C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT OF CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

MAY /JUNE 2011

PYHSICS
GENERAL PROFICIENCY EXAMINATION

GENERAL COMMENTS

This year 13,003 candidates registered for the examination. This represented a 5.53 per cent increase in candidates registered compared with 12,321 in June 2010. The percentage of candidates achieving Grades I–III was 74 per cent compared with 75 per cent in 2010. Candidate's performance therefore remains steady. This trend is encouraging as it is important for the region to have sufficient numbers of qualified Physics graduates to cater to the increasing thrust in science and technology which is the driver of present and future development in the Caribbean.

Once again, candidates needed to show better mathematical skills in areas such as scientific notation and solving equations. More emphasis must be placed on using mathematical skills in studying Physics. Also, candidates should not be losing marks on simple recall items.

Performance the multiple choice paper was better than that of June 2010. This year, the mean score was 33.97 with a standard deviation of 10.95 compared with a mean score of 31.56 and a standard deviation of 10.60 in June 2010.

Paper 02 – Structured Essay Questions

This paper consisted of one data analysis, two structured and three essay-type questions.

Section A

Question 1

This question was based on the concepts of velocity, acceleration, distance and displacement. Candidates were required to use data given to draw a graph, determine gradient and complete a velocity–time graph.

An analysis of overall performance revealed that more than 60 per cent of the candidates received a score of 13 (52 per cent) out of a possible 25 marks.

Areas of Good Performance

Candidates performed will on Part (a) which required them to plot a graph, Part (b) which required them to determine the slope of the graph and Part (c) which required that they find the distance using the graph.

In determining the slop, the following were required: (1) a large triangle, (ii) correct read offs, (iii) the value of the slope and (iv) unit.

A**reas of Weak Performance**

In Part (d) (ii), too many candidates attempted to find average using the formula (u+v)/2. The formula for average velocity is total Distance/Total time.

In Part (e) many candidates chose either displacement or acceleration as a vector instead of both.

Recommendations

Candidates should

- use the graph page to its maximum.
- use a ⊙ or x when plotting points.
- be encouraged to always include unit of gradient where necessary.
- be trained to understand the meaning of the gradient.
- use formulae in the right context.

Question 2

This question was based on specific heat capacity and specific latent heat. It tested candidates' ability to remember basic concepts and solve problems on specific heat capacity and latent heat.

Areas of Good Performance

The main areas of good performance were in Parts (a) (i) and (ii) which required candidates to recall symbols and definitions.

Area of Weak Performance

Part (a) (iii) which required candidates to remember the relationship (c = mc) between specific heat capacity and heat capacity was poorly done.

General Comments and Recommendations

- Teachers should place greater emphasis on SI units.
- The relationship between the concepts *specific heat capacity* and *Heat capacity* should be clearly emphasized.

Question 3

This question was based on the flow of charges in different media and the ability to differentiate between direct and alternating current.

Performance on this question was satisfactory with 50 per cent of the candidates scoring more than 7 out of a total of 15 marks.

Areas of Good Performance

Parts (a) (iv), which required candidates to calculate charge, and Parts 3 (b) (i) and (ii) were generally well done.

Areas of Weak Performance

Parts (a) (i)–(iii) presented difficulties for candidates. Candidates knew that the flow of current in the copper wire was due to electrons but did not know that the flow of current within the simple cell was due to both positive and negative ions. Some candidates mixed up the responses for Parts (a) (ii) and Parts (a) (iii) which were *carbon, rod* and *zinc*, respectively.

Recommendation

There is a need for candidates to do much more electronics in their preparations.

Section B

Question 4

This question was based on the refraction and diffraction of light waves.A few candidates scored the full 15 marks but the vast majority, 64 per cent, scored less than half of the full marks.

Area of Good Performance

Candidates were able to recall and use a formula to find refractive index correctly.

Areas of Weak Performance

Candidates performed poorly on Part (a) which required them to explain the occurrence of light and dark bands on the screen. The required responses were as follows:

S – Waves spread out from each slit and overlap
I – Interference to give bright and dark bands
B – Bright bands result from Constructive Interference
D – Dark bands result from Destructive Interference.

Many candidates also had difficulty in Part (b) (iii) in dealing with a calculation involving the unit, nanometer. (1 nanometer = 10^9).

Recommendation

- Teachers should engage students in a more hands-on manner with this topic. This experience could have helped many candidates to respond in a more acceptable manner.

Question 5

This question was based on transformers and proved challenging to candidates. A few candidates scored the full 15 marks, but the vast majority scored less than half of the full marks.

Area of Good Performance

Part (a) (ii) was reasonably well known as most candidates had a general idea about the basic structure of a transformer, though much neater diagrams were expected.

Area of Weak Performance

Candidates, in Part (a) (i), had great difficulty in finding more than one advantage in using a.c, to transmit electrical power. The required responses were as follows:

AC allows voltage step up/down with current step down/up
Transmission at lower current gives lower power losses
AC allows instruments that depend on frequency

Part (b) presented problems with transposing the formulas, which were generally well known.

Recommendation

There is need for more practice in manipulating formulas (cross multiplication) to solve problems based on the requirements of the question.

Question 6

This question involved radioisotopes and nuclear energy. Candidates had to recall how radioisotopes are used in medicine, outline safety precautions when using the same, make use of information on half-life to predict the probable age of a plant and finally use Einstein's mass–energy equation to solve a problem. In this question, 25 per cent of candidates earned more than half of the full marks.

Area of Good Performance

Part (a) was done relatively well by most candidates.

Areas of Weak Performance

Although Part (a) (i) was reasonably well done, too many candidates gave general uses rather than the uses in *medicine* which the question required.

Calculating half-life in Part (b) (i) and the power output in Part (b) (ii) proved challenging for the vast majority of candidates.

Recommendation

More practice in solving half-life problems should be given to candidates.

Paper 03/2 – Alternative to School Based Assessment (SBA)

Question 1

This question required candidates to find out how the image distance and object distance were related for a converse lens.

Area of Good Performance

Candidates were able to plot the graph accurately.

Areas of Weak Performance

In Part (a), many candidates did not read the values correctly and were unable to state the precaution. The calculation of u and v presented a challenge.

In Part (b), candidates need more practice in drawing, this may have affected the *best fit line*. Very few candidates drew the line passing through the origin.

It must be noted that in theory a graph of v *vs* u for a convex lens will *not* give a straight line through the origin. However, while this may be true in theory, candidates were given readings designed to give a straight line through the origin.

In Part (c), not many candidates were able to deduce the relationship from their graphs. For Part (d), calculation of magnification was not well done.

Recommendation

Candidates require practice in questions of this nature.

Question 2

This question was poorly done. In Part (a), the majority of candidates did not give a complete description of the experiment. In Part (b), many candidates were unable to read correctly from the given graph. For Parts (c) and (d), the calculations were not well done by many candidates.

Question 3

This question required candidates to describe an experiment to investigate the best conductor of electricity from six identical solids of different materials

Area of Good Performance

In Part (c), candidates generally knew the circuit diagram.

Areas of Weak Performance

Part (b), the description of the experiment, proved challenging for many students.

In Parts (c) and (d), the observation and conclusion were satisfactorily produced by some candidates only.

Recommendation

These types of questions continue to show the need for more exposure to these kinds of experiments in a practical setting.

Paper 031 – School Based Assessment

For many centres, the standard of the SBA in 2011 showed improvement. This was evidenced by the high percentage of centres with

- adequate syllabus coverage (10 topics or more and the total number of activities). (Each skill being assessed two times per school year)
- good graph work (>5 graphs over two years is very good)
- good standard of practical exercise with all headings and adequate responses
- good ORR — Observation, Recording, Reporting Skills
- good A/I — Analysis and Interpretation results

Overall, some centres have produced good work. However, P/D, Planning and Design, remains the biggest problem for many centres, although there is some improvement. In most cases, this was due to poor choice of exercises for assessing the skill rather than the actual assessments. Centres should be reminded that standard textbook exercises (Traditional Laboratory Exercises) are inappropriate for assessing P/D.