GCSE EXAMINERS' REPORTS

SCIENCE - PHYSICS

JANUARY 2018

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General Certificate of Secondary Education

January 2018

PHYSICS 1 - FOUNDATION

The number of candidates sitting this paper was very small. Their performances on answering the questions varied but were generally weak. There is no good reason why a student is entered for a paper when their attention has not been brought to the inner front page to the meaning of multipliers that are contained there. Conversion between kW to watts in question 6 is so straightforward that there is little excuse for not getting the correct answer, except for the fact that the power is given some way back in the question, but that was only rarely the source of the mistakes. The answer for the unit of wave speed in question 2(d) was often wrong and the conversion from minutes to seconds in the last part of the question was often wrong. A significant number of the entrants also thought that the speed of electricity through cables is increased by a step up transformer (in question 1). There were very poor answers to the extended writing exercise contained in question 7.

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PHYSICS 1 - HIGHER

General Information

There were some good candidates amongst the small number that sat this paper. However there were other candidates who gained few marks on the complete paper. These did not recall facts, their responses to questions that required extended writing were poor and application of mathematics was below the required standard.

Better candidates dealt well with the first question. They substituted correctly into equations and converted between kW and W correctly. Weaker candidates were unable to complete these tasks consistently well, making many errors.

The topic of heat transfer caused problems for most candidates in question 2. Understanding and application of conduction, convection and radiation remains poor. (a) Most candidates scored a mark in the lower band. No candidates realised that it is convection in the air surrounding the tank that is responsible for heat loss.
(b) The question stem referred to a shiny white foam jacket. Lack of understanding led candidates to talk about sunlight being reflected from the surface.

In question 3, few candidates identified both radioisotopes correctly and use the data in the second table to provide a well-reasoned argument for their selection. Clearly others misread the data or didn't understand the implications for a drop in count rate caused by each absorber. It was disheartening to see attempts at using the data to reason an incorrect selection of radioisotope.

Candidates were required to plot a graph in question 4. Too often, there was an error in adding a linear scale on the x-axis because it read 0→1→2→3→4→6. Only a couple of candidates were able to correctly calculate the length of the plastic tray. Some candidates selected the wave equation and used erroneous values for frequency.

The second QWC question in 5(a) was better answered than the first. Some candidates selected to refer only to advantages of each and ignored their environmental impact. However, commonly candidates gained marks in the middle band. (b) Candidates answered this part well.

Marks gained in question 6 were relatively low. In a(i), it was rare to see lines added to the graph to construct a triangle from which the gradient is calculated. Few correct answers within the acceptable range were seen. The remainder of part (a) was answered poorly or left blank. Parts (b) and (c) caused problems for most of the candidates. There were problems in using the relevant data in (b) and in using standard form in parts (b) and (c). In part (c), no correct values of frequency were calculated. Errors included not converting nm and ignoring the red shift value.

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PHYSICS 2 - FOUNDATION

General information

The number of candidates sitting this paper was very small. Their performances on answering the questions varied but were generally weak. Recall of knowledge was poor, use of given data was careless; there were errors in substitutions into equations and in arithmetic.

Few candidates selected the correct values consistently well to score many marks out of 5 in question 1(a). In (b), the role of the moderator was not well known and the term control rods was not known.

In 2(a), some credit was usually gained but in some cases it was clear that phrases were selected at random. In part (b), it was disheartening to read answers referring to the skydiver moving upwards as the parachute opens.

In question 3(a), the points were usually plotted correctly but they were not always joined with a suitable line. Some lines were point to point and others missed the points by more than the allowable margin. Most candidates could deduce from the graph the time taken for the count rate to fall from 400 to 100 but then believed this was equivalent to the half-life. It was disappointing to see few correct answers to (b) (i) and (ii). Most candidates gained credit for (c)(i) and (ii) but few could reason whether radon is suitable for this purpose.

Many arithmetical errors were seen in the calculations in question 4. There were also errors in substituting values. Few candidates underlined the correct options in each sentence in (c).

Errors in part (a) of question 5 arose from incorrect reading of the time scale. However, an ecf applied from (i) to (ii). Candidates were unable to deduce the effect on thinking distance if the speed doubled. Additions to the graph were either non-existent or incorrect. Candidates were able to give a vague response in (c), but it was not backed up data.

It was discouraging to note that only a very small number of the entry could complete the circuit diagram correctly in 6(a). The circuit symbols for a lamp and variable resistor were not well known. In (b), credit was gained for completing the table but candidates were unable to use the data to reason whether the statement was correct.

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PHYSICS 2 - HIGHER

There were some good candidates amongst the small number that sat this paper. They dealt well with the common question and gave good answers to the first of the two QWC exercises in the second question. They understood the meaning of proportionality and applied their knowledge well in answering the last part of the question. Questions 3(a)(i) and (ii) were answered well along with part (c)(i) but (b) and (c)(ii) were not well answered. Question 4 was not well answered on the whole and answers to the next question on mechanics were not good either. There was a general failure to recognise that the car at point A in the question possesses both kinetic and potential energy and so a total was not found. Only a small number of candidates managed to carry their answer from (a)(i) into (a)(ii) correctly to find an answer there (usually on the ecf principle). Answers to (b) were invariably poor. The first part of the last question (the second opportunity to apply extended writing skills) was poorly answered with confusion over what is achieved by control rods and the moderator. In answering the last part of this question, most candidates used the table correctly to write down the nucleon and proton numbers of the products and so earned one mark but the nuclear equation either didn't have a subject or was not balanced so one of the two marks on offer was forfeited.

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PHYSICS 3 - FOUNDATION

General information

There was a single entry for this paper. Performance across the questions fluctuated dramatically.

Q1. The candidate identified one of the effects correctly.

Q2. The candidate gained just under half marks for the question. The pie chart was interpreted successfully and some parts of the life cycle were correctly selected.

Q3. No credit was awarded.

Q4. The candidate scored well in (a) and (b) (i) of this question.

Q5. The candidate gained roughly half marks here. Some credit was awarded in parts (a) (i) and (ii) and (b).

Q6. The candidate gained just over half marks here. Most of the marks were awarded in the parts requiring numerical answers.

Q7. The candidate gained a couple of marks for the question and these were awarded in part (c).

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PHYSICS 3 - HIGHER

The candidature for this paper was very small and the achievement was low. The responses to questions that required extended writing in their answers were poor (as has been evident in the past). The application of mathematics was below the standard expected and knowledge of mechanics was also poor. Some candidates failed to recognise that the momentum of a stationary object is zero in the first part of the first question but gained some credit in parts (ii) and (iii). Except for part (c) the remainder of the question was poorly answered. Candidates did not answer the question 2(a) but often chose instead to relate their answer to stepping up or down a voltage along with the advantages of doing it. The question was not done well on the whole. Whilst question 3(a) was poorly answered, some credit was given for answers to part (b). Question 4 was generally reasonably well answered but candidates had little clue as to how to answer any part of question 5. The extended writing part of the final question was poorly answered but the last part was often well done.

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SCIENCE A CONTROLLED ASSESSMENTS

OVERVIEW

The number of entries for this award was extremely low, making it very difficult to draw generalisations and conclusions about performance.

ADMINISTRATION AND MARKING

Samples were submitted on time and were well organised. The marking was generally of an acceptable standard, although, as in the past, there was a tendency towards generosity.

PUPIL PERFORMANCE

The small numbers involved preclude any overall comment on pupil performance.

RESEARCH EXERCISE – GENERAL ISSUES

The main issue in the research task were that the descriptions of investigations in part two were generally much too vague. The candidates did not have a clear understanding of the concept of strength of evidence.

PRACTICAL AND SAFETY EXERCISE – GENERAL ISSUES

There were no general issues with either of these exercises.

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ADDITIONAL SCIENCE & SEPARATE SCIENCES CONTROLLED ASSESSMENTS

OVERVIEW

The number of entries for this award was extremely low, especially in the separate sciences, making it very difficult to draw generalisations and conclusions about performance. In additional science, the majority of the candidates did the enzyme practical.

ADMINISTRATION AND MARKING

Samples were submitted on time and were well organised. The marking was generally of an acceptable standard, although, as in the past, there was a tendency towards generosity.

PUPIL PERFORMANCE

The small numbers involved preclude any overall comment on pupil performance.

BIOLOGY EXERCISE

Most candidates investigated starch concentration. Performance was generally of quite a high standard, and the only issue revolved around the risk assessment, with a number of candidates unsure of the distinction between hazards and risks. This applied not only to this exercise, but also to the chemistry and physics exercises.

CHEMISTRY EXERCISES

Performance was generally quite good, with no issues other than the one of risk assessments mentioned above.

PHYSICS EXERCISES

Performance was generally quite good, with no issues other than the one of risk assessments mentioned above.

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