Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2020

Pearson Edexcel International GCSE
In Physics (4PH1)
Paper 2P

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General Comments

As in the previous series, most students were able to recall the equations and often 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

(a) Most students correctly identified at least two of the three renewable energy resources. A large fraction of those students also lost a mark for naming at least one other, unrenewable energy resource.

(b) Although many correctly named 'by radiation' as the method of energy transfer from the Sun to a solar cell, the minority of students named a viable disadvantage. All large-scale methods of energy generation are expensive, so this was not acceptable.

Question 2

The formula was recalled well, with many students successfully substituting in the correct values. There were some rearrangement, rounding and unit errors although these were in the minority.

Question 3

(a) The formula and substitution to show that the momentum of stone A were answered very well.

(b) In Q3(b)(i), the idea of conservation of momentum was largely misunderstood. Many candidates assumed that the momentum of stone A before the collision equalled the momentum of stone B after the collision. This ignored that stone A had some momentum after the collision, so that the true momentum of stone B must be the equal to the change in momentum of stone A. In Q3(b)(ii), credit was still awarded provided the **change** in momentum for stone B was substituted into the formula given on the formulae page.

Question 4

Q4 was answered well by the majority of candidates.

(a) Most students remembered the key idea that two objects with the same sign charge will repel, although students scored higher marks if they related this to the context and referred to the metal rod and thin piece of metal. Considerable numbers of students mentioned also that the powder becomes charged and how that had happened. The mechanism for how the rod and thin piece of metal became charged was less clearly described. Remember that in metals, it is only electrons that are free to move.

(b) Very many correct answers throughout Q4(b) and comparatively few errors in the power of ten, demonstrating that successful students can comfortably handle standard form.

(c) The idea of earthing for safety reasons, along with the potential hazards, were recalled very well. This included that charges will flow either away from or towards the ground, through the wire.

Question 5

Measuring a sound wave frequency with an oscilloscope is named in the specification explicitly. How to calculate the frequency from an oscilloscope trace has been asked from time to time. This question was subtly different in that it required knowledge of how to **perform** the activity.

The specification mentions 13 experiments explicitly. It is expected that students have had first hand experience of these experiments - further details are available in the practical skills guide book: https://qualifications.pearson.com/content/dam/secure/silver/all-uk-and-international/international-gcse/biology/2017/teaching-learning-materials/biology-chemistry-physics-Core-Practical-Guide.pdf

(a) Successful students made reference to connecting a microphone and using the oscilloscope to measure the period of the wave. The other mark scheme points such as measuring the number of squares and the multiplying by the time scale were rarely mentioned, although that is how students performed the calculation in previous papers.

(b) Any one of a range of factors that needed to be controlled were acceptable. Some students mentioned length as a factor, despite that being the independent variable. In Q5(b)(ii), most students calculated the average correctly though some did not round to the same number of significant figures as the original data in the table. The graph was plotted well, included labelling the axes. Curves of best fit were excellent and the resulting string lengths for Q5(b)(v) well with tolerance for most. In Q5(b)(vi), specific lengths for which the frequencies are too low were often missed out. Many students attempted to reference the range of human hearing, with some not mentioning the lower limit of 20 Hz.

Question 6

(a) The majority of students correctly linked the idea of magnitude with being a measurement of the brightness of a star. Considerably fewer knew that absolute magnitude is how bright a star is at a standard distance. Knowledge of the value of this distance is not required, though lots of students could quote it.

(b) The HR diagram was relatively leniently marked as it was the first time that the students have been asked to draw the various regions. An example HR diagram was given in Q4 of paper 2PR last summer.

Question 7

(a) Q7(a) focused on the constituent parts of the nucleus, rather than simple references to atomic and mass number.

(b) Q7(b)(i) was a two stage calculation that involved an understanding of percentages and standard form. The most common error was a factor of 1000 from the conversion from g to kg. Q7(b)(ii) yielded some good answers relating a long half-life to a low activity. Very few students mentioned about the food not being contaminated or that the percentage or mass of uranium in the plate was very small, which also gives a low activity.

Question 8

(a) The left hand rule was successfully used by the majority of students.

(b) Many students drew correct peripheral loops or one straight, vertical central field line yet responses with both were rare.

(c) In Q8(c)(i) students realised that the question was about electromagnetic induction, although the language was confused. The important idea is that there is no **electrical** connection between the primary coil - in this case in base unit - and the secondary coil - connected in series with the battery. There is, however, a **magnetic** connection between the two and only a changing magnetic field from the primary coil will induce a **voltage** in the secondary. Q8(c)(ii), in contrast, was well-answered.

Paper Summary

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

- 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 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 incorrect.
- 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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