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Examiners' Report/
Principal Examiner Feedback

Summer 2013

International GCSE
Physics (4PH0) Paper 2PR

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General
Many students scored very well across all aspects of this paper, indicating thorough preparation fully covering the specification. Numerical work was usually handled very well, including simple rearrangement of equations. Questions relating to experimental work and other skills covered by AO3 often allowed students greater freedom of expression and examiners were pleased to see many responses that indicated the students had experience of practical physics and were able to describe their ideas clearly. However, a number of blank responses were also seen and some responses to the longer, more extended questions indicated a lack of preparation in depth. There is evidence that some students do not see each question as *structured* and tackle each part as a discrete question.

Question 1
This question proved to be an accessible start to the paper for most students with about 75% gaining 3 of the 4 marks. In part (a), many students chose half-life rather than activity for the quantity measured in bequerels. Students were less likely to choose gamma as the most ionising radiation.

Question 2
The unit for a moment of a force was correctly identified by over 75% of students. However, the 'show that' calculation in part (b) proved to be more difficult. Many were able to quote the principle of moments but were unable to apply this by taking moments about point B. The most common response was to state 500/2 = 250, without explaining any reasoning. Students who explained their responses were more likely to gain credit.

Parts (b)(ii) and (c)(i) were both well answered. A few students placed the weight arrow alongside the painter rather than below him. In part (c)(ii), many students incorrectly responded that F_B increased but F_A decreased. Another common error was to omit that both forces increased.

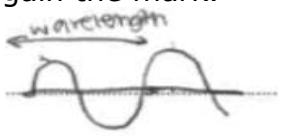
Question 3
This question was set in the context of a standard experiment and so in the main targeted AO3. Students who had experience of the experiment were able to make fuller responses; in particular they were able to give a sensible suggestion in part (a)(i). Other students often re-stated the stem of the question, ie you add masses to add weight. It is possible that part (b)(i) assisted students with the decision of how to display the data as over 80% of students drew a well labelled and scaled bar chart.
In part (c), most students offered two suggestions which meant changing the experiment rather than reason why the same experiment might produce varied results. The concept of pressure was clearly understood in part (d) as over 80% gained both marks. In part (e), the most common mistake was to suggest the same marking point twice eg by naming a lubricant twice (oil and water). However, nearly 60 % of students gained both marks.

Question 4
The responses to all parts of this question were pleasing and demonstrated good understanding of electrostatics in an unusual application. There were only a few instances of responses where positive charge moved. Where students failed to gain full marks, this was often due to lack of precision in their answers eg 'so **they** moved from **it** and **it** became negative' rather than 'so the electrons moved from the metal plate and the lifting plate became negative'. In part (d), credit was given for a deflection either towards the rod or out of the paper.

Question 5
In part (a) nearly 90% of students were able to identify a non-renewable energy source but less than this could explain what is meant by a non-renewable source.
In part (b)(i) it was disappointing to find that less than 40% of students gained two or more marks for a simple outline of the transmission process. There was considerable evidence that many students had misread the question as common responses included details of converting the energy from a fossil fuel to electrical energy for transmission.
However, the discussion for part (b)(ii) was often very well done with over 70% of the students gaining 3 or more marks. It was pleasing to see that students organised their ideas well and attempted to describe six discrete ideas. Bullet pointed responses did gain credit when they were more than brief lists.

Question 6
The responses to most parts of this question were pleasing and demonstrated that students had a good grasp of the concept of momentum. Over 70% gained full marks for parts (a)(i) and (ii). A few failed to match the unit to the numerical value in (ii). Some students gave conservation of energy in part (a)(iii) rather than conservation of momentum. This error was also mentioned in part (b).

Question 7
It was surprising that only 50% of students could define 'wavelength' with sufficient precision to gain a mark. Clear diagrams were accepted. A few students attempted a diagram which lacked precision eg and so failed to gain the mark.



The wave equation and calculation of wavelength were well done with over 85% gaining all three marks.
In part (c), diffraction was often named as the effect (but commonly misspelled). Many students were also able to describe the condition for maximum diffraction but were unable to link this to the wavelength of light. There was also some confusion evident that diffraction occurred with water waves because they were longitudinal but diffraction did not occur with light waves as they are transverse.

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
- Show all working, so that some credit can still be given for answers that are only partly correct
- Describe experiments in reasonable detail and be ready to comment on experimental data and methods
- Recall the units given in the specification and use them appropriately, for instance when describing the measurements taken in an experiment
- Take care to follow the instructions in the question, for instance when requested to use particular ideas in the answer
- 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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