



General Certificate of Secondary Education

Applied Science 4863

AASC/2H Science at Work

Report on the Examination

2008 examination – January series

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General comments

It was pleasing to see that most candidates attempted all of the questions and very few parts were left blank. The main weakness was specific knowledge; particularly in chemistry

Question 1

A large number of candidates did not gain the marks in **1(a)** by giving features that were already labelled on the diagrams. The word 'other' should be pointed out. Candidates should also be reminded to be more specific in their answers; 'shape' or 'toe' are too vague.

In responding to **1(b)** most candidates recognised that synthetic materials are lighter in weight and a few mentioned that they were more waterproof and flexible. Many simply referred to cost and comfort, answers that were not worthy of credit. Candidates needed to explain *why* synthetic materials would be more comfortable to gain a mark.

The mark for the feature in **1(c)** was not always gained, as candidates rarely clearly identified the change in the boot (ie thin bottom plate). Candidates were not expected to know where the metatarsal is, so an allowance was made for those who wrote about protecting the heel. Candidates who identified studs in their answer did not seem to realise that the more pointed shape would increase the pressure on the foot if they were stood on.

Most candidates correctly chose metal or polymer to answer **1(d)** but their reasons often related to the function of the studs for grip rather than to the properties of the material. Those who chose composite knew that it is a combination of materials and often stated the combination of the best properties.

Question 2

Many candidates thought that the fingerprint in **2(a)** is a whorl but it is very clearly a loop. Some gave the answer 'swirl', which is clearly incorrect.

The main reason for candidates not gaining the mark in **2(b)(i)** is that they did not state that it was identical to C. Most candidates were able to correctly measure the distance between X and Y in **2(b)(ii)** and knew to divide their answer by 5 to give the correct answer to **2(b)(iii)**. The most common error in this question was to multiply by 5 rather than divide.

In responses to **2(c)** candidates demonstrated a sound knowledge of procedure but were not able to gain full marks because they omitted mounting the fingerprint or storing it on a database: most seemed to think it appropriate to mount the fingerprint on paper or store it in a plastic bag, neither of which are suitable procedures.

The uniqueness of fingerprints (**2(d)**) was not well known by some candidates and many thought that identical twins have the same print. Quite a few were under the misconception that there are only three types of fingerprints in total.

Question 3

Most candidates answered **3(a)** well, picking out the healthier options in bar P, but some candidates gave explanations such as 'It has a wider range of food groups' or 'It contains more nutritious food', which were too vague to gain credit. Some did not gain any marks because they mentioned carbohydrates which are present in both bars.

Responses to **3(b)** showed that only about 50% of candidates knew that ingredients are listed on the packaging in the order greatest to smallest proportion of contents.

A wide variety of answers was seen to **3(c)**, and few were correct. Candidates should be reminded to show their working as marks can be awarded for correct calculations.

Question **3(d)** was generally well done.

Answers to **3(e)(i)** showed that candidates do not know the preservatives given in the specification, most frequent responses being salt or sugar. Very few candidates gave tartrazine as their answer to **3(e)(ii)**. Some E numbers were given but these seemed to be quite random.

'To prevent constipation' was the most common correct answer to **3(f)**. There were many vague answers like 'It helps the digestive system', which could not be given credit: how does it help the digestive system?

Question 4

Most candidates scored at least 2 marks for **4(a)** and many gained full marks. Some candidates needed to explain themselves better to gain the marks (for example, does the answer 'breathing harder' mean that the cyclist finds it hard to breathe or that his breaths become deeper or quicker?). References simply to the presence of lactic acid in muscles were not enough to gain marks as it is the fact that the levels built up that is important.

Very few candidates identified glycogen as the energy store in **4(b)**, and some thought that starch would be stored. Many got 1 mark for realising that complex carbohydrates would provide a slow release of energy.

Question **4(c)** was very poorly answered. Many responses to **4(c)(i)** gave $\text{C}_6\text{H}_{12}\text{O}_6$ as the formula for glucose, demonstrating lack of chemical knowledge, even though glucose is on the list of chemicals for which candidates should know the formula. Very few candidates knew the name of the bond required in **4(c)(ii)** and some totally misread the question, answering 'sugar. Very few candidates could explain why glucose has a low melting point (**4(c)(iii)**) and those that attempted the question it often suggested that the bonds are weak, which was not worthy of credit. Candidates should be reminded that the bonds between the atoms – the covalent bonds – are strong; it is the force between the molecules that are weak. Candidates often interchanged the words atoms and molecules and hence do not gain marks. Reference to weak bonds between atoms scored no marks.

Question 5

Correct answers to **5(a)(i)** were mostly well known. The most common incorrect answer was fingerprints.

Responses to **5(b)(i)** were rarely correct. Very few candidates appeared to know about electrophoresis, most mentioning chromatography or the more vague 'DNA analysis'. Many candidates scored no marks for **5(b)(ii)**. Those that had some idea realised that the fragments were of different sizes and so would separate differently but very few mentioned the electric current passing through the gel or that DNA is negatively charged. Answers were tending to refer to chromatography in general rather than electrophoresis.

Most recognised that the answer to **5(c)** was Suspect 2 because the evidence matched the evidence DNA. However, a sizeable few believed it to be Suspect 4.

Question 6

Many candidates gave the correct answer (bacterium) to **6(a)(i)**, but quite a few gave the vague answer 'disease'. Many were able to realise that the contamination occurred was through the leaking pipe (**6(a)(ii)**), but some referred to general contamination issues such as not washing hands or not cooking the food enough.

In answering **6(b)** most candidates knew to take a sample from chocolate and ill people but many were then comparing the samples using a microscope rather than growing the bacteria on agar plates.

In **6(c)** most candidates recognised that the chocolate needed to be above 30°C to kill the bacteria.

Question **6(d)** was a good discriminating question. Some candidates were able to give a good evaluation and recognised some of the reasons why the company did not want to recall their chocolate – ie the loss of money, reputation and that they were not sure their product was contaminated. The danger of this decision was also considered by some candidates who referred to the health risk caused.

Mark Ranges and Award of Grades

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