Examiners' Report/
Principal Examiner Feedback

January 2016

Pearson Edexcel International GCSE
in Physics (4PH0) Paper 1P

or

Pearson Edexcel Certificate
in Physics (4PH0) Paper 1P

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2016
Publications Code UG043323
All the material in this publication is copyright
© Pearson Education Ltd 2016

Report to centres 4PH0 1P January 2016

General

On the whole, students demonstrated that they could recall facts and equations but were less proficient at applying these in new situations. Generally, students made few numerical mistakes in their calculations. However, they should be reminded that S. I .units are normal, and that **all** quantities involved should be in S. I. when substituted into equations.

There was evidence that students who had experience of laboratory work gained good marks on questions targeted at AO3 (experimental methods, data processing, variables etc.).

Many students seemed to lack examination techniques in that they failed to read all the information in the question. Another area of concern was the lack of precision when asked to draw e.g. a moon's orbit draw as an ellipse or a force arrow that is bent.

Question 1 Electromagnetic spectrum

This question was designed to be a straightforward start to the paper. However these free response questions proved to be more challenging than expected. In particular part (b), where almost half of the students confused 'burns to the skin' with 'sunburn' and hence did not gain the mark for damage caused by infrared.

Question 2 Metals and magnetism

This was a set of four multiple choice questions which were more accessible with over three quarters of students being successful in parts (a), (b) and (c). In part (d) It would appear that the detail of field direction was overlooked as nearly 40% of students erroneously chose B or D. Only a very few students chose A.

Question 3 Planets and comets

Almost 75% of students correctly identified the planets and star as being similar to the Solar System.

More candidates found difficulty with parts (b) and (c), where they were required to draw a moon's orbit and a comet's orbit. Only a third of students gained all three marks. Commonly, students did know that the comet has an elliptical orbit, but could not position it with sufficient accuracy e.g. they drew it centred on the star, rather than having the star as a focus. Often too, the moon's orbit was drawn as an ellipse.

In part (di), many students failed to gain the mark because their response was insufficiently precise e.g. 'it has a smaller radius' – where 'it' could mean the orbit or the planet. It was surprising that part (dii) was well answered with nearly 85% of students gaining the mark.

In part (e) over 40 % and 60 % of students were able to calculate the maximum and minimum distances (respectively) between planets P and R. Quite a few students gave the same answer for both distances.

Question 4 Low friction movement.

In part (ai) students were required to draw and label forces. Only 40 % of students gained two or more marks for this task. The fact that the glider was at rest on the air track was ignored by many students because they drew a downwards force arrow much larger than the upwards force arrow. A common error was to write 'gravity' or 'mass' instead of weight. The placement of arrows was also problematic for some students. There was some evidence to show that good performance was centre dependant. Part (aii) was more challenging, just over 33 % of students gained one or more marks for identifying reduced friction. The most common error was to think that glider moved with increased speed.

The calculation in part (b) proved to be more accessible as over 70% of students gained two or more marks. The most common error was to fail to change the time into S.I. units. In part (biii), a number of students calculated the time backwards from their speed in (bii) rather than realising that (since the speed of the glider was stated to be constant) the time would be the same. A common error was to double the time. Over 60 % of students failed to gain this mark.

Question 5 Filament lamp

It was pleasing to note that the basic practical circuit was better attempted with over 50 % gaining all three marks. However, a number of students did not use standard circuit diagram symbols and thus failed to gain marks. Students found the calculation that followed relatively straightforward with nearly 70 % of students gaining all the marks. The unit of resistance was well known.

In part (aiv) it was obvious that many students knew the correct shape for the curve when under reverse voltage, but failed to recognise that the size should be identical to the forward voltage.

The current in the diode was not well known with many students choosing C.

Question 6 Refraction and total internal reflection

Most of this question proved to be accessible as over 50 % of students gained 5 or more marks in part (b). However it was disappointing to note that many could not measure an angle with a reasonable degree of accuracy. The explanation of total internal reflection was not well attempted with just less than 30 % of students gaining two or more marks.

Question 7 Ionising radiation

Part (a) was well done by the majority of students with over 70 % gaining full marks. Similarly, part (b) was well done with two thirds of students gaining two or more marks.

It was surprising that students found part (c) more challenging; in particular only one third of the students gained the mark for gamma radiation penetration. There were some rather unusual suggestions for an alpha radiation detector including an oscilloscope. Just 60 % of students gained this mark.

Question 8 Electromagnetic induction and generator

It was pleasing to note that many students made a good attempt at part (a) with nearly half gaining one mark and a further third gaining both marks.

In part (b), an application based question on a bicycle dynamo, the majority of students were able to gain good marks throughout with the exception of part (iii). In part (biii) the main problem seemed to be determining the time for one cycle from the graph.

As expected in part (c), the calculation was well done by over 60 % of candidates, but there were some inevitable mistakes in the equation and processing the calculation. The most common mistake was to assume that all the data in the stem had to be used in part (i); students correctly determined 900W as the power and then incorrectly multiplied by 72 %. In part (cii), lack of precision with input and output was the most common error. Part (ciii) was well done as an ecf was applied from part (ci), but there were a few students who could not rearrange the equation or divide by 72%.

Question 9 Work done

In part (a) the majority of the students omitted to use S. I. throughout and hence lost a mark. There was a similar error seen in part (b) where a number of students used 1 minute rather than 60 s. However over 50 % of students gained all three marks for part (b).

Question 10 Model barometer

The vast majority of candidates found this question very difficult. Part (ai) was a standard explanation of pressure in a gas. Candidates showed understanding of the random motion of particles hitting the walls but were less clear about how these impacts cased a pressure. Approximately 25% of students were able to gain all three marks: the context seemed to have confused many students.

In parts (aii) and (aiii), just fewer than 25 % of students were able to make progress with the model and gain three or more marks. However, in part (b), more students were able to explain what happened to the model when the air in the can was heated.

Question 11 Elastic band and Hooke's law

This question was AO3 based and was placed towards the end of the paper as it was designed to be a little challenging to students. There was evidence in part (ai), that some students lacked laboratory experience and were unfamiliar with the correct names of various apparatus. In part (aii), 50 % of students were able to identify the control, dependent and independent variables. A similar percentage of students could make some progress in their description of measurement of extension.

Part (b) concerned data handling. In (bi), students were expected to look critically at the data presented and suggest improvements. Repeating and averaging did not gain credit at this level. Some of the better students clearly referred to the plotted graph and showed understanding of the 'gap' in the unloading data. Many students were able to plot points correctly but struggled with drawing curves for the two lines. This is an area that needs practice. Approximately 40 % of students gained these four marks.

It was pleasing to note that in the final part (bv) there was evidence that students had tackled similar questions in previous examination papers. The common error here was to tackle both parts of the stem as one: students could gain credit for consideration of Hooke's law and for consideration of whether the band is elastic or not.

Question 12 Solar Updraft Tower

This was an application based question about heat transfer and electricity generation. However, part (a) was a relatively straightforward question about convection and many students gained marks here. It was a little disappointing that in (aii) some students arrows stopped under the turbines.

In part (b) a majority of students were successful with the energy transfer diagram but not with the description of generation of electricity.

Part (c) was designed to lead the students through consideration of the energy output of the SUT. Many students took the first step and nearly 75 % realised that the most output would occur in daylight. However, the next step in the reasoning (why blocks were used) caused almost all students to falter. The final part (ciii) was quite pleasingly answered as nearly a third of the students used their knowledge of heat transfer to make a feasible suggestion, most commonly to paint he blocks black.

Recommendations for improvement

1. Wherever possible, centres should ensure that students do the suggested practicals. If this is not possible for whatever reason, students should be encouraged to use good simulations, some of which are available with minimal cost online.

2. The other AO3 skills, such as evaluations, conclusions, curve drawing and writing methods can be practiced. This can be done effectively by brainstorming with a partner or even as a homework task.

3. Students should also practice different types of data analysis e.g. from graphical data and from text or tables. There has been at least one of these on all recent examination papers in this subject as it is forms part of the required AO3 skills.

4. Students can also recognise areas where poor technical vocabulary loses easy marks. This can be done by for example giving students (photo) copied but otherwise unidentified sections from internal examinations where they can try to spot errors. Teachers can discuss why confusing say, power and energy, loses marks.

5 Drawing skills were shown to be quite poor in this examination. This is an areas that can be improved with practice.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London WC2R 0RL