Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2019

Pearson Edexcel Advanced Level
In Physics (WPH03) Paper 01 Exploring Physics

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 learners at: www.pearson.com/uk

Grade Boundaries

Grade boundaries for all papers can be found on the website at:
https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

Summer 2019
Publication Code WPH03_01_1906_ER

General comment

This paper is designed to test students' knowledge and understanding of practical skills. This was the last occasion in which students could take this paper as many were resitting. It is important in the context of practical work that appropriate numbers of significant figures are used in answers. Some answers lost marks because scientific terms were not used correctly or because examiners had difficulty in understanding imprecise and confused explanations. As ever, it is important that students read the beginning of the questions carefully in order to identify the context.

The mean mark on the paper was 22.5. This was 2.5 marks lower than the mean on the corresponding WPH03 paper last year and the standard deviation was higher.

		Mean	Standard Deviation	A	E
WPH03	1806	23.0	7.1	30	18
	1906	21.4	6.5	29	18

This report should be read together with the published paper and mark scheme available on the Edexcel website.

Section A – Multiple Choice

Questions 1-5

An explanation of the distractors is included in the mark scheme. Although all questions had high percentages of correct responses, over a quarter did not read the scale on the analogue microammeter correctly.

	Subject	Percentage of students who answered correctly
1	SI system	91
2	Reading measuring instrument	73
3	Understanding of method to measure the Young Modulus	90
4	Understanding of method to calculate the Young Modulus	88
5	Unit	80

Section B

Q06 Determination of the centre of gravity of an irregular solid

Q6a

Most students could describe the basics of a suitable experiment, but many struggled with the essential details - such as ensuring that the marked lines

were vertical for the suspension method. Some students made labelled additions to the illustration that usefully enhanced their description.

Q6b

Very few students could explain properly how their method allowed the centre of gravity to be determined. Most explanations went little further than a basic statement of the principle of moments.

Q7 Investigation of the resistance of a negative temperature coefficient thermistor

Q7a

There were some excellent responses, but many students omitted to mention how they would cool the thermistor below room temperature. Some students mistook the thrust of this question and described how the resistance of the NTC would vary with temperature rather than how they would vary the temperature.

Q7b

Most students were able to gain marks here. Many chose to calculate resistance from p.d. and current measurements. Some who did this forgot that temperature measurements would also be necessary.

Q7c

Most students identified the independent and dependent variables correctly.

Q7d

Very few students identified the difficulty with obtaining identical temperatures for repeat readings.

Q7e

Many students labelled the axes of their sketch graph properly, but fewer were able to draw the correct curve.

Q7f

Very few students identified the main source of uncertainty as a difference in temperature between the thermometer and the thermistor. However, many mentioned stirring the water as part of their method, without properly explaining why this was necessary.

Q7g

Many students identified the high temperature as a hazard, but fewer were specific as to which part of the apparatus would be hot. Most could suggest an appropriate precaution, especially when hot or boiling water was seen as the hazard.

Q8 Determination of the Planck constant

Q8a

Most students answered this question very well. Some described imagined inconsistencies in the presentation of the results. A few students did not criticise the results, but instead used them to describe the relationship between the two variables.

Q8b

Most students realised that it was necessary to divide throughout by e in order to obtain the correct equation for the graph before making their comparison. The weaker responses seen compared the equation for a straight-line $eV = hf - b$. Many students omitted the additional statement that the graph $V = (h/e)f - b/e$ is a straight line because its gradient (h/e) is constant.

Q8c

Many students found the graph challenging. Whilst most labelled their axes properly, many made a poor choice of scale, particularly for the frequency axis. When the axes included the origin, the points were cramped together on a small area of the grid. With only four data pairs, students generally plotted well, but many found it difficult to draw a well-balanced line.

Q8di

Most students used a suitably large triangle to find the gradient and went on to calculate it properly. However, some values were given with the wrong power of ten or an inappropriate number of significant figures.

Q8dii

Most students gave an appropriate calculation, but some forgot to include the correct unit.

Q8e

Most students answered this question well. Some gave a straightforward response based on repeating readings for a sensible reason. Many students gave well thought, thorough responses based on the range or source of the data given in the question or on practical issues related to this experiment.

Summary

This paper has provided students with a wide range of contexts from which their knowledge and understanding of the physics contained within this specification could be tested.

The following are useful ideas for students in similar papers in the future:

- all diagrams should be drawn with a ruler and labelled clearly;
- familiarity with the SI system and the plotting and use of graphs using scales which are multiple or sub multiples of 1, 2 and 5 should be reinforced;
- students should make sure they understand the term 'experimental techniques';
- answers may be written using bullet points;
- assertions should always be supported with reasons;
- in any planning questions it is useful to consider whether a reader could carry out the experiment completely from the instructions given in the answer.

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