

CARIBBEAN EXAMINATIONS COUNCIL

**REPORT ON CANDIDATES' WORK IN THE
ADVANCED PROFICIENCY EXAMINATION
MAY/JUNE 2010**

ELECTRICAL AND ELECTRONIC TECHNOLOGY

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GENERAL COMMENTS

One hundred and sixty-two candidates registered for the Unit 1 examination and 87 candidates registered for the Unit 2 examination.

As in previous years, performance was somewhat poor.

DETAILED COMMENTS

UNIT 1

Paper 01 – Short Answer Questions

Candidates were required to do all questions from this paper which accounted for 90 marks.

The marks scored by candidates ranged from 2 to 54. Only 1 candidate scored in the 51–60 range. Approximately 2 per cent scored in the 41–50 range, 9 per cent scored in the 31–40 range and 22 per cent scored in the 21–30 range. The remaining 66 per cent scored 20 marks or below.

Module 1 – DC Circuit Theory (Questions 1–5)

Candidates were required to use fundamental laws and simple theory to solve simple DC circuits. From a possible 30 marks, the highest score was 20 and the lowest score was 0. Only 13 per cent of the candidates scored 50 per cent of the possible scores or above in this module. Thirty per cent scored in the 11–15 range, 35 per cent scored in the 6–10 range and the remaining 22 per cent scored in the 1–5 range.

Comments on Questions

Question 1

In general, this question, which tested candidates' ability to manipulate series and parallel circuits and Ohm's law, was not understood by many candidates. Many candidates appeared to have difficulty with manipulating series and parallel circuits. Approximately 25 per cent of the candidates were able to provide perfect responses (5–6 marks), 26 per cent scored in the 3–4 mark range and the remaining 49 per cent scored between 0 and 2 marks. Some candidates did not respond to the question.

Question 2

This was a relatively good question for candidates. It focused on charge stored in the capacitor. Approximately 40 per cent of the candidates provided perfect responses (5–6 marks) whereas 34 per cent scored in the 3–4 mark range. The remaining 27 per cent scored between 0 and 2 marks. Most candidates were able to calculate charge.

Question 3

This question tested candidates' knowledge of inductors. Only eight per cent provided perfect responses (5–6 marks) whereas 30 per cent scored in the 3–4 mark range. The remaining 62 per cent scored between 0 and 2 marks. Many candidates experienced difficulty with this question since they were unaware of the basic inductor.

Question 4

Candidates were asked to state Norton's Theorem and use the theorem to determine currents in a simple circuit. This provided a significant challenge for candidates. Eighty-two per cent of the candidates either scored zero or did not respond to the question. The remaining 18 per cent were only able to score in the 1–3 range. Most candidates were unable to determine the currents in the circuit.

Question 5

Candidates were asked to define relative permittivity and relative permeability. This proved relatively challenging for candidates. It was evident that candidates were unaware of these characteristics of materials. Sixty per cent of candidates either scored zero or did not respond to the question. Thirty-three per cent of the candidates were only able to score in the 1–3 range and only 7 per cent scored 4 marks or more.

Module 2 – Analogue Electronics and Communications (Questions 6–10)

Basic analogue and electronics and communications concepts were covered in this module. The module proved to be somewhat challenging as most candidates either did not respond to the questions or scored zero. The highest score was 16, and approximately 11 per cent of the candidates scored zero from a possible 30 marks. Two per cent scored in the 16–20 range, 6 per cent scored in the 11–15 range, 21 per cent scored in the 6–10 range and the remaining 60 per cent scored in the 1–5 mark range.

Comments on QuestionsQuestion 6

This question tested candidates' knowledge of the PN diode. It proved relatively challenging for candidates. It was evident that candidates were unfamiliar with the construction of PN Diode and were unable to explain what occurs when the diode is reversed biased. Fifty-one per cent of the candidates either scored zero or did not respond to the question. Only 5 per cent scored in the 3–4 mark range and the remaining 44 per cent scored in the 1–2 mark range (from a possible six marks).

Question 7

This question tested candidates' knowledge of the super-heterodyne receiver. It proved difficult for most candidates since they were unfamiliar with the reasons for using this receiver in communication. They were also unfamiliar with the AGC and the purpose it serves. Sixty-four per cent of the candidates either scored zero or did not respond to the question. Only 5 per cent scored in the 3–4 mark range. The remaining 31 per cent scored in the 1–2 mark range (from a possible 6 marks).

Question 8

This question on Operational Amplifiers proved difficult for most candidates. Three per cent provided responses in the 5–6 mark range, 11 per cent provided responses in the 3–4 mark range and 30 per cent scored in the 1–2 range. The remaining 56 per cent either scored zero or did not respond to the question. Most candidates were unable to determine the voltage gain of an operational amplifier.

Question 9

Several candidates understood the concept of ground and sky wave. Five per cent of the candidates provided good responses (5–6 marks) whereas 22 per cent scored in the 3–4 mark range and 47 per cent scored in the 1–2 range. The remaining 56 per cent scored zero or did not respond to the question. Most of the candidates who attempted this question were able to define ground and sky waves and state factors that influence the range of the waves.

Question 10

This question focused on the basic transistor. However, it proved extremely difficult for most candidates. One per cent of the candidates provided good responses (5–6 marks). Four per cent scored in the 3–4 mark range and 9 per cent scored in the 1–2 range. The remaining 86 per cent either scored zero or did not respond to the question. It was evident that candidates were unfamiliar with the biasing of transistors.

Module 3 – Introduction to Power Systems (Questions 11–15)

This module basically introduced candidates to electrical power systems and continues to be the most challenging of the three. The highest score was 17, and 21 per cent of the candidates scored zero from a possible 30 marks. Of the 141 candidates, 3 per cent scored in the 16–20 range, 5 per cent scored in the 11–15 range, 20 per cent scored in the 6–10 range and 52 per cent scored in the 1–5 range. These statistics suggest that candidates were ill prepared for this module.

Comments on Questions

Question 11

Thirty-five per cent of the candidates scored zero when asked to state Lenz's Law and explain what happens when a current carrying conductor is placed in a magnetic field. Only 3 per cent of the candidates were able to provide reasonable responses. Twenty-one per cent scored in the 3–4 mark range and 40 per cent scored in the 1–2 mark range.

Question 12

This question proved relatively difficult for most candidates. The majority of candidates were unfamiliar with the concept of armature reaction. Only one candidate provided a perfect response (worth 6 marks). Three per cent scored in the 3–4 mark range, 17 per cent scored in the 1–2 mark range and the remaining 79 per cent either scored zero or did not respond to the question.

Question 13

Most candidates were unfamiliar with the term telemetering and were unable to outline the procedures involved in this process. Eighty-nine per cent of the candidates were unable to respond to this question. The remaining 11 per cent were only able to provide partial responses.

Question 14

This question tested candidates' knowledge of thermal overloads. Two per cent of the candidates provided good responses (5–6 marks) whereas 9 per cent scored in the 3–4 mark range. Twenty-eight per cent scored in the 1–2 mark range and the remaining 61 per cent either scored zero or did not respond to the question. This result suggests that most candidates lack understanding of thermal overloads.

Question 15

Candidates were asked to sketch the torque-load characteristics for the series, shunt and differential compound motors on one set of axes. Seven per cent provided good responses (5–6 marks), 14 per cent scored in the 3–4 mark range whereas 15 per cent scored in the 1–2 mark range. The remaining 64 per cent either scored zero or did not respond to the question. The performance of candidates suggests that they were unfamiliar with the torque-load characteristics curves of the various d.c. motor configurations.

Paper 02 – Essay Questions

One hundred and thirty eight candidates sat this paper. They were required to do six questions which accounted for 150 marks. Questions 1, 4 and 7 were compulsory and valued 30 marks each. Candidates were required to select one of the remaining two questions in each module worth 20 marks each. Most candidates attempted the two required questions from each module.

The marks obtained on this paper ranged from 1 to 84. Only 2 per cent of the candidates scored above 50 marks. Seven per cent scored in the 41–50 range, 13 per cent scored in the 31–40 range, 28 per cent scored in the 21–30 range, 36 per cent scored in the 11–20 range and the remaining 14 per cent scored in the 1–10 range.

Module 1 – DC Circuit Theory (Questions 1–3)

Candidates were required to answer Question 1 and one other question from this section. From a possible score of 50 marks, the highest score was 35. One candidate scored in the 31–40 range, whereas 8 per cent scored in the 21–30 range, 38 per cent scored in the 11–20 range, 51 per cent scored in the 1–10 range and 2 per cent scored 0. These scores represent the best obtained by the candidates per module.

Comments on Questions

Question 1

The maximum score obtained was 19 from a possible 30 marks. Ten per cent of the candidates scored in the 11–20 mark range, 33 per cent scored in the 6–10 mark range, 51 per cent scored in the 1–5 mark range and 6 per cent either scored zero or did not attempt the question. Generally, candidates did not demonstrate understanding of maximum power transfer and Norton's Theorem. Most candidates were unable to solve for variables in the parallel network.

Question 2

This question was the most popular and was selected by 80 per cent of the candidates, but proved quite challenging for them. From a possible 20 marks, approximately 13 per cent of the candidates scored in the 11–20 mark range, 42 per cent scored in the 6–10, 32 per cent candidates scored in the 1–5 mark range and 13 per cent scored 0 for this question. Candidates demonstrated a fair working knowledge of capacitors in series and parallel, and the terms permittivity and dielectric strength. Most candidates were unable to solve for capacitance, charge, electric field strength and flux density when given all variables for the capacitor.

Question 3

Few candidates chose this question which was worth 20 marks. Of those who selected the questions, 13 per cent scored in the 6–10 mark range and 87 per cent scored in the 0–5 range. It was evident that candidates were unfamiliar with inductive circuits and related calculations.

Module 2 – Analogue Electronics and Communications (Questions 4–6)

Candidates were required to answer Question 4 and one other from this section. From a possible score of 50 for this module, the highest score was 27. Two candidates scored in the 21–30 range, 12 per cent of the candidates scored in the 11–20 range, 29 per cent scored in the 6–10 range, 45 per cent scored in the 1–5 range, and 13 per cent scored zero.

Comments on Questions

Question 4

All candidates were required to answer this question which tested candidates' knowledge of power supplies. The highest score was 12 from a possible 30 marks. Two candidates (approximately 2 per cent) scored in the 11–20 mark range, 17 per cent scored in the 6–10 range, 59 per cent scored between 1 and 5 marks, while 22 per cent either did not attempt the question or scored zero. Several candidates experienced difficulties understanding the power supply and calculating the circuit variables.

Question 5

This was the more popular of the two optional questions in this module. Eighty per cent of the candidates chose this question and scored a high of 15 from a possible 20 marks. Two per cent of the candidates scored in the 11–20 mark range, 8 per cent scored in the 6–10 range, 56 per cent scored in

the 1–5 range, and 34 per cent either scored zero or did not attempt the question. Candidates were unable to draw and label the block diagram of the FM receiver and discuss how noise is produced and removed from a receiver.

Question 6

Candidates were asked to explain the construction of a transistor and how it is biased as an amplifier. They were also asked to use the h – parameters to determine the variables of a transistor. This question was attempted by only twenty-seven candidates, from among whom a high of 17 (from a possible 20 marks) was scored. Four per cent of the candidates scored in the 11–20 range whereas 18 per cent scored in the 6–10 range, 41 per cent scored in the 1–5 range, and 37 per cent scored zero. Candidates lacked understanding of hybrid parameters.

Module 3 – Introduction to Electrical Power Systems: (Questions 7–9)

Candidates were required to respond to Question 7 and one other from this section. From a possible score of 50 for this module, the highest score was 37. Two per cent of the candidates scored in the 31–40 range, 19 per cent scored in the 21–30 range, 23 per cent scored in the 6–10 range, 49 per cent scored in the 1–5 range and 7 per cent scored zero.

Comments on Questions

Question 7

All candidates were required to answer this question. The highest score was 19 from a possible 30 marks. Fifteen per cent of candidates were able to score in the 11–20 mark range, another 15 per cent in the 6–10 mark range and 50 per cent in the 1–5 range, while 20 per cent either did not attempt the question or scored zero. Most candidates had a fair understanding of SCADA and were able to answer at least one segment of this question.

Question 8

This was the most popular Module 3 question. It tested candidates' knowledge of magnetomotive force and magnetic field strength. One hundred and twenty eight candidates attempted this question and scored a maximum of 8 from a possible 20 marks. Six per cent of the candidates scored in the 6–10 mark range, 73 per cent scored in the 1–5 mark range and 21 per cent either scored zero or did not attempt the question. It was evident that candidates were unable to solve magnetic field strength, flux density and mmf when given parameters for a coil.

Question 9

This question tested candidates' knowledge of d.c. dynamos. Seven per cent of the candidates attempted this question and scored a maximum of 2 from a possible 20 marks. Thirty per cent of the candidates scored in the 1–5 mark range while 70 per cent either scored zero or did not respond to this question. It was evident that candidates lacked the knowledge required to respond effectively.

UNIT 2**Paper 01 – Short Answer Questions**

Candidates were required to do all questions from this paper which accounted for 90 marks. The marks obtained by candidates on this paper ranged from 8 to 65. Of the 58 candidates, approximately 10 per cent scored in the 51–70 range, 26 per cent scored in the 31–50 range, 41 per cent scored in the 21–30 range, 19 per cent scored in the 11–20 range and 4 per cent scored in the 1–10 range.

Module 1 – AC Circuit Theory (Questions 1–5)

Candidates were required to use fundamental laws and simple theory to solve simple AC circuits. From a possible 30 marks, the highest score was 28 and the lowest score was 4 marks. Sixteen per cent of the candidates scored in the 21–30 range, 45 per cent scored in the 11–20 range, 34 per cent scored in the 6–10 range and 5 per cent scored in the 1–5 mark range.

Comments on QuestionsQuestion 1

This question was generally understood by most candidates. Sixty per cent of the candidates provided excellent responses to this question, scoring in the 5–6 range. Thirty five per cent of candidates scored in the 3–4 range, and 5 per cent scored in the 1–2 range.

Question 2

This question was generally understood by most candidates. Twenty-one per cent provided excellent responses and scored in the 5–6 mark range. Twenty-four per cent scored in the 3–4 range, 52 per cent scored in the 1–2 mark range and 3 per cent either scored zero or did not respond to the question. Most candidates were able to draw the phasor diagram for the circuit and were able to calculate the currents.

Question 3

This question posed difficulties for more than 50 per cent of the candidates. Only 9 per cent of the candidates provided perfect responses for this question (scoring in the 5–6 range). Seventeen per cent scored in the 3–4 range, 52 per cent scored in the 1–2 range and 22 per cent either scored zero or did not respond to the question. Most candidates were unable to sketch and label the notch filter frequency response.

Question 4

This question posed difficulties for nearly half of the candidates. Twenty-seven per cent scored in the 5–6 range, 26 per cent scored in the 3–4 range, 40 per cent scored in the 1–2 range and 7 per cent either scored zero or did not respond to the question. Some candidates experienced difficulty determining the resonant frequency and Q-Factor.

Question 5

This question posed difficulties for about 72 per cent of the candidates. Only 9 per cent of the candidates provided perfect responses for this question (scoring in the 5–6 range). Nineteen per cent scored in the 3–4 range, 29 per cent scored in the 1–2 range and 43 per cent either scored zero or did not respond to the question. Most candidates were unable to sketch the phasor diagram.

Module 2 – Digital Electronics and Data Communications (Questions 6–10)

Basic analogue and electronics and communications concepts were covered in this module. This module was understood by only a few candidates. From a possible 30 marks, the highest score was 20 and the lowest score was zero. Twenty-six per cent of the candidates scored in the 11–20 range, 36 per cent scored in the 6–10 range, 36 per cent scored in the 1–5 range and 2 per cent scored zero.

Comments on Questions

Question 6

This question posed difficulties for several candidates. Only 3 per cent of the candidates provided good responses for this question (scoring in the 5–6 range). Thirty-one per cent scored in the 3–4 mark range, 26 per cent scored in the 1–2 mark range and 40 per cent either scored zero or did not respond to the question. Most candidates were unable to explain the operation of the multivibrators.

Question 7

One candidate provided a good response for this question (scoring in the 5–6 range). Nine per cent of candidates scored in the 3–4 mark range, 22 per cent scored in the 1–2 mark range whereas 67 per cent either scored zero or did not attempt the question. Most candidates were unfamiliar with ‘pulse code modulation’.

Question 8

This question proved to be quite challenging for most candidates. Only 9 per cent of the candidates scored in the 3–4 range (from a possible 6 marks), 26 per cent scored in the 1–2 mark range and 65 per cent either scored zero or did not attempt the question. Candidates were unable to define the terms ‘inversion layer’ and ‘threshold voltage’.

Question 9

This question was relatively well understood by most candidates. Forty-one per cent of candidates scored in the 3–4 mark range (out of a possible 6 marks), 45 per cent scored in the 1–2 mark range and 14 per cent scored zero. Most candidates were able to draw the three input symbol for the AND gate and define the term ‘coding’.

Question 10

This question was understood by most candidates. Nine per cent of the candidates provided good responses for this question (scoring in the 5–6 range from a possible 6 marks), 47 per cent scored in the 3–4 mark range, 39 per cent scored in the 1–2 mark range and 5 per cent either scored zero or did not respond to the question.

Module 3 – Introduction to AC Machines: (Questions 11–15)

This module posed significant challenges to candidates. From a possible 30 marks, the highest score was 21, however, several candidates scored zero. Twenty-eight per cent of candidates scored in the 11–20 mark range, 44 per cent scored in the 5–10 mark range, 25 per cent scored in the 1–6 range and 3 per cent scored zero.

Comments on QuestionsQuestion 11

This question was perhaps the best understood for most candidates. Forty-three per cent of the candidates provided excellent responses (scoring in the 5–6 range from a possible 6 marks), 38 per cent scored in the 3–4 range, 12 per cent scored in the 1–2 range, whereas 7 per cent either scored zero or did not attempt the question. Most candidates were able to identify the components of the equivalent circuit of a transformer by virtue of their symbols but not in relation to the device.

Question 12

This question was relatively well understood by most candidates. Fourteen per cent of the candidates provided excellent responses (scoring in the 5–6 range from a possible 6 marks), 33 per cent scored in the 3–4 mark range, 34 per cent scored in the 1–2 mark range and 19 per cent scored zero or did not respond to the question. Most candidates did not know the conditions to be met to achieve maximum efficiency in a transformer.

Question 13

This question proved to be quite challenging for most candidates. Only 2 per cent scored in the 5–6 mark range. Ten per cent of the candidates scored in the 3–4 range, 12 per cent scored in the 1–2 mark range and 76 per cent either scored zero or did not attempt the question. It appeared that candidates were not exposed to the concept of synchronous impedance during their studies.

Question 14

The response profile for this question was relatively poor. Candidates were required to explain the relationship between rotor torque and its resistance and to sketch the characteristic curve when rotor resistance equals its impedance. Only one candidate provided an excellent response, scoring the maximum 6 marks. Nine per cent of candidates scored in the 3–4 range, 52 per cent scored in the 1–2 range, whereas the remaining 38 per cent either scored zero or did not attempt the question.

Question 15

Candidates were asked to describe three methods used for starting a synchronous motor. However, only 14 per cent of candidates were able to describe one method and scored in the 1–2 mark range from a possible six marks. The remaining 86 per cent of candidates either scored zero or did not attempt the question.

Paper 02 – Essay Questions

Fifty-eight candidates sat this paper. They were required to do six questions which accounted for 150 marks. Questions 1, 4 and 7 were compulsory and valued 30 marks each. Candidates were required to select one of the remaining two questions in each module worth 20 marks each. Most candidates attempted the two required questions from each module.

The marks obtained on this paper ranged from 4 to 108. Only one candidate scored in the 100 and above range. Seven per cent of candidates scored in the 81–99 range; 9 per cent scored in the 41–80 range; 14 per cent scored in the 31–40 range; 34 per cent scored in the 21–30 range; 29 per cent scored in the 11–20 range and 5 per cent scored in the 1–10 range. The marks scored by candidates in this module have improved in recent years.

Module 1 – AC Circuit Theory (Questions 1–3)

Candidates were required to do Question 1 and one other question from this section. From a possible score of 50, the highest score was 42 and the lowest was 2. Five per cent of the candidates scored in the 40–45 range; 8 per cent scored in the 31–40 range; 17 per cent scored in the 21–30 range; 35 per cent scored in the 11–20 range and 35 per cent scored in the 1–10 range.

Comments on Questions

Question 1

This question tested candidates' knowledge of the sinusoidal wave form as well as active and reactive power. Candidates responded fairly well to the question. The maximum score obtained was 27 from a possible 30 marks. Eleven per cent of the candidates scored in the 21–30 mark range; 7 per cent scored in the 16–20 mark range; 29 per cent scored in the 11–15 mark range; 24 per cent scored in the 6–10 mark range; 24 per cent scored in the 1–5 mark range and the remaining 5 per cent either scored zero or did not respond to the question.

Question 2

This question tested candidates' knowledge of reactive circuits and their ability to describe the action of inductance and capacitance at resonance. The question also determined candidates' knowledge of circuit parameters for RLC circuits. Fifty-three per cent of the candidates attempted this question. One candidate scored 19 marks, the maximum for this question, while another scored zero. Six per cent of the candidates scored in the 11–15 mark range, 50 per cent scored in the 6–10 mark range, and 38 per cent scored in the 1–5 mark range.

Question 3

This question tested candidates' knowledge of filters and specifically their ability to determine cut-off frequencies and to compute component values. Fifty per cent of the candidates attempted and scored a maximum of 17 marks from a possible 20 marks. Four per cent scored in the 16–20 mark range, 11 per cent scored in the 11–15 mark range and a similar number scored in the 6–10 mark range. The remaining 24 per cent of candidates scored in the 1–5 mark range. It was evident that this question was challenging for most of those who attempted it.

Module 2 – Digital Electronics and Data Communications (Questions 4–6)

Candidates were required to respond to Question 4 and one other question from this section. From a possible score of 50 marks, the marks obtained by candidates ranged from 0 to 33. Only one candidate scored in the 31–40 range. Seven per cent of the candidates scored in the 21–30 range; 31 per cent scored in the 11–20 range; 21 per cent scored in the 6–10 range; 28 per cent scored in the 1–5 range and 12 per cent scored zero. Performance on this module was not impressive.

Comments on QuestionsQuestion 4

This question tested candidates' knowledge of the topologies used in computer networks. The scores ranged from 0 to 21, from a possible 30 marks. One candidate scored 21, whereas 7 per cent scored in the 16–20 mark range. Twenty-eight per cent of candidates scored in the 11–15 mark range, 21 per cent scored in the 6–10 mark range, 19 per cent scored in the 1–5 mark range and the remaining 21 per cent either scored zero or did not respond to the question.

Question 5

This question tested candidates' knowledge of multiplexers and memory systems. Forty-seven per cent of the candidates attempted the question and scored marks ranging from 0 to 5. Thirteen candidates scored in the 1–5 mark range and the remaining seven either scored zero or did not respond to the question. It was evident that candidates were not prepared to answer a question of this nature.

Question 6

This question tested candidates' knowledge of multivibrators and shift registers. Thirty one candidates attempted the question and scored marks ranging from 0 to 12. One candidate scored in the 11–15 mark range, four scored in the 6–10 range, 15 scored in the 1–5 mark range and the remaining 11 scored zero. Most candidates were not familiar with 'pulse code modulation' and were unable to differentiate between FSK and DFSK.

Module 3 – Introduction to AC Machines: (Questions 7–9)

Candidates were required to respond to Question 7 and one other question from this section. From a possible score of 50 marks, the marks obtained by candidates ranged from 0 to 38. One candidate scored in the 31–40 range. Nine per cent of the candidates scored in the 21–30 range, one per cent scored in the 11–20 range, 10 per cent scored in the 6–10 range, 38 per cent scored in the 1–5 range and 40 per cent scored zero.

Comments on QuestionsQuestion 7

This question tested candidates' knowledge of the single-phase capacitor-run induction motor. The marks obtained by candidates ranged from 0 to 21 (from a possible 30 marks). Only one candidate scored in the 20–30 mark range; 3 per cent of candidates scored in the 11–15 mark range; 7 per cent scored in the 6–10 mark range; 24 per cent scored in the 1–5 mark range and the remaining 64 per cent either scored zero or did not respond to the question.

While some candidates experienced difficulty with basic theoretical concepts, many experienced difficulty with the calculation requirements in Section (e).

Question 8

This was the more popular of the two optional questions. It required candidates to draw the circuit of a practical transformer and explain the function of each element. In addition, the specification for a transformer was given for candidates to determine voltages and currents. Forty-seven candidates attempted the question and scored marks ranging from 0 to 17. Four per cent of the candidates scored in the 20–30 mark range; 6.5 per cent scored in the 11–15 mark range; another 6.5 per cent scored in the 6–10 mark range; 36 per cent scored in the 1–5 mark range and the remaining 47 per cent either scored zero or did not respond to the question. While many candidates were unable to draw and label the practical transformer, most were able to calculate the parameters requested.

Question 9

This question tested candidates' knowledge of the synchronous motor. Candidates were asked to explain the term 'synchronous impedance' and to determine the resistance of such motors. Only 11 candidates attempted this question scoring marks ranging from 0 to 6. One candidate scored 6 marks, 6 scored in the 1–5 mark range and the remaining 4 scored zero. In general, this question was quite challenging for candidates.

Paper 03 - Internal Assessment (IA)

An adequate number of sample IAs were submitted for inspection and moderation. The following were observed:

- The grades submitted from some of the schools appeared to be inflated.
- No project activity booklets were submitted.
- Students did not adhere to the specific guidelines/requirements for completing IAs.
- Students need to follow the format established for writing reports.
- There is a need to address sentence construction and spelling in the project documentation.
- Students need more guidance in documenting their methodology. Most observed were unacceptable.
- In many instances, students failed to discuss the findings of the experiment or outcome of the project.