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Examiners' Report/ Principal Examiner Feedback

Summer 2015

Pearson Edexcel International GCSE in Physics (4PH0) Paper 2PR

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Examiner's Report International GCSE Physics 4PH0 2PR

Overview

Many students scored very well across all aspects of this paper, indicating thorough preparation fully covering the specification apart from Geiger and Marsden's work. Numerical work was usually handled very well, including simple rearrangement of equations. There was evidence that some centres were better at preparing their students for questions relating to experimental work and other AO3 skills. It was also evident that many students found difficulty in structuring their responses to longer, extended questions. There are strategies that can be used to improve students' performance in these areas.

Question 1

This question was expected to be an accessible start to the paper. On the whole this was true apart from part (a) where nearly 40% of candidates could not identify where the car has the most speed.

In parts (b) (ii) – (iii), less than 10% failed to gain a mark. Significantly more candidates found difficulty with the kinetic energy calculation.

Question 2

It was pleasing that over 80% of candidates were successful in part (a) which was application based.

Candidates were also successful in part (b) (i). However, the rest of the question showed a considerable lack of knowledge of Geiger and Marsden's experiment and Rutherford's model of the atom. In particular, the details of the relative proportions of the alpha particles that were scattered and through what angle were omitted.

It was disappointing that about a third of candidates did not gain any marks in part (c).

Question 3

As expected, the principle of moments calculation was well done with over 60% gaining full marks. A further 30% showed some progress into the question, usually by determination of one correct moment.

In part (b), many candidates were unable to make the link with moments, so the most common answer was that the force reading increased because the iron bar weighed more. Just over 20% of candidates could correctly link this to an increased clockwise moment.

Question 4

It was surprising to find that almost ¼ of the candidates could not state that iron is a magnetic material. Some of this was due to incorrect detail e.g. iron is magnetically hard, but there were many who said 'iron is an electromagnet'.

Consequently, the description of the construction of the electromagnet was a little disappointing, with just over 1/3rd gaining full marks. Many candidates did take advantage of the space and drew a sufficiently detailed and labelled diagram which gained them all or most of the marks.

Part (c) was well answered with over 50 5 of candidates able to describe demagnetisation.

Question 5

Although over 80% of candidates were successful in part (a), most candidates found part (b) (i) difficult. There was a lack of understanding of the role of water bath.

The graph In part (c) was well done: over 50% of candidates gaining full marks. The most common mistake was to choose 40° C, 2670 Ω rather than 60° C, 2350 Ω as the anomalous point.

In parts (d) (i) and (d) (ii), most candidates were able to give sensible suggestions and gain full marks.

Question 6

Nearly ¾ of the candidates were successful in part (a) and gained five or six marks in the question about microwaves. However, the most common mistake was to miscount the number of waves giving 3 or 4 rather than 3.5 waves. Candidates who showed their working clearly were awarded credit for carrying this error forward into the calculation of frequency.

In part (b), candidates knew the term diffraction (albeit with many misspellings) as nearly *0 % gained this first mark. The explanation was found more difficult: just fewer than 20% gave clear answers which gained them full credit. The most common mistake was to lack precision in the detail e.g. candidates incorrectly said that no diffraction occurred with microwaves instead of little diffraction.

Question 7

Candidates who structured their answers into advantages and disadvantages of both types of power station tended to gain more marks, not least because they attempted to answer the question fully.
A common mistake was to write at length about just one type of power station (usually the nuclear power station) and then run out of time and space for the other power station. Some of the factors considered were similar for both types of power station. It was however quite worrying that many candidates gave erroneous 'facts' about nuclear power stations e.g. that they emit carbon dioxide, cause their workers and nearby field to be radioactive and are expensive to run.

Based on the performance shown in this paper, students should:

- Take note of the number of marks given for each question and use this as a guide as to the amount of detail expected in the answer.
- Be familiar with the equations listed in the specification and be able to use them confidently.
- Be familiar with the names of standard apparatus used in different branches of physics.
- Practice structuring and sequencing longer extended writing questions including giving both sides of a discussion.
- Show all working, so that some credit can still be given for answers that are only partly correct.
- Be familiar with the list of suggested practical given in the specification and be able to describe these experiments in reasonable detail.
- Be able to comment on data and experimental methods.
- Take care to answer the question asked, not a similar question on the same topic from a previous exam paper.
- Take advantage of opportunities to draw labelled diagram as well as or instead of written answers.
- Allow time at the end of the examination to check answers carefully and correct basic slips in wording or calculation.

Grade Boundaries

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