



General Certificate of Secondary Education

**Applied Science (Double Award)
4861**

APSC/2F Science for the Needs of Society

Report on the Examination

2009 examination – June series

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General comments

This paper was generally very well answered, with fewer candidates missing questions out than in previous series. This may have been due to there being more one word answer questions and fewer requiring larger descriptions. The calculations were better attempted. There are still, however, some common recurring misconceptions, including how nerve signals are sent around the body.

Question 1

- (a) (i) This was a good opening question and many of candidates gained all 3 marks.
- (a) (ii) Many candidates achieved this mark.
- (a) (iii) Most of the correct answers referred to 'long' or 'branched', the most common answer being 'long'. Unfortunately, there were many responses of 'small' and 'thin', 'flexible' or 'streamlined so they can move around the body' which was a common misconception. A number of candidates referred incorrectly to parts of the cell as roots or talked about stems or surface area. Not one candidate mentioned the fatty outer layer of the cell.
- (b) The majority of candidates were able to access the marks for this question.

Question 2

- (a) (i) Most candidates correctly identified the alloy.
- (a) (ii) A number of candidates were unable to answer this correctly.
- (a) (iii) Half the candidates achieved this mark.
- (b) Many of the uses given for steel were actually those of stainless steel, indicating some confusion by candidates. Some candidates listed 'attractive' or 'expensive' as properties for gold, which were too vague to be credited. Similarly vague statements such as 'strong' also appeared for copper and gold. A number of candidates still think that lead is used in pencils.
- (c) This was generally well answered, with most candidates gaining 1 or more marks.
- (d) The responses to this question were slightly disappointing. The most common correct responses related to habitat loss, global warming or digging. There were a number of very vague statements mentioning pollution, but to gain the mark air or noise pollution needed to be specified. Some candidates referred, incorrectly, to the ozone layer.

Question 3

- (a) This was quite well handled, although some candidates calculated the difference in deaths between 1998 and 2002, but did not state that this was the amount deaths decreased by.
- (b) (i) This question generally was poorly answered generally. Many candidates wrote about how reducing the speed limit would give drivers more time to think or to stop or that someone would have more chance of surviving being hit, but did not address the question of the effect on the number of accidents and so could not be credited.
- (b) (ii) In contrast, this was quite well done. Most correct answers related to traffic jams and longer journey time. Some candidates referred incorrectly to the number of accidents, which relates to the previous question. Others responded that people might be late or might speed.
- (b) (iii) Most candidates managed to gain at least 1 mark for this question. Most candidates gained this 1 mark by listing two items from the same mark point (such as pedestrian crossing or lollipop person), rather than two different measures. In this, as in many other questions asking for two or more factors, candidates need to be able to differentiate between them and provide different factors. Some incorrect responses included traffic lights or related to how to cross the road or what the driver should do.
- (c) Some candidates attempted unnecessary calculations or stated a number only. Others thought that increasing the speed would decrease the stopping time.
- (d) (i) The most common correct answers were alcohol, drugs, tiredness and mobile phone. The most common incorrect answers related to reaction times or weather. Some candidates gained 1 mark because they gave two distractions. Some candidates referred to the panic or shock of the driver.
- (d) (ii) Very few responses related to braking distance. Many statements given were so vague (e.g. just stating 'condition of car') that they could not be credited. Many references were made to driver, not to condition of car, weather, or speed. Some candidates gave two road conditions (e.g. icy road and wet road), which could only be given 1 mark.

Question 4

- (a) (i) Candidates achieved marks across the full range for this question.
- (a) (ii) This area does not seem to be well known, with less than half of the candidates gaining even 1 mark.
- (b) This question was attempted by all candidates, and most gained at least 1 mark.
- (c) (i) This was generally answered well.
- (c) (ii) In contrast, very few candidates were able to correctly identify the required reactant.

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- (d) (i) The majority of candidates answered this by correctly referring to weight or heavier. It was slightly disappointing that few responses noting other features were seen.
- (d) (ii) Generally well answered.

Question 5

- (a) Most candidates gained at least 1 mark, although a few gained all three.
- (b) Responses generally either gained 2 marks for the correct answer or no marks. Many responses were just random numbers with no evidence of any working out. Candidates should be encouraged to show their working, as credit may be given for correct working.
- (c) (i) It is evident that most candidates still do not know the definition of a hydrocarbon. Very few candidates could answer this correctly.
- (c) (ii) Only half of the candidates who responded to this question were able to give the correct formula and many did not attempt it.
- (d) The fractions most commonly correctly given were gas, diesel and kerosene. Incorrect responses included coal and petrol. Some candidates gave no use for the fraction they listed and so could not gain the mark. Some candidates referred to hydrogen or cooking oil for cars or to gas oil or oil for lubricating engines. A few students gave deodorants as a use for gas. Many answers seemed to indicate that candidates simply did not understand the question.
- (e) (ii) Despite the formula being given, most candidates could not identify the product of the combustion of hydrogen.
- (e) (ii) Many candidates correctly mentioned carbon dioxide or its formula, but there were many vague references to hydrogen having water in it, harmful or dangerous gases being given off, 'chemicals' or the idea that petrol 'contains more chemicals' than hydrogen. None of these could gain any credit. Other incorrect responses included references to boiling point or burning time or the fact that hydrogen gives off water that might have gained the mark, if they had only included the word 'just'.

Question 6

- (a) (i) This was fairly well done, candidates who gained only one of the two marks available missed out microwaves. The most common incorrect responses included Bluetooth, TV, alpha and beta.
- (a) (ii) Most candidates attempted this question, although the proportion of correct answers was low.
- (c) (i) Responses to parts 6(c) and 6(d) indicated that few candidates understood the use of ionising radiation in radiotherapy.

Most candidates were unclear on the properties of gamma rays, offering very vague statements such as 'because they are strong' or 'because they can go through the body'. Many candidates seem to think that gamma rays allow us to see where in the body the cancer is, that they are the least dangerous, that they kill all cells or burn. Few creditworthy responses were seen.

- (c) (ii) Lots of vague statements were made about protective clothing. Some candidates referred (incorrectly) to using gloves or masks (confusion with radiation suits?), others believe that standing behind glass would work. A few suggested that sunscreen would be protective.
- (d) (i) Many answers were very vague and included references to the machine (noisy, claustrophobic, electrocution).
- (d) (ii) Again, not generally well answered. Some candidates suggested putting people to sleep, 'strapping them down' or even blindfolding them. Some got confused with the previous question and suggested covering them (protective clothing) or 'lowering the energy level'. Some suggested 'trying it on themselves first'.

Question 7

- (a) (i) Very few candidates could answer this correctly. Many responses incorrectly referred to the fact that the doctor has had more training or the germ needs to be inhaled or simply quoted the doctor.
- (a) (ii) Most candidates achieved a mark for covering the mouth, but more generally about washing hands or disinfecting. Some showed some awareness of isolation and vaccinations. Many candidates only got one mark as they put 'cover mouth when sneezing' then 'cover mouth when coughing', which is the same marking point.
- (b) (i) There was some confusion between types of cells, with candidates stating incorrectly that red blood cells 'fight germs' etc. An alarming number of responses were 'carry blood'.
- (b) (ii) The many odd responses received indicate that many candidates had little idea as to what platelets are. The most common correct responses were 'clot blood' or 'form scab'. Incorrect responses included 'protect body', 'fight disease' and 'carry information around body'.

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- (c) Very few candidates got all three sentences correct with only 20% getting the first two or the last two correct. A great number wrote 'small' or 'different' for the first space. Platelets and antibiotics were the most common incorrect answers for the last space.
- (d) Most candidates correctly responded with antibiotic or penicillin and a few named other antibiotics. Incorrect responses included paracetamol, Calpol, tablets, medicine and injection.

Question 8

It was clear from the responses to this question that candidates find this part of the specification difficult.

- (a) (i) Only half of the candidates could answer this question correctly. Most correct answers related to more buildings, more products, more jobs or more profit. Incorrect answers included disadvantages of destroying the natural beauty or more pollution. Some responses simply referred vaguely to the natural beauty (e.g. the quarry remains natural).
- (a) (ii) There were very few candidates who could suggest a feasible action. Many incorrectly mentioned reducing the size of the quarry, or the amount of trucks, moving it, digging deeper or fencing it off instead.
- (b) A quarter of candidates wrote nothing and over half of those that did write something got it wrong. Various ways of explaining that the stones needed to be smaller were seen. Quite a few candidates referred to melting, heating, flattening or adding cement.
- (c) (i) Quite a few candidates incorrectly repeated the formula or gave one of the following responses: calcium oxide, carbon hydroxide calcium carbonate, quicklime or calcium oxide hydrogen.
- (c) (ii) Only about a third of candidates were able to gain this mark.
- (d) (i) Responses here were very poor. Many candidates got confused and answered 'mix with water and/or sand' or vaguely mentioned 'mix with other materials'. Other incorrect responses included 'melt', 'heat' or 'break it down'. A large number of candidates got mixed up with mortar or just put any fact they knew about limestone in the hope of getting a mark. A quarter did not attempt to answer the question.
- (d) (ii) Only a third of candidates gained marks here. Those getting 1 mark usually omitted 'small stones'. Those gaining no marks usually talked vaguely about adding water and leaving it to set. Others referred to the strength or use of concrete.
- (d) (iii) The most common correct answer seen was statues, followed by glass and toothpaste. Most incorrect answers referred to buildings. Some candidates talked about making marble.

Question 9

- (a) (i) Most candidates gained 2 marks here; those receiving only 1 mark usually incorrectly plotted 33. A lot of candidates wasted time by colouring the bars in unnecessarily.
- (a) (ii) This was generally well answered with the most common correct answer being coal. Incorrect answers included fossil fuel, renewable energy sources, oxygen or carbon.
- (a) (iii) Fewer than half of the candidates answered this correctly. Quite a few candidates appeared to misread the question and gave non-renewable energy sources. Some confused nuclear with renewable energy sources. There were some vague statements about sun or water. The most common response was solar and wind.
- (b) Most candidates attempted this question and many gained the mark.
- (c) (i) A quarter of the candidates did not give an answer and two-thirds of those that did were incorrect.
- (c) (ii) Responses to this question were generally poor and very few candidates got both marks. The most common response gaining 1 mark was 'use renewable energy resources'. Quite a lot of candidates simply stated 'use less of them', which could not be credited. Common misinterpretations were 'don't waste gases' and 'use different ways of making gases'. Some candidates confused producing less polluting gas with using less gas and so talked about using oil instead.

Mark Ranges and Award of Grades

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