Pearson Edexcel

Examiners' Report

Principal Examiner Feedback

Summer 2018

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

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Examiner Report International GCSE 4PH0 2PR

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, excluding rearrangement of equations. Students need to be reminded to work in SI units wherever possible. It was evident (and pleasing to note) that centres had worked at writing extended responses as the previous difficulties in this area were reduced.

Question 1 - Static electricity

This question was proved to be a very straightforward start to the paper with nearly 90% of students completing the cloze exercise correctly. It was surprising that the third word (like charges 'repel') was the most problematic.

Question 2 - Work done when a can is crushed

This question was also straightforward for most students as over 60% gained three or four marks. The greatest problem was that students did not use the correct distance expressed correctly in SI units neither did they convert kN to N.

Question 3 - Nuclear fission

Almost two thirds of students correctly identified the function of the control rods and of the moderator in a nuclear reactor. Students were also moderately successful in the extended writing description of fission with 50% of students gaining three or more marks. In this question marks were often lost for imprecision in terminology e.g. atom or particle instead of nucleus, confusing neutron and nucleus, daughter cells instead of daughter nuclei and giving the impression that a single neutron collides with many nuclei.

Question 4 - Magnetic fields

About a quarter of students failed to gain marks for part (ai). Some students were able to offer good answers here in terms of magnetism, but some students even though they mentioned magnetism, gave their explanation in terms of the force provided by the bar magnet alone. Other students erroneously attempted explanations in terms of charge and electrostatic induction, with pins having opposite charges and were therefore attracted to each other. There were some mentions of steel as a *hard* material, not a *magnetic* material and a few students thought that the pins had become electromagnetic.

Many students found part (aii) difficult. In some cases, this was because the students focused their discussion on the magnetic properties of steel, even though the experiment was aimed at investigating magnetic fields. In other cases, students simply wrote in words what was depicted in the diagram e.g. 'there are 5 pins at the N and 2 pins in the middle and 5 pins at S' rather than interpreting the diagram. Inevitably some students incorrectly confused magnetism with electrostatics. Just 20% of students gained both marks here.

It was unexpected that students would also find part (aiii) difficult. Under 20% of students gained this mark.

Common responses that scored zero included: pins will lose their magnetism quickly as magnetically soft; pins will fall off magnet; less pins attached to magnet; pins would not form a chain and there would be no difference.

In part (bi), nearly three quarters of students gained 1 mark by identifying the correct independent variable. Common incorrect variables included: number of coils; electromagnet strength; the core and the voltage. Under 25% of students were able to go on successfully and explain why the variable was independent and score the second mark. Often, the reason/rationale was omitted. Other students attempted a correct rationale, but their explanation contained no reference to the change occurring due to the individual willingly selecting the values. A large group of students simply gave incorrect explanations which included: a) changing the current, changes the electromagnet strength
b) changing the current would affect the electromagnet strength but changing the electromagnet strength would not affect the current.

The identification of control variables in part (bii) was as poorly answered as part (bi). Common errors included: the current/voltage, discussion of the material of the wire and/or the electromagnet and the strength of the electromagnet.

Part (biii) had a wide range of answers and level of detail which effectively differentiated across the ability range. Just over 40% of students gained five or more marks. These students provided detailed diagrams and methodologies demonstrating an excellent understanding. However, many students missed out the use of an ammeter or a means of detecting/measuring strength. Some students suggested the use of a galvanometer to test the strength of the electromagnet. Weaker responses included confusing diagrams using horseshoe shapes for the coil of wire and incomplete circuits without a power source. There were also a few students who described transformers or motor effect experiments.

Question 5 - Space probe

It was surprising that for the relatively straightforward part (ai) under 50% of students did not pick up full marks. The errors included not seeing the connection between wavelength and frequency with speed, which lead to conflicting answers. Some students did not notice “free space” in the stem and answered as if the light was entering the atmosphere, whilst other students defined the terms, rather than saying how their magnitude was affected as the wave travelled.

Some students found the first two objective questions challenging as just over 50% gained both marks. Identification of the digital signal was well done with over 90% of students gaining this mark. Part (b) was also well done with just a few students making copying errors such as ’34.6 x 0.275’ instead of ’36.4 x 0.275’

Part (c) also differentiated across the ability range with over a quarter of students failing to gain a mark and a further quarter gaining full marks. It seemed that many students did not know how to use the (given) equation. There were the usual errors caused by incorrect conversions of mN to N and 25 mins to 1500s.

Question 6 - Voltage output from a simple generator

Many students made a good attempt at this question with 50% gaining full marks. There were some unusual waveforms seen. Some students lost marks because of lack of precision in their sketch e.g. inconsistent amplitude and/or inconsistent frequency. The most common error was inconsistent frequency.

Question 7 - Application of principle of moments-the yard arm

Over 80% of students were able to identify the pivot position in part (a). However the principle of moments was not as well known as nearly 40% failed to gain this mark. Often this was because they had simply defined a moment in either word form or as an equation.

Part (c), was answered very well by the majority of students. Part (d), which led on from part (c), a wide spread of marks with just over a third of students gaining full marks. Some thought as to the likely mass of 1 banana would have enabled students to correct simple errors such as incorrect conversion from g to kg and/or from weight to mass. It was important that ALL steps in the calculation were shown, to allow credit for working to be awarded.

Over 70% of students were able to gain at least one mark in part (e). It was common to see a student give both a correct and incorrect alteration, showing a poor understanding. The common errors included moving the movable weight further along to the RHS, moving the pivot to the centre of the bar making the bar heavier, stronger or thicker, increasing the distance between the pivot and the basket and decreasing the distance between the pivot and the movable weight.

Question 8 - Electromagnetic radiation

Just 20% of students gained five or more marks for this question. There was evidence that many centres had discussed how to structure longer questions with their students as many students realised that they needed to consider the entire spectrum and set their response out accordingly. Students generally showed a much superior knowledge of the high energy end of the spectrum i.e. UV, X Ray and Gamma radiation. There was a great deal of confusion between Infrared and Ultraviolet. In a number of cases, lack of precision or repeat of stem lost students some marks.

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
- Practice structuring and sequencing longer extended writing questions
- Read the introduction (stem) of each question in order to get the correct context
- Practice using data given in the question in a meaningful way by for example making a comparison or using it further into the question
- Show all working, so that some credit can still be given for answers that are only partly correct
- 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
- Be able to rearrange equations
- Allow time at the end of the examination to check answers carefully and correct basic slips in wording or calculation
- Know the standard prefixes and work in SI units

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