidates appeared to have had knowledge of the differences between both word processor and DTP. These candidates were able to discuss advantages of DTP over word processing such as:

- Flexibility in formatting and aligning blocks of text on a page around graphics, using different orientation of texts.

- The page layout feature of the DTP, which allows each page to be formatted differently, and which would be harder to be accomplished when using a word processor.

It is recommended that teachers expose candidates to the DTP package not just in theory but also, through practical exercises both in and outside of class. This will allow them to become more aware of what tasks can be done using this package. They could also be asked to produce business documents for an exhibition (e.g., a Business Expo).

Part (d) most candidates were able to correctly identify software package most appropriate to use in performing a given task. However, several of them were unable to justify their response.

Question 4

The question examined candidates' ability to apply their knowledge and understanding of database concepts to a given scenario. Approximately twenty percent of the candidates did this question. Most candidates performed below the acceptable level. The responses of most candidates indicated a lack of knowledge and understanding of key database concepts. Only one candidate scored above 20 marks.

In Part (a) (i), most candidates gave a poor definition of a primary key; evidenced by the absence of keywords such as attribute/field, unique, and row. In addition, a few responses of the definition referred to the use of the primary key, e.g., "primary keys are used for creating relationships/links", rather than defining the term.

Most candidates were able to identify the primary key within each of the tables for part (ii). In some instances the primary key was combined with another attribute unnecessarily, for example, Item_code + Supplier_code in the Item table.

In parts (iii) and (iv), it appeared that a number of candidates did not understand the questions and so could not offer suitable responses. Candidates were unaware that links are due to the existence of relationships between tables, and that the nature of the relationships between tables may be one-to-one (1:1), one-to-many or many-to-one (1:M) and many-to-many (M:M) and are based on certain assumptions. For example, for part (iv), if the key fields of the item table and the supplier table are item_code and supplier_code, respectively, then the relationship between tables is one-to-one, and the assumption therefore was that an item is supplied by only one supplier.

Part (b) was generally poorly done by most candidates. In most cases, data values were confused with attribute/data names. For example, data values such as "luxury item", and "non-taxable item" were all listed as attribute names. The attribute and table names should be indicative to the data that they hold. A suggested response for the table is as follow:

Tax table

Tax_code
Tax_description
Tax_rate

In Part (c) most candidates did not perform well. Generally the candidates listed features of the package, but did not show how each could be an advantage/disadvantage. For example, queries and reports were stated as advantages of the database package. Although both features are also available in a spreadsheet package, to build a query or generate different reports from a single worksheet in a spreadsheet is not as easy to do as in a database. Therefore, ease of use would actually be the real advantage of the database package compared to the spreadsheet package for building queries and generating multiple reports. Other advantages include minimising redundancy of data, faster retrieval of information based on specified criteria, and ensuring data consistency. Regarding disadvantage, database packages do not allow for automatic recalculation when data values are changed, or 'what if' scenarios.

Part (d) was generally done well by most candidates, as they were able to identify the appropriate package. The justification however, for candidates at this level, lacked depth.

SECTION III

INFORMATION AND COMMUNICATION SKILLS

Question 5

This question was designed to test the candidates' understanding and knowledge of wireless communications. The question was attempted by approximately 60 per cent of the candidates. Most candidates performed poorly. Only two per cent of the candidates scored 20 or more marks.

Part (a) most candidates were able to get two (2) of the four (4) marks allotted for this part of the question. Candidates' responses kept repeating parts of the question itself, for:

> "Wireless communication is communication that does not use physical means such as wires. It uses the atmospheres or air to transmit data or information."

However, a more appropriate response would have been:

> "The system where data or information is transmitted using radio frequency, infrared or other types of electromagnetic or acoustic waves, instead of wires or cables."

Part (b) although most candidates were able to correctly identify two (2) devices, other than the computer, that operate using wireless communication technology, a number of them listed the telephone and intangible aspects of wireless communication (such as Bluetooth and infrared) as examples of wireless devices. Bluetooth and infrared are not devices. Bluetooth is a standard and communications protocol for personal area networks (limited range), whereas, infrared is an invisible band of radiation at the lower end of the visible light spectrum. Ideal responses of devices that operate using wireless communication would include:

- Cell phones (cellular)
- Radios
- Two-way radios
- Beepers or pagers
- Televisions
- Television remote controls
- Satellite phones

In Part (c) was generally poorly done by most candidates. Many candidates were able to identify devices that would facilitate access to the Internet, but failed to emphasize the wireless aspect, giving responses such as modem, network interface cards, router and adapter. Ideal responses would have been wireless modem, wireless card, wireless router, wireless adapter and microwave antenna or transmitter.

In Part (d) was generally well done by most candidates, who gave responses with appropriate justification, such as:

- Greater accessibility
- Mobility/portability (ability to move around without cables hampering movements)
- Not as much need for cables

However some candidates indicated that wireless communication was cheaper to use than traditional communication, which was incorrect.

In Part (e) the candidates failed to recognise the question also required a comparison with more traditional forms of access. As a result, most candidates gained only half of the marks allotted. With this oversight by the candidates, their responses in terms of identification of problems from a wireless standpoint could also be found under the traditional means of communication as well. The more appropriate responses would include:

- Relatively more expensive than traditional communication
- Harmful rays from radiation
- More security issues
- Clustering of ground space.

Question 6

This question was attempted by forty percent of the candidates. It assessed candidates' ability to demonstrate their understanding and knowledge of the characteristics and categories of information. This question was generally satisfactorily done by most candidates. Approximately 18 per cent of the candidates scored 20 or more marks.

Part (a) most candidates were able to identify four characteristics of information. However, few candidates confused the characteristics of information with the characteristics of information sources: currency, availability and breadth of coverage. Appropriate responses include accuracy, incomprehensibility, lifespan and relevance.

Part (b) a few of the candidates did poorly in this section. As stated in part (a), the responses referred to the sources of information source rather than the information itself. Some of the examples given to show the importance of the characteristics when evaluating information were poor. For example,

> "If information is accurate it must be from a source which is verified and have some experience on the topic of the information."

A good example of the characteristic – lifespan – is

> "When dealing with the stock market, the lifespan of information is very important since stock values quoted are constantly changing. Therefore, information pertaining to share values of stocks last week will not be useful in making buy-or-sell decisions today".

Part (c) candidates performed better on this part of the question, indicating that they possessed adequate knowledge and understanding of the categories of information.

Part (d) this part was generally well done. Some candidates misinterpreted the question and gave the characteristics of information as answers.

PAPER 03/1

INTERNAL ASSESSMENT

This project enabled candidates to examine the potential uses and issues related to a particular emerging technology, and to determine it applicability to their environment (school, community, country or the Caribbean region). Additionally, it enabled the candidates to demonstrate skills and competencies from each of three modules.

SECTION I

REVIEW OF EMERGING TECHNOLOGY

In most cases, this section of the IA was generally well done. Most candidates gave full descriptions of the technology, named and compared an existing technology and gave potential uses of the technology. However, some candidates misinterpreted the summary section, rather than summarizing section one; they gave summary of the data collected.

SECTION II

APPLICABILITY OF TECHNOLOGY

This section was generally not well done. Most candidates did not clearly identify the data types and information sources. The majority of those who did identify the data types and sources did not give any justification for their choice of data types or information sources. Data types refer to text, date, alphanumeric, and so on.

With regard to data collection methods, it was observed that the majority of the candidates were not clear on the data collection methods. Some candidates completely omitted this section from the IA. Others mentioned one of two methods, questionnaires and interviews. **Other data collection methods that could be included are observation, investigation/reviewing documents and research.**

Some candidates failed to mention the types of data processing methods they employed, and whether the method is manual or automated. In addition, most candidates mixed up the data analysis methods with the data processing methods as they mentioned the use of charts, graphs and tables as data processing methods. Data processing methods include spreadsheet, word processor, database, SPSS whereas data analysis methods include the use of charts, graphs, tables, making comparisons, interpretations and tendencies based on observation.

SECTION III

SUMMARY OF RESEARCH

This section was poorly done. Several projects lacked proper analysis. In a few instances, no analysis was done.

There were instances where the candidates failed to:

- state the problems they encountered,
- give summary of data analysis findings,
- identify possible follow-up projects or
- make appropriate recommendations.

However, despite this failing, teachers allotted marks.

Many candidates summarized the data, placing them in charts and tables, but failed to give an interpretation or explanation of what the data represent or how the findings would assist in determining the applicability of the technologies in their environment.

Note must also be made to the fact that several candidates use content straight from the Internet, without giving credit in references. Also, a number of the candidates failed to submit the project in the appropriate format; there were no headings, table of contents and bibliography.

Candidates should be reminded that the Layout of References must be done using the APA or MLA style and that **all** references used (including personal contacts) should be listed.

PAPER 3/2

ALTERNATE PAPER

SECTION I

REVIEW OF EMERGING TECHNOLOGY

The question tested candidates' knowledge and understanding of the emerging technology that they studied. Most candidates performed poorly.

In Part (a), most candidates identified the emerging technology but did not provide a description of the technology.

In Part (b), most candidates simply stated an intended purpose of the technology. There was no discussion regarding the intended purpose. In addition, they failed to indicate the level of success and general impact of the technology on societies.

In Part (c), most candidates responded with a statement or partial discussion of each potential benefit.

SECTION II

APPLICABILITY OF TECHNOLOGY

The question assessed candidates' knowledge and understanding of data collection and analysis methods that may be used in determining the applicability of the emerging technology in their environment. Most candidates performed poorly.

The candidates' responses suggested an unawareness of the following:

- The pros and cons of the various data collection methods – questionnaires; interviews; observation; investigation/research;
- Validation and Verification methods that may be used when collecting certain types of data;
- Data analysis methods – the use of graph, charts, tables, etc to discover trends and patterns.

Therefore, the basis of their discussion and explanation by the candidates was flawed.

SECTION III

INFORMATION AND COMMUNICATION SKILLS

The question tested candidates' knowledge and understanding of IT tools which could be used to communicate the findings of the research to particular target groups. Most candidates did poorly.

Most candidates described features of the tools identified in Part (a), rather than to show **how** they would use the features of the tools to present the information relating to the findings to the Public. Discussion of the problems when using a tool was, to a large extent, not organised, or merely simply a statement of problem.