Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2021

Pearson Edexcel International GCSE

In Physics (4PH1) Paper 2P

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Introduction
As in examinations for previous specification, most students were able to recall the equations and usually they handled the related calculations well. Students who gave the best practical descriptions usually appeared to be writing from first-hand experience. Responses to the longer questions showed that the less able students tend to struggle when assembling a logical description or when asked to offer more than one idea. There was a wide range of responses and it was good to see that many students could give full and accurate answers.

Question 1
This question about electromagnetic waves and other wave properties was deliberately gentle. Question 1(a) is about the difference between all sound waves and all light waves, hence frequency and wavelength were not acceptable responses. Excellent responses made it clear which of the two waves is faster (although that comparison was not required). The best responses completely described both sound waves as longitudinal and light as transverse, rather than merely describing one of these two concepts.

Question 1(c) was completely superbly. A minority of candidates confused amplitude, frequency and which corresponded to volume and pitch.

Question 2
Questions 2(a) and 2(b) were very well answered by the majority of candidates. The most successful responses for question 2(c) described a chain reaction as a process that affects the uranium nucleus rather than the whole atom.

Question 3
Nearly all candidates named a suitable instrument to measure distance in item 3(a) and could read the scale sufficiently well in item question 3(b)(i). Most candidates made the link that the force required for distances of less than 15 cm exceeded the 10N limit of the newtonmeter.

Graph plotting continues to steadily improve. Very few candidates forget units or use an inappropriate scale in question 3(c).

Data analysis and evaluation items, such as 3(d) are best answered by considering a relevant formula. In this case that formula is **moment = force × perpendicular distance.** Then the candidate can use data read off from the graph or table to test whether the moment changes. Finally, no credit was given for an unqualified statement of agreement or disagreement.

Question 4
Most candidates recognised the term non-renewable in item 4(a)(i) although a sizable minority described the term more literally i.e. that a particular supply of fuel could be somehow regenerated. Candidates calculated percentages well, with the only barrier being recognising which resources are renewable.

In question 4(b), the majority of candidates suggested at least one reason that burning fossil fuels can be harmful with smaller numbers also identifying a chemical that would cause that effect. ‘Climate change’ was considered to be too vague.

Question 4(c) was more challenging due to the functional numeracy requirement and being able to interpret the data provided. In question 4(c)(iii) the more successful responses included some numerical comparison with the total land area of the USA as well as some comment about the suitability of solar power in general.

Question 5
Candidates continue to present very good responses to simple questions about the structure of transformers and the relationship between input and output voltages and currents.

Maximum marks for question 5(b) were available to candidates who recognised that large-scale transmission of electricity requires a high-current system. This, in conjunction with the calculation in item 5(a)(iii) meant that the majority of candidates could describe the use of step up and step-down transformers. Rather fewer candidates could describe why high current is required. Better responses included ideas about **lower** heating in the transmission wires, rather than just a statement that there is heating.

Question 6
Most candidates correctly located white dwarfs and red giants on the Hertzsprung-Russell diagram. Only the minority of candidates located larger main sequence stars than the Sun. There was no pattern to where letters Y and Z went, which indicates that this material that is new to the specification is still unfamiliar territory. An example of a Hertzsprung-Russell diagram is available in the 2019 series.

Nearly all candidates suggested a good reason why the Moon cannot be shown on the Hertzsprung-Russell diagram.

Question 7
Questions 7(a) and 7(b) were answered particularly well by most candidates, with the conversion between the conversion of mass of the ball into kilograms being the only challenging aspect.

Question 7(c) was less well answered by many. The formula required is provided on the formula page at the front of the examination. In general, few candidates remembered to use the mass of the ball or could rearrange the given formula.

Question 8
Many candidates used a pattern statement to explain the direction of the electrostatic force in question 8(a). The minority recognised that that force would cause the ink drop to fall in a curved path rather than a straight path in question 8(b).

Although the standard form aspect of item 8(c) proved moderately challenging, question 8(c)(i) was answered well. Question 8(c)(ii) required use of another formula given on the formula page and the acceleration calculated from the item above. This was a high-demand question which an encouraging number of students made some progress with.

There were a range of excellent responses for question 8(d). Bringing the plates closer together was not accepted as that would fundamentally change the apparatus.

Summary Section

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

- Take care when drawing diagrams to add labels and draw accurately.
- Either build or simulate circuits in which the number of components changes and noting the effect on the currents and voltages in or across those components.
- Ensure that they have either seen or performed the practicals named in the specification where possible.
- 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.
- Take note of the command word used in each question to determine how the examiner expects the question to be answered, for instance whether to give a description or an explanation.
- Be familiar with the formulae listed in the specification and be able to use them confidently.
- Structure multi-step calculations as simply as possible to facilitate checking at each stage.
- Recall the units given in the specification and use them appropriately, for instance frequency.
- Be familiar with the names of standard apparatus used in different branches of physics.
- Practise structuring and sequencing longer extended writing questions.
- Show all working so that some credit can still be given for answers that are only partly correct.
- Be ready to comment on data and suggest improvements to experimental methods.
- 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 diagrams 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.

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