OXFORD
INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL A-LEVEL PHYSICS

(9630) Paper 2

Report on the examination

June 2017

GENERAL

This was the first year of entries for this specification. Paper PH02 proved to be generally accessible to the majority of candidates and there were some very strong performances. Some candidates did find the demands of the paper to be challenging, however.

In light of student responses it appears that candidates found Question 11 to have been the most demanding part of the paper. This questioned required students to apply their understanding of forced vibrations in an unfamiliar context, in this case earthquakes. The application of understanding in context proved to be a challenging area for students in other questions on the paper and it would therefore be useful for students to practise more application questions.

Candidates tended to be successful with direct, single stage calculations but struggled with multi-stage calculations where guidance was limited. The stronger candidates tended to be much better organised in their setting out of mathematical work.

Questions involving the use of graphical data proved to be more challenging. Candidates frequently struggled with interpreting and evaluating gradients accurately or with extrapolation. Candidates could be drawn to the Practical Handbook which may help them to develop these skills. Similarly graph sketching skills could be further developed.

In general, students tended to cope better on questions involving electricity than on those related to waves and wave phenomena.

QUESTION 1

This question proved to be difficult for many students with only a small percentage gaining full credit. In 01.1 a common mistake was to forget to multiply by the charge of an electron. In 01.2 a significant proportion of candidates stated a definition of conventional current without relating it to the context given.

QUESTION 2

02.1 tested data analysis skills and this was not done well. The majority of students either failed to spot the anomaly or didn't divide by 10. By contrast, the selection and use of the pendulum formula in 02.2 was done well with the majority of students gaining full credit.

QUESTION 3

Only a minority of students achieved the mark in 03.1. Often answers were vague with candidates simply saying diffraction. Another common misconception was that the photoelectric effect provided evidence for electrons exhibiting wave properties. The calculations of speed in 03.2 and of de Broglie wavelength in 03.3 were done much more successfully.

QUESTION 4

This question testing I-V characteristics was tackled well with the majority of students gaining at least half marks. Whilst most were able to reproduce the general shape of the curve some were careless in ensuring the curve had rotational symmetry. The question proved to be a good discriminator with only the strongest candidates putting the level of detail required in their sketch (for example, ensuring that the gradient at the origin lead to the correct resistance).

QUESTION 5

Whilst the calculations in 05.2 and 05.3 were done successfully by the majority of students, few were able to appreciate that the critical angle in Figure 1 was the incident angle at the boundary BC.

QUESTION 6

The calculation of electrical power in 06.1 was tackled extremely well with virtually all students gaining full credit. 06.2 proved to be more of a challenge, however. Common mistakes included missing some of the lamps out or forgetting to find the reciprocal of their value to give the total resistance in parallel.

QUESTION 7

In 07.1 students tended not to write in sufficient detail to obtain full credit. Only the very strongest candidates were able to explain why the resistance of the thermistor would decrease as the temperature increased. Whilst the calculation of the thermistors resistance in 07.2 was done better, students should be reminded that in a “show that” question they should give their unrounded answer which is only approximately equal to the value given. The use of graphs in parts 07.3 and 07.4 was not done well. Whilst many students could calculate the magnitude of the gradient, few correctly stated the gradient as negative. Only the most able candidates were able to extrapolate the graph in 07.4.

QUESTION 8

08.1 proved to discriminate well between the candidates and whilst the majority of candidates were able to describe some aspects of interference only a few could explain it both in terms of phase and path difference. A common mistake in 08.2 was to use 0.24 m for the fringe spacing instead of dividing by 8 spaces. In 08.3 the majority of students could describe a simple experimental setup. Fewer students made note of the measuring apparatus needed for each individual measurement and students should be encouraged further to consider measuring apparatus.

QUESTION 9

Only a minority of students could state the SI unit of resistivity in 09.1. The calculations required in 09.2 were tackled well by many students with many gaining 3 or 4 marks. Weaker students were able to calculate the resistance of the fuses but failed to link this to the current needed to melt them. Only the strongest candidates were able to give a “real-world” consideration in 09.3

QUESTION 10

Few candidates could draw a suitable best fit line for the data in 10.1. Many students failed to realise that there was a linear section and a curve and that consequently one straight line was not appropriate. 10.2 was done better with the majority of students gaining some credit. However a significant proportion of students failed to realise that only the section of the graph up until the limit of proportionality should be used. Whilst the majority of students could state suitable equipment in 10.3 and 10.4, fewer were able to describe an accurate method for their use.

QUESTION 11

This question proved to be demanding for many students. Only a minority of students could state a correct definition of transverse waves in 11.1. Similarly, few students were able to correctly answer 11.2 and 11.3 by applying their understanding of resonance and force vibrations. 11.4 was tackled much better with the majority of students able to rearrange the equation correctly. Only the most able students could sketch undamped and damped resonance curves in 11.5 and 11.6 and it may be useful for students to have more practical experience of forced vibrations.

Section C: Multiple Choice Questions

Candidate's overall performance in the multiple choice questions correlated strongly with their performance in the rest of the paper. Questions on electricity tended to be done better with the exception of 16 where only a minority of students could determine the internal resistance from the graph. Calculations such as in question 20 were tackled well and overall candidates had a good knowledge of units and of fluorescent tubes as assessed in questions 12 and 19 respectively. Candidates found interpreting an energy level diagram in questions 17 and 18 to have been much more challenging.

The wording used in Question 13 meant that none of the 4 answer options were strictly true. Doubling the photon energy will increase the kinetic energy of the liberated electrons but it will not double it as was suggested and we apologise for this. The majority of students gave the intended answer and there was no evidence that student performance was affected by this. However, to ensure that no students could have been disadvantaged by this, all students were awarded the mark for this question.

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