Pearson

Examiners' Report
Principal Examiner Feedback

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Exploring Physics

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This paper is designed to test candidates' knowledge and understanding of practical skills. Although the majority of candidates showed good knowledge and understanding, there were some weaknesses in understanding some experiments. 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 candidates read the beginning of the questions carefully in order to identify the context.

The mean mark on the paper was 20.3; this was 3.2 marks lower than the mean on the WPH01 paper in January 2016 and the standard deviation was also lower.

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 now included in the mark scheme. Although questions 1 – 4 had high percentages of correct responses, it was clear from responses to question 5 that some candidates were not familiar with the unit for the Young Modulus.

	Subject	Percentage of candidates who answered correctly
1	SI system	89
2	Mean, anomalous values and significant figures	82
3	Young Modulus experiment: required quantities	97
4	measuring instruments	92
5	unit	71

Section B

Question 6

Q06(a)
There were some confused responses, however most students gained marks for suggesting balancing the bat after suspending it or placing it on a knife-edge. Fewer went on to suggest marking the centre of gravity or repeating the experiment. A significant minority treated the bat as an irregular lamina.

Q06(b)
Few students gave clear responses to this part of the question. Some students mentioned the zero sum of moments or the positioning of the centre of gravity beneath the point of suspension, however few went on to explain that this happens when equilibrium is achieved. Where assumptions were mentioned, they were often about external conditions (e.g. air currents) rather than the symmetry of the bat.

Question 7

A significant number of candidates did not appreciate that oscilloscopes can be used to measure short time intervals. This was particularly disappointing as there are now good programs for PC based soundcard oscilloscopes freely available on the internet.

Q07(a)
Those students who realised that distance and time were the key measurements usually scored well here. Those who planned to use $v = f\lambda$ did not do well. Only a minority gave fair descriptions of using the double beam oscilloscope to measure the time difference.

Q07(b)
Most students correctly suggested a metre rule or tape measure for the distance, but many thought that the time difference could be measured successfully with a stopwatch. Students should have recognised that the time difference involved was too short to measure with a stopwatch.

Q07(c)
Where distance and time were stated as the quantities to be measured, they were usually also properly identified as independent and dependent variables.

Q07(d)
Even when they had planned an unsuccessful experimental method, students were generally able to give good reasons for repeating their readings.

Q07(e)
Many students gave good responses, often also recommending an appropriate graphical method.

Q07(f)
Few students realised that the main source of uncertainty was in the measurement of a very short time period. Hardly any students suggested using as large a distance a possible or considered how the geometry of the setup might affect the results.

Q07(g)
Many students correctly identified the low risk in this experiment. Some looked more deeply for possible hazards. Whilst ear protection against damage from loud sound was accepted as a sensible precaution, protecting the feet against the unlikely possibility of a falling oscilloscope or wearing rubber gloves to handle electrical components were not accepted.

Question 8
Questions requiring candidates to plot a graph using only a few pieces of information are generally well done and demonstrate the understanding of the topic as a whole. However candidates should be aware that they are expected to use multiples or sub-multiples of only 1, 2 or 5 for scales. A copy of an acceptable graph is given in the mark scheme.

Q08(a)
Most candidates were able to give two valid criticisms. Some points were made in a vague way and could not be credited. Criticism of inconsistent precision should be clarified as to which particular readings are at fault – in this case the potential difference values. A few students mistakenly asserted that there was inconsistency in the results themselves rather than in their precision.
Repeating and averaging essentially cover the same idea and are not given separate marking points. Some students made a very sensible comment about the need for further readings between 0.5 V and 1.0 V in order to clarify the shape of the curve.

Q08(b)
Most students drew a good graph, accurately plotted with well-labelled and correctly oriented axes. A few chose unacceptable scales – 15 small squares to 0.5 V, for instance. There were some well-drawn curves, but a sizeable minority of the students did not realise that the component was non-ohmic and therefore attempted to force a straight line through their points.

Q08(c)(i)
Most calculations were done well. A few were let down by an inappropriate choice of significant figures for the final result. A small number of students mistakenly drew a tangent to find the gradient of their graph.

Q08(c)(ii)
This part of the question yielded generally good responses. Most students realised that the high resistance is the reason for the small current. A few also identified the component as a diode during their explanation.

Summary

This paper provided candidates 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 candidates:
Familiarity with the SI system and the plotting and use of non-linear graphs are useful knowledge and skills.
Answers may be written using bullet points and assertions should be supported with reasons.
In the planning questions it is useful to consider whether a reader could carry out the experiment successfully from the instructions given in the answer.

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