



A-level **Physics**

7408/3BA

Report on the examination

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Question 1

- 1.1** This question was done quite well with over half of students gaining 2 of the 3 available marks. Many diagrams were too symmetrical to be black-body curves. Marks could be gained as an error carried forward from a miscalculation of their peak, only if their working was shown. Many students did not show any working so missed out on this mark.
- 1.2** This question was done poorly with less than 25% of students appreciating that this star was similar to the Sun so would have a similar value of absolute magnitude.
- 1.3** This was the most demanding question on the paper. Students often gave vague statements about distance or brightness without saying how this impacted a method of detection.

Question 2

- 2.1** The majority of students were able to construct a sensible ray diagram. However, there were a significant number of students who did not use a ruler to produce their rays meaning that their diagrams were unsuitable. Some students also did not include a principal axis or only labelled the focal lengths rather than the location of the principal foci.
- 2.2** Generally a well done question with almost 80% of students able to access at least 2 of the marks. Very few students were able to access all 6 marks, however. Students often were quite generalised in their discussions rather than using the data given to calculate specific values to use in their answers. The main point of the question was a comparison of the images formed by A and B and students often did not make these comparisons.
- 2.3** The “explain” command word was not appreciated by a large proportion of students who simply stated two benefits rather than giving an explanation for why these are benefits. Some students focused on the data analysis that is done by the computer more than the CCD itself but this was information that was given in the question.

Question 3

- 3.1** This question was done very well with over 54% of students scoring full marks. The main sources of error came from students who had not shown clear and logical working meaning that subsidiary marks could not be awarded.
- 3.2** Students often struggled with this question. Talk of a dark or black galactic centre was the main incorrect answer given.
- 3.3** The most common wrong answer was that Hubble’s constant changes with time. This would be true as the universe ages, and is not necessarily related to its acceleration. The correct answer is based on the idea that the observations of red shift and apparent magnitude suggested that the supernovae had a brighter than expected peak absolute magnitude.

Question 4

4.1 Almost 60% of students scored full marks on this question. Those who did not generally failed to follow the “show that” command word and simply did some calculations without giving logical steps or a sensible conclusion. Student’s language was often vague so that in their conclusions many calculated the same number and stated that they were “about” the same.

4.2 Students performed relatively poorly on this basic recall question. Often students only included one of the two elements or added in several additional ions.

4.3 The command word “explain” was often ignored by students who just stated that Aa1 was brighter. For credit students had to give a clear reason based on the data given earlier in the question. Students frequently referred to “higher” or “lower” spectral class. This is too vague a statement to gain credit without some sort of indication of which class of star was hotter. Just under half of students were awarded this mark.

4.4 Students generally noticed that the changes in magnitude were due to one star passing in front of the other with over 75% of students gaining this mark. Many students did not answer the question in full however, and failed to mention the apparent magnitude at points other than P and Q.

4.5 This question required students to read a value from the graph and then convert this into seconds to use in the angular velocity equation. It was generally done well. Due to the nature of the question, students needed to show correct working to gain marks. Some students missed out several steps with their working or did not include any subjects or units in their calculations making them difficult to follow.

Question 5

Over half of students were able to access the marks for this question although many struggled with the “discuss” command word. Students who did very well on this question provided a logical approach, providing clear calculations for X, clear calculations for Y and then making a logical conclusion based on these. There were several novel approaches which could gain full credit.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.