CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE
CARIBBEAN SECONDARY EDUCATION CERTIFICATE EXAMINATION
JANUARY 2008

PHYSICS

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GENERAL PROFICIENCY EXAMINATION

JANUARY 2008

GENERAL COMMENTS

Overall performance in the 2008 Physics CSEC Examination was, in the opinion of the Examiners, quite satisfactory with nearly 60 per cent (59.8 per cent) of candidates achieving between Grades I and III. One commendable feature of this performance was the fact that the performances in both Use of Knowledge (Profile 1) and the Knowledge and Comprehension (Profi   similar.

An area of weakness which occurs year after year and was also evident in this y   s responses is the inability of many candidates to transpose simple formulae. We encourage teachers to make a special attempt to deal with this particular weakness. It should be p   sible to correct this by simple repetitive drills.

The examiners also wish to highlight the fact that a major proportion of candidates were unable to carry out basic unit conversions such as mass in grams to weight in newtons. Again these weaknesses may be corrected by practice drills.

Many candidates appeared to experience considerable difficulty when asked to apply familiar concepts to unfamiliar situations. Physics teachers are encouraged to expose their students to a wide a variety of everyday situations in which physics is applicable thereby developing in them the ability to identify the physical principles at work in these situations.

PAPER 01

MULTIPLE CHOICE

DETAILED COMMENTS

The performance in this year's multiple choice paper i similar to that of recent January sittings. The average on this paper has remained between 33 and 35 (t of a possible 60) over the last few January sittings, and this year was no exception with average score was 38 (out of a possible 59) with a standard deviation of 10.2. Approximately 10 candidates scored full marks.

PAPER 02

STRUCTURED QUESTIONS

SECTION B

DATA ANALYSIS, MECHANICS

Question 1

Overall Performance

The average mark for this question was 17.7 out of a p   sible 30 and the standard deviation was 6.91. One candidate scored full marks.

Areas of Good Performance

Standards for the plotting of graphs
Apparatus required for an investigation

Areas of Weak Performance

Units of gradient hence the unit of spring constant
Extrapolation of graphs
Conversion of mass in grams to force in Newtons
Knowledge of an elastic limit

General Comments and Recommendations

Teachers are encouraged to use sample graphs to illustrate to candidates that graphs have units and to do exercises in class

THERMAL PHYSICS

Question 2

Performance Overall

The average mark for this question was 5.96 (or 39.7 per cent) out of a possible 15. The standard deviation was 3.99. Nine candidates scored full marks. Sixty-seven candidates scored zero.

Areas of Good Performance

Statement of Boyle's Law

Areas of Weak Performance

Kinetic theory and its applications. Most candidates appear to be unfamiliar with the relationship between temperature and the kinetic energy of particles.

General Comments and Recommendations

None.

SECTION D

LIGHT AND WAVES

Question 3

Performance Overall

The average mark for this question was 6.39 (or 36.3 per cent) out of a possible 15 marks. The standard deviation was 4.27. Approximately 31 candidates scored full marks.

Areas of Good Performance

None in particular

Areas of Weak Performance

Very few candidates attempted to label the "lateral displacement" of a ray of light passing through a glass block.

General Comments and Recommendations

None.

SECTION

ELECTRICITY AND MAGNETISM

Question 4

Performance Overall

The average mark for this question was 4.80 (or 32 per cent) of a possible total of 15 marks. The standard deviation was 3.39. Approximately 6 candidates scored ull marks.

Areas of Good Performance

Part (a) (i); Part (b) (i)

Areas of Weak Performance

Part (a) (ii); Part (b) (ii) and (b) (iii)

General Comments and Recommendations

When teaching the a.c generator, teachers should emphasize the shape of the graph of output current vs time.

Many candidates did not grasp the concept of an induced e.m.f. In many cases where candidates found difficulty in grasping the concept, it can often be brought home by appealing to a more familiar analogous situation. For example, the motion induced in a compass needle by a changing magnetic field is visible and readily accepted. This can be used as a basic point to develop and solidify the concept of electromagnetic induction.

Many candidates appear not to have mastered the relationship between the period and the frequency. This can easily be corrected by exposure and drill.

SECTION E

ELECTRICITY AND MAGNETISM

Question 5

Performance Overall

The average mark for this question was 6.56 (or 43.7 per cent) out of a possible score of 15 marks. The standard deviation was 3.47. No candidate scored full marks.

Areas of Good Performance

Series and parallel circuits
Symbols for electrical components

Areas of Poor Performance

Resistance value of an open circuit
Calculation of potential difference.

General Comments and Recommendations

Teachers should show candidates the effect of larger and smaller resistances on bright   ss of a lamp in a simple series circuit. Candidates should be encouraged to note that as resistance gets   r the lamp gets dimmer indicating a smaller current and ultimately as the resistance becomes infinite (an open circuit) there is no current at all. Conversely the lamp gets brighte   when the series resistance is decreased indicating that the current has increased.

Candidates should also be encouraged to make the association between an open circuit and infi ite resistance and a short circuit and zero resistance.

CHART I

Paper 2 Performance by Question
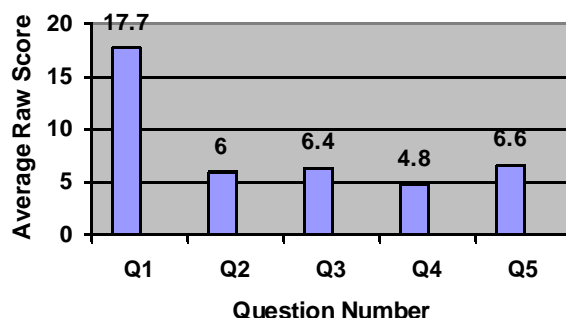
PAPER 03

FREE RESPONSE (ESSAY TYPE) QUESTIONS

MECHANICS AND THERMAL PHYSICS

Question 1

Popularity

This was the least popular question on the paper and was attempted by approximately 42 per cent of the candidates.

Performance Overall

The mean score for this question was was 3.2 (15.5 per cent) with a standard deviation of 2.36. No candidate scored full marks.

Areas of Good Performance

(a), b (ii)

Areas of Weak Performance

b (i)

General Comments and Recommendations

Candidates need to see the manometer in operation in order to fully understand it. It is a very easy device to construct and even the most cash strapped schools should be able to afford two lengths of glass tubing and a length of plastic or rubber tubing.

THERMAL PHYSICS

Question 2

Popularity

This was the second most popular question on the paper and was attempted by about 65.6 per cent of the candidates.

Performance Overall

The mean score for this question was was 7.1 (35.7 per cent) with a standard deviation of 4.57. No candidate scored full marks.

Areas of Good Performance

There was wide distribution of good performances across the entire question. Some candidates knew some parts well while others knew other parts.

Areas of Poor Performance

Many candidates seemed to unaware the distinction between natural convection and forced convection.

General Comments and Recommendations

It is recommended that teachers provide their candidates with greater exposure to descriptive type practice questions. This would assist candidates in the organization of their own ideas an absolute necessity for the answering of free response type questions.

LIGHT AND WAVES

Question 3

Popularity

This was the third most popular question on the paper and was attempted by approximately 52.3 per cent of the candidates.

Performance Overall

The mean score for this question was was 5.1 (25.4 per cent) with a standard deviation of .43. No candidate scored full marks.

Areas of Good Performance

a (i), Most candidates knew the magnification formula.

Areas of Weak Performance

c (i) and c (iv)

General Comments and Recommendations

Application of lenses in forming real and virtual images needs to be emphasized as well as the differentiation between real and virtual images.

SECTION E

ELECTRICITY AND MAGNETISM

Question 4

Popularity

This was the most popular question on the paper and was attempted by approximately 85.6 per cent of the candidates.

Performance Overall

The mean score for this question was was 8.9 (44.8 per cent) with a standard deviation of 4.72. Four candidates scored full marks.

Areas of Good Performance

The types of energy in a (i).

Areas of Weak Performance

b (i).

General Comments and Recommendations

No specific recommendations

NUCLEAR PHYSICS

Question 5

Popularity

This was the second most unpopular questions on the paper and was only attempted by approximately 49.6 per cent of the candidates.

Performance Overall

The mean score for this question was was 7.0 (35 per cent) with a standard deviation of 3.95. No candidate scored full marks.

Areas of Good Performance
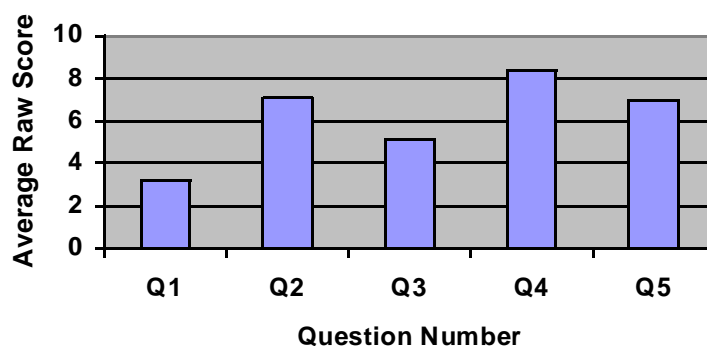
The 3 types of e/m radiation

Areas of Weak Performance

Many candidates had problems expressing powers of 10.

General Comments and Recommendations

Teachers should teach this topic earlier and do more e ercises to improve their candidates' familiarity with the material.

CHART II

Paper III Performance by Question

PAPER 04

ALTERNATIVE TO SCHOOL BASED ASSESSMENT

SECTION A

MEASUREMENT

Question 1

Popularity

All candidates attempted the questions.

Performance Overall

The mean score for this question was 8.5 (52.9 per cent) with a standard deviation of 3.6. No candidate scored full marks.

Areas of Good Performance

None.

Areas of Weak Performance

None.

General Comments and Recommendations

None

Question 2

Popularity

The question was attempted by all candidates.

Performance Overall

The mean score for this question was 11.5 (57.5 per cent) with a standard deviation of 2.2. Two candidates scored full marks.

Areas of Good Performance

Graph plotting.

Areas of Weak Performance

Intercept calculation.

General Comments and Recommendations

None

Question 3

Popularity

This question was attempted by all candidates.

Performance Overall

The mean score for this question was 9.2 (76.5 per cent) with a standard deviation of 2.2. Forty-four candidates scored full marks.

Areas of Good Performance

Almost all sections were fairly well done.

Areas of Weak Performance

A significant number of candidates could not distingui h clearly between observation and conclusion.

General Comments and Recommendations

None.