

CARIBBEAN EXAMINATIONS COUNCIL

**REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION
CERTIFICATE EXAMINATION**

MAY/JUNE 2009

ELECTRICAL AND ELECTRONIC TECHNOLOGY

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ELECTRICAL AND ELECTRONIC TECHNOLOGY

TECHNICAL PROFICIENCY EXAMINATION

MAY/JUNE 2009

GENERAL COMMENTS

The number of candidates sitting the Technical Proficiency examinations increased to 3 800 as compared with 3 702 in 2008.

The overall performance of candidates resulted in approximately 78 per cent earning Grades III and above. Candidates did well on the practical project of the Internal Assessment component (SBA) but displayed the need for improvement on the written project. Competencies requiring attention are Knowledge and Application which are tested on Paper 01 (Multiple Choice) and Paper 02 (Essay/Problem questions) .

DETAILED COMMENTS

Paper 01 – Multiple Choice

Though candidates' performance on this paper compared favourably with the 2008 performance; there is still the need for better and broader coverage of Modules 1 – 4 and 6 – 7 of the Unit. Frequent practice for candidates in the use of the multiple choice format is advised. The mean score on this paper was 28.8 marks or 48 per cent out of the total mark of 60.

Paper 02 – Essay/Structured Restricted – Response Problem Questions

This paper comprised three sections A, B and C. Section A comprised five compulsory short answer questions, each worth eight marks. Section B comprised four questions worth 20 marks of which candidates were required to answer three questions. Section C comprised two questions each worth twenty marks. Candidates were required to answer one question.

Section A

Question 1

This question tested candidates' knowledge of Ohm's law and temperature coefficient of resistance.

Most of the candidates defined Ohm's law and solved the series – parallel circuit problem correctly.

Some candidates had difficulty in defining temperature coefficient.

Question 2

Properties of inductors and applications of transformers were tested in this question.

This question was popular among candidates. Parts of this question were done well.

However, some candidates did not understand the factors affecting the conductors and the use of laminations in transformers.

Question 3

This question tested the knowledge of power supply. Candidates were asked to state the advantages of full-wave rectifiers over half-wave rectifiers and properties of power supply output.

Most of the candidates attempted this question and some of them did well.

Some candidates were, however, not able to show the correct direction and connections of the diodes.

Question 4

This question tested the knowledge and applications of meters. Candidates were asked to identify the methods of changing the voltage and current range of meters.

A number of students could not explain correctly the techniques used to change the range of multi-meters. This concept is important in understanding the range of meters and should not be ignored while teaching this topic.

Question 5

This question tested candidates' knowledge of transmission and generation of electricity in commercial systems. It also tested candidates' understanding of primary and alternate energy sources.

The first part of the question was done well but a number of students could not define the difference between primary and alternate energy source.

Section B

Question 6

This question tested candidates' knowledge and application of a transistor circuit.

Candidates were asked to show, with diagrams, how to reverse and forward bias a diode and to calculate various values of a given transistor circuit.

The overall performance was poor and not many candidates attempted this question.

Very few candidates answered Part (a) correctly. Very few candidates explained the functions of the capacitors correctly.

More intense Laboratory activities will help to solve these problems. It seems teachers need to pay attention to this topic in the class, as transistors are the foundation of digital circuits.

Question 7

Knowledge and applications of digital circuits were tested in this question.

Candidates were asked to draw digital logic symbols and develop truth tables.

This was a very popular question and many candidates did well.

Some candidates did have problems deriving Boolean expressions from the diagram given in the question.

The section on the knowledge of computers was done well.

Question 8

The knowledge of primary and secondary cells, properties of primary cells as well as secondary cells were tested in this question.

Candidates were also required to calculate the impact of load in a battery circuit.

Most of the candidates could differentiate between primary and secondary cells and their properties.

Not many candidates performed well in the practical section where there was an impact of the load on the output current of the battery. They had difficulty in applying the formula of internal resistance to the circuit.

Question 9

This question tested the knowledge and operation of D.C. motors.

Candidates were asked to state the function of the variable-resistor and the compound field winding in a compound motor. They were also asked to explain the functions of a commutator.

Not many candidates attempted this question and it was poorly answered by those candidates who did.

Section C

Question 10

This question tested the knowledge of layout and wiring of electrical installations.

Practical understanding of the earthing in electrical installations was also tested. Candidates were asked to explain the function of different electrical components.

While most of the candidates listed the symbols correctly, a number of them could not properly explain the earthing features of installations.

Question 11

The candidates were asked to make a distinction between the terms 'Illumination' and 'Luminous intensity'.

Candidates were asked to define the features of different types of lamps, the operation of a fluorescent lamp circuit, and the testing of such circuits.

A number of candidates defined the terms correctly and were able to state the functions of different components in fluorescent lamp circuits. Very few of the candidates were able to connect two lamps controlled at two locations correctly.

Paper 03 – School-Based Assessment

Candidates continued to perform well in this component of the examination.

School-Based Assessment (SBA) is intended to be a diagnostic, formative and summative assessment tool. Candidates can present their best efforts once the suggested time frame is followed by teachers. The new format, requiring both practical and written projects, should be taken seriously if candidates are to develop the intended competencies.

The following guidelines on School-Based Assessment are reprinted here for the guidance of teachers and candidates.

Candidates are required to complete two assignment during terms four and five (Terms one and two of the examination year). EACH candidate is required to:

- (1) perform five laboratory exercises to be selected from a list of eight published by CXC. These will be worth 90 marks for the profile dimension, Practical Ability;
- (2) complete a written assignment set by the Classroom teacher in keeping with the guidelines outlined by CXC and based on the Common Modules A1, A7, and A8. This will be worth 30 marks for the profile dimension, Practical Ability.

N.B.: **Candidates and teachers need to approach the written component of the SBA with greater planning and analysis of what is required if the aims of the common modules are to be realized. The written assignment is an individual project.**

The School-Based Assessment Written Component

The written assignment is in the form of a report of about 1 000 – 1 200 words based on the common modules. These are:

Safety, Health and Welfare
Introduction to Computer
Impact of Technology on Society

Candidates are to demonstrate their full understanding of the concepts relating to these modules. They should produce a report that uses word-processing technology. Candidates may also use other software packages (spreadsheets or databases) to do any analysis that may be necessary to enhance the presentation of the report.

The report should be a critical analysis of a particular institution, business or theme that has relation or relevance to the Unit(s) or subject(s) being studied. It is suggested that one of two approaches be used.

1. Industrial visits

Preparation of a report on a visit to an industry or industrial site.

2. A report on a particular theme that is relevant to the Unit(s) or subject(s) being studied, for example,

- Transport – road, air, rail, or water
- Communication
- Manufacturing
- Service industry

The report should include drawings, and photographs, wherever these are relevant, in addition to the written material. The report should address the areas listed below.

- The jobs or careers involved in the particular institution or theme that relate to the Unit(s) or subject(s) being studied.
- The norms, regulations and codes of which employees in these areas must be aware and to which they must adhere, because of legal, financial, strategic or other considerations.
- The impact of technology on the careers identified and the processes involved as they relate to the Unit(s) or subject(s) being studied, for example, employment vs. unemployment, self-employment, security considerations, methods of processing and environmental considerations.

- Ethical and moral considerations. A critical look at the environment issues, employment practices and safety, health and welfare issues as they are addressed.

3. If the candidate is studying:

- (i) one Unit or subject only, the report should address the areas listed in point 2 above which are relevant to the Unit only.
- (ii) two or more Units or subjects, the report should address the areas listed in point 2 above which are relevant to ALL the Units or Subjects being studied.

Revised Mark Scheme for Written Assignment

The written assignment should be marked out of an aggregate of 30 marks. **Seven of these marks will be allocated for communication of information in a logical way using correct grammar.** The following indicates how the 30 marks are to be awarded.

WRITTEN ASSIGNMENT		MARKS	
1.	INTRODUCTION <ul style="list-style-type: none"> • Topic outlined briefly • Methods or approach at data collection/handling 	1 1	2
2.	CONTENT <ul style="list-style-type: none"> • Identifies <ol style="list-style-type: none"> 1. Careers 2. Norms 3. Regulations/codes • Impact of technology on careers <ol style="list-style-type: none"> 1. Employment/unemployment 2. Security or processing 3. Environmental • How ethical and moral considerations are addressed <ol style="list-style-type: none"> 1. Legal policies on safety, health and welfare 2. Moral approaches to handling safety, health and welfare issues 	1 1 1 1 1 1 2 1	9
3.	PRESENTATION <ul style="list-style-type: none"> • Data presentation – Use of appropriate <ol style="list-style-type: none"> 1. Tables 2. charts/diagrams 3. Photographs • Word-processing format – Use of appropriate <ol style="list-style-type: none"> 1. Title 2. Headings and Sub-headings 3. Line spacing 4. Margins and Justification 5. Fonts <ol style="list-style-type: none"> (a) Headings and sub-headings (b) Size and colour 	1 1 1 1 1 1 1 1 1	9
4.	SUMMARY <ol style="list-style-type: none"> 1. Limitation of the report 2. Major findings 3. Recommendations 	1 1 1	3
5.	COMMUNICATION OF INFORMATION <ul style="list-style-type: none"> • Communicate information in a logical way using correct grammar and appropriate jargon of the field ALL of the time • Communicate information in a logical way using correct grammar and appropriate jargon of the field MOST of the time • Communicate information in a logical way using correct grammar and appropriate jargon of the field SOME of the time • Communicate information in a logical way using correct grammar and appropriate jargon of the field RARELY 	6-7 4-5 2-3 0-1	7
TOTAL			30

OBSERVATIONS AND RECOMMENDATIONS

1. The teachers must make sure that the candidates are well aware of the revised mark scheme for written assignments.
2. Candidates have demonstrated improvement in word processing and skills in presenting data in graphs – but need to improve skills in presenting data in the form of tables.
3. The SBA reports should be kept in schools until moderators have completed their assessment.
4. Data and information used in the SBA report, obtained from different sources including interviews and Internet, should be indicated in the report.