Pearson Edexcel

# Examiners' Report
# Principal Examiner Feedback

## November 2024

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

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**General Comments**

As in examinations for previous seasons, most students were able to use the additional formula sheet or recall the equations. They usually 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**

Virtually all candidates scored well on a question designed to be a gentle entry to the paper.

Most candidates remembered that the alpha particle consisted of 4 nucleons, although some could not remember that this consisted of 2 protons and 2 neutrons.

A small number of candidates remembered that alpha decay caused the proton number of the original nucleus to fall by 2 but could not then balance the equation. The key idea here is that both the ”top” numbers and ”bottom” numbers either side of the arrow should balance.

**Question 2**

Whilst small numbers of candidates referred to the movement of positive charges in Q2(a), a large proportion correctly mentioned that this type of static charging was due to the transfer of negative charges, specifically electrons.

Q2(b) proved challenging for candidates in terms of scoring both marks. Many succesfully mentioned the movement of charge being equivalent to a current although few wrote about the movement of charge stopping to convey why the current returned to zero shortly afterwards.

Given the appearance of the relevant formula on the sheet, Q2(c) proved straightforward. Commonly, candidates would give an incorrect rearrangement or convert from milliseconds to seconds incorrectly. Candidates should note that ’ms’ never stands for ’minutes’.

**Question 3**

The majority of candidates scored highly here, assuming that they knew the principle of conservation of momentum. Some candidates mistook moment, energy or force for momentum. In item Q3(b), most candidates correctly stated the momentum of object B and the velocity of object A before the collision. The key to item 3(b)(iv) was to use the given formula connecting average force, momentum change and time taken. Some candidates provided a correct alternative which involved calculating the mean acceleration and then multiplying that by the mass of

the object. The final part of Q3(b) required knowledge of Newton's Third Law, so that the magnitude of the force was the same as the candidate's previous answer and to the right, so that it decelerated object B.

**Question 4**

Some candidates got the regions on the HR diagram muddled however many correctly identified the position of the Sun and that of red giants for Q4(a)

There were lots of alternative answers for Q4(b) which candidates quoted successfully.

In Q4(c), many candidates dropped a single mark for not using multiple periods to get the value of the period or for not spotting that the brighter star must be the closer star. Other than that, this part was answered very well indeed.

**Question 5**

Many candidates produced an excellent method for determining the specific heat capacity of the liquid. Most of the marks available were for quoting the bare minimum needed for completing the task, i.e. listing the measurements and the apparatus required for finding the temperature change, mass and energy supplied to the liquid. Full marks could only be awarded if at least one pertinent experimental detail was included.

In Q5(b), about half of all candidates stated the correct temperature change of 35 $^{o}$C. 'Error carried forward' was applied in the next parts of the question. Many candidates used the power of the heater without multiplying by any time at all, which limited them to one mark maximum. Many others, however, rearranged the formula and evaluated correctly.

**Question 6**

Q6(a) involved the use of the formula linking moment, force and perpendicular distance. Nearly all students either correctly evaluated a moment or doubled the moment they had calculated for a single force.

In Q6(b) virtually all candidates said something relevant about either the arrangement or the motion of particles in a liquid. Very many managed to do both and score highly.

**Question 7**

All of the different stores an object possesses are listed in the specification. The only two that are relevant in Q7(a)(i) are the kinetic and thermal stores. In either case, they both increase when the turbine increases speed. In Q7(a)(ii), the kinetic energy store does not change as the speed is constant.

Q7(b)(ii) provided significant levels of challenge since it contained a multiple-step calculation. The formula for kinetic energy that links mass and speed was often referenced, although signficant numbers of candidates did not evaulate the KE correctly. If the candidate knew that the KE was the useful energy output, then they could access more marked.

**Question 8**

In Q8(a), the majority of candidates selected an appropriate measuring instrument to score the first mark. Some scored the second mark by suggesting 'a repeat or average' approach. Rather fewer scored the second mark for mentioning a different suitable technique for ensuring quality data.

The speed calculation was answered very well, with virtually all candidates scoring either 2 or 3 marks for the substituting the correct numbers and evaluating, even if they forgot to use double the given distance to account for the echo.

Questions 8(c) and 8(d) provided significant challenges. Most candidates scored at least a mark in Q8(c) by spotting the lack of repeats and making a suitable reference to the student's reaction time. Rather fewer mentioned any of the other listed marking points.

In Q8(d), candidate's explanations tended to be simplistic which wouldn't score marks given this was the last item on the paper.

**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 equations listed in the specification and be able to use them confidently.
- Recall the units given in the specification and use them appropriately.
- 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 itemly correct.
- Be ready to evaluate experimental methods and suggest improvements to them
- Take care to follow the instructions in the question, for instance when requested to use itemicular 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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