

Additional Science B

Gateway Science Suite

General Certificate of Secondary Education **J262**

OCR Report to Centres

June 2012

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

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OCR REPORT TO CENTRES

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Overview

This session presented the first opportunity for candidates to enter a paper for this specification. B721 was offered at both foundation and higher tier and both attracted a fairly small number of entries.

These new specification papers involve a number of different challenges for candidates.

One of these involves the need to write extended answers to three questions. In their answers candidates often failed to cover the full extent of the question, only concentrating on one aspect.

There are also increased numbers of questions testing quantitative skills. Candidates need to improve their ability to convert quantities between different units. They also need to be able to provide their answers to a suitable number of decimal places. Some of these quantitative questions are developed, ie answers to one part of a question are required to answer subsequent parts. Candidates are not double penalised in these questions.

Another change is the inclusion of more 'How Science Works' questions. Candidates need to be more specific in their answers to these questions. Simply stating 'ethical issues' or 'religious reasons' is seldom sufficient and less vague answers are required.

Hopefully candidates in future sessions will have had more opportunity to experience more examples of these questions by using the sample assessment material that is available or by using these papers.

More detailed comments on specific questions are provided in the principal examiners reports.

B721/01 Foundation Tier

General Comments

The level of difficulty of the paper appeared to be appropriate for the ability range of the candidates, producing a good distribution of marks covering almost the whole mark range available. Some candidates seemed to run out of time at the end, but this was rare.

The quality of candidates' spelling, punctuation and grammar was poor in some cases and there were times when deciphering a candidate's writing posed a serious difficulty. It was felt that poor literacy caused many candidates to lose marks, especially where they were being asked to read information before they answered a question.

Comments on Individual Questions

- 1 (a) The majority of candidates were able to correctly identify the term fertilisation.
- 1 (b) The context of the question seemed to confuse many candidates as their answers related to fertilisation e.g. 'twins can form', instead of the more general terms of repair and replacement of cells.
- 1 (c) Very few candidates realised that this was the same process as used by strawberry plants, which is in the specification. The term 'runners' was seldom seen, instead most candidates incorrectly referred to seeds.
- 2 (a) About half the candidates were able to correctly calculate the change in pulse rate.
- 2 (b) Most candidates were able to complete the bar chart; however some lost the mark because of inaccuracies brought about because they did not use a ruler.
- 2 (c) The few candidates that got this wrong tended to write 'because it was 52', without making a comparison.
- 2 (d) Many candidates mistakenly thought the last sentence was incorrect. Those that were correct in part (i) tended to also gain the mark in part (ii), but not all.
- 3 (a) Very few candidates understood where Sara had gone wrong. Many thought the leaf had died. The minority of candidates did realise the leaf was too thick and some were able to suggest there was not enough light getting through.
- 3 (b) Most candidates correctly matched the parts of the blood to their function.
- 4 (a) Many candidates were able to gain at least two marks by mentioning that the DNA was a double helix. Very few understood that enzymes were proteins and that DNA codes for proteins. The letters A, T, G and C were often quoted, but only the minority mentioned they were bases.
- 4 (b) Few candidates were able to correctly describe genetic engineering. Many transferred cells from one potato to another, but most answered in terms of selective breeding. In part (i) many candidates incorrectly referred to the potatoes getting a different disease.
- 5 (a) Over half the candidates correctly identified semiconductors.
- 5 (b) The majority of candidates understood the idea that nanotubes are strong.

- 6 Most candidates were able to identify the best material for an electrode as material B. However, a few incorrectly thought that A would be better because it did not conduct electricity.
- 7 (a) The majority of candidates were able to identify one cost. However, very few could explain these costs. Many mentioned the terms batch and continuous without showing any understanding of how they affected the cost. Candidates found it difficult to express their understanding and often produced very muddled responses. In some cases, it was clear they had learnt the costs, as a list had been written off to the side. Candidates answering a similar question in the future may benefit from the use of bullet points. For example, they could write a cost and then explain it – ‘testing’ drugs have to be tested to make sure they are safe.
- 7 (b) Very few candidates were able to clearly explain the need for publishing work. Many gave vague answers such as ‘so others know about it’ instead of more scientific answers such as ‘so other scientists can test their findings and further develop the drug’.
- 8 (a) Many candidates were able to give the correct answer to part (i). In part (ii), the majority were unable to answer in terms of rate, explaining that the rate decreases and then stops. A common misconception was that rate increases at the start. Many incorrectly referred to volume increasing then reaching a maximum.
- 8 (b) Less than half the candidates gained both marks. Many talked in terms of amounts of acid instead of concentration. Others referred to concentration, but not acid. ‘Put more zinc in’ was also seen as a frequent incorrect answer. Some candidates gave one correct change and explained it. However this question asked for other ways Christina could change the experiment, so they could only be awarded one mark.
- 8 (c) Most candidates were able to answer this correctly.
- 9 (a) About half the candidates were able to correctly calculate the relative formula mass.
- 9 (b) Few candidates showed an understanding of balanced equations. Many simply put ZnCO_3 and others wrote it the wrong way round. Parts (i) and (ii) involved simple calculations, however the majority of candidates were unable to calculate the correct answers. It is possible they did not understand which numbers to use, rather than were unable to do the maths.
- 10 (a) Only the more able students were able to gain both marks. Many candidates used 2g as their mass instead of 100g.
- 10 (b) Most candidates were able to identify C as the answer, but some lost the mark because they did not refer to energy transfer.
- 11 (a) About half the candidates were able to calculate speed of delivery, some of these however were unable to correctly round the answer correctly, as 3.14m/s was often seen as an answer.
- 11 (b) Many candidates failed to identify the first delivery as the fastest and instead they just attempted to give a reason. Most incorrectly answered in terms of energy instead of force.
- 12 (a) Few candidates calculated acceleration correctly. Of those that did, many rounded incorrectly. Very few candidates understood the concept of units. Many simply put another number in the space. Some made a better attempt by putting m/s.

- 12 (b)** Many candidates failed to explain the difference between Y and X, the concept of greater deceleration being too difficult for many to grasp. Most candidates wrote 'slows down more'. Very few candidates made correct reference to the gradient of the graph.
- 13** Very few candidates gave clear ordered answers using correct terminology. Vague comments about cost or 'eco friendly' were not awarded marks. Some candidates gave good detailed arguments for electric cars, but then failed to write about the disadvantages. Only the more able candidates were able to explain that scientists could monitor carbon dioxide emissions to help determine the benefits.
- 14** Most candidates were able to identify at least one correct statement.
- 15 (a)** Few candidates could use the information to calculate stopping distance. In part (i), many failed to link increased speed to increased stopping distance and the increased risk of an accident. The most common answers stated 'you need to know how long it will take you to stop'.
- 15 (b)** Many candidates failed to connect the points with a straight line. In part (ii), few candidates made the comparison between increases in breaking and thinking distance. They simply wrote they both went up.
- 15 (c)** The majority of candidates gained both marks.

B721/02 Higher Tier

General Comments

This is the first sitting for this paper in the new specification and the cohort was fairly small. There were few cases where many answers were left blank, but most of the candidates seemed to find the paper very challenging. There were indeed some stretching questions, but many candidates seemed to lack preparation and tripped up on some of the less challenging questions. Very few could give a correct balanced equation in Q5a and many could not recall the steps needed in tissue culture in Q1d. Answers to quantitative questions were mixed, but candidates should be encouraged to give their answers to a suitable number of decimal places.

Comments on Individual Questions

- 1 (a) Some answers referred to the fertilisation process with statements such as "to swim/fertilise/break into egg", but most answered correctly in terms of energy.
- 1 (b) This question was often answered well, although a number of candidates lost the mark by referring to damage rather than killing the embryo. A number just gave vague ethical answers, without qualifications.
- 1 (c) This question caused a few problems, with answers confusing meiosis and mitosis, even though candidates could get the mark very simply by stating that the offspring would not be identical.
- 1 (d) This question was not answered well by most candidates, as many suggested taking cuttings and using rooting powder. Very few gave any growing conditions.
- 2 (a) Few candidates could answer 'atria'. 'Ventricle' was often seen, along with references to valves and blood vessels such as the aorta.
- 2 (b) Candidates found these two questions very difficult. Many could score on (i) by referring to the number or thickness of chambers, but the implications of this were not understood.
- 3 (a) A number of candidates simply wrote about shape of enzymes and therefore did not score. Others wrote about base pairs and the making of amino acids. Some very good answers included the role of mRNA and ribosomes, but very few wrote about the triplet code for each amino acid and how this builds up a protein.
- 3 (b) There were a large number of selective breeding answers here and many candidates did not appreciate that resistance is caused by a gene.
- In (b)(ii) many candidates repeated the question by referring to harmful, with only a few suggesting changes to taste or becoming poisonous.
- 4 (a) In part (i) a number of candidates gave 12.43 recurring and so lost a mark.
- Question 4(a)(ii) was not answered well. A few candidates referred to pH7 as the optimum and even fewer wrote about denaturing.
- 4 (b) Many appreciated that the third result was anomalous, but did not suggest discarding/repeating or saying that it will give a low mean result.

- 5 (a) Many candidates scored a mark for calculating the relative molecular mass of zinc carbonate and zinc oxide, but could not use these correctly.
- 5 (b) This question was well answered with many candidates scoring two.
- 6 (a) A small number of candidates scored marks for the equation, giving eg MgCl or H , or a range of other attempts.
- 6 (b) Many candidates answered in the accepted range, but a number answered 60.
- 6 (c) The idea of a greater surface area scored well, but many candidates referred to 'more collisions' rather than increased frequency of collisions.
- 7 (a) A significant number of candidates correctly answered 7560, but more used the incorrect mass and gave 151.2 for 1 mark.
- 7 (b) This question was poorly answered as many candidates did not refer to bonds and many others confused exo/bond making with endo/bond breaking.
- 8 (a) Many candidates could identify sample B as most pure, with correct reasoning. Descriptions of the process varied, with some good references to chromatography.
- 8 (b) Many candidates correctly stated continuous, but then just repeated the information in the table. Others went for batch and therefore did not score for their reasons.
- 8 (c) Many answers went down the route of 'for money/kudos' etc. Other answers vaguely referring to checking results, but some did write about further research and development.
- 9 (a) The idea of average speed was not clearly understood. Candidates who used either 37 or 41m/s scored one mark. A common error was to subtract the speeds and use 4m/s, giving the answer 4.42s.
- 9 (b) A number of candidates lost a mark by not referring to reaction time.
- 10 (a) This question scored well with most candidates answering $40 \times 3.5 / 2$.
- 10 (b) Some candidates correctly calculated $X = 420$ and $Y = 280$, but then wrote about acceleration and so lost the third mark. Many other candidates lost all marks by not calculating.
- 11 Many candidates scored quite well, giving pros and cons plus a statement about testing and comparing environmental impacts. However, there were also many vague answers mentioning pollution or burning fuels etc. A number did not address monitoring/testing at all or in any meaningful way.
- 12 (a) Plotting the graph scored well, but there was some inaccurate plotting.
- 12 (b) This question was not answered well, with answers mentioning speed having the greatest effect and simply stating the data from 100km/hr.

- 12 (c)** Many candidates in part (i) scored a mark by referring to repeats, but in (ii) many lost the mark for simply stating different conditions rather than specifically stating road surface or weather.
- 12 (d)** Most candidates scored for the idea of absorbing energy. Very few wrote about the increased time of collision or stopping distance and even fewer wrote about change in momentum.
- 13** Most candidates finished the paper well.

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