
LEVEL 3 CERTIFICATE AND EXTENDED CERTIFICATE **APPLIED SCIENCE**

ASC1: Key Concepts in Science
Report on the Examination

1776 & 1777
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General

The paper gave students the opportunity to apply their knowledge and understanding across a range of topics from the unit 1 content. It was clear, as with last June's exam, that while some students were able to attain very high marks, many aspects of the paper proved to be challenging for the majority of students.

Presentation was generally good with handwriting being legible and it was clear that the space provided for answering questions was sufficient for the vast majority of students (there were very few additional sheets to mark). It was also clear that students had sufficient time to complete the paper. All questions were attempted by the vast majority of students.

It was noted that a large proportion of students are unfamiliar with balanced symbol equations. Many did not write them accurately and did not accurately interpret them in terms of reacting molar ratios.

In the questions that required the use of a formula, many students were unsure how to rearrange the equations that are provided on the formulae sheet. Students should be familiar with the formulae sheet so that they can identify the correct equations to use and be confident in rearranging them. In their answers, students should be encouraged to always write the formula down and then substitute in the required data, setting their work out clearly. Students should always double check the units for their answer.

Section A: ASC1/B (Biology)

Question 1

01.1 Students were asked to state the normal range for body temperature, which is stated in the specification. 29% of all students were able to do so and gain credit.

01.2 66% of all students gained credit for selecting the normal range for blood pH. All other incorrect answers were seen, but the most common incorrect answer was '7.00–7.35'.

01.3 74% of all students gained full or partial credit in this question, which differentiated between students well. 29% gained full marks and a further 27% gained two marks.

Of the incorrect answers seen, a significant number linked ADH with sodium reabsorption or controlling heart rate. In addition, a significant number gave the function of insulin as converting glycogen to glucose.

01.4 92% of all students gave a correct conclusion based on the data relating to percentage of people with obesity and the percentage of people with diabetes.

Question 2

02.1 This question differentiated between students well. 31% of all students gained two marks in this question and 34% gained one mark. Where students failed to gain the second mark it was often for answers relating to naming A, such phospholipid. Answers such as phospholipid layer were allowed.

02.2 This was a multiple-choice question asking for the function of part C. 34% of students correctly gave the answer as cell recognition, with many students giving active transport or facilitated diffusion as their answers.

02.3 In this question students were asked to link a cellular function to the correct organelle which carries it out. 13% of students correctly gave smooth endoplasmic reticulum as their answer. Of the answers seen that did not gain credit the following answers were seen relatively often:

- endoplasmic reticulum
- rough endoplasmic reticulum
- ribosomes
- Golgi body.

02.4 In this question students were asked which organelle breaks down damaged cell parts in eukaryotic cells. This was slightly better answered than question **02.3**, with 21% correctly giving lysosomes. Phonetic spelling of lysosomes was allowed. Incorrect answers seen included:

- Golgi body
- smooth endoplasmic reticulum.

02.5 2% of all students could correctly describe the function of plasmids. Many stated that the plasmid contained the genetic material for cellular functions or simply stated that the plasmid protected the cell, without describing the nature of this protection.

Question 3

03.1 This question was well attempted, with 23% gaining two marks and a further 46% gaining one mark. Many students restated the stem of the question stating that one reason was that nutrients are added without going on to say that there is a continuous source or nutrients or that the balance of nutrients can be controlled.

For the second idea, students needed to make it clear that the water supplied is continuous or state what the water is used for. Many answers seen were simply too vague to gain credit and what was written could apply equally to tomatoes grown in soil as well as those grown using hydroponic methods.

03.2 31% of all students gained full or partial credit in this question for describing the splitting of water molecules to produce hydrogen and oxygen.

03.3 60% of all students correctly gave 'producer' as the organism at the start of food chains. Incorrect answers seen included:

- consumer
- first organism
- source.

03.4 58% of all students gained a mark in this question with a further 7% gaining two marks. Many answers gave the idea of a meat-free diet being healthier without stating how it is healthier or they stated that it would help you lose weight.

03.5 58% of all students gained credit in this question for giving a disadvantage of a meat-free diet.

Section B: ASC1/C (Chemistry)

Question 1

- 01.1** Many incorrect references to neutrons having a charge were seen. Whilst some students knew there were positive and negative charges within an atom, a smaller portion of students talked about the number of the protons and number of the electrons being equal. 42% of all students gained full or partial credit in this question.
- 01.2** This question differentiated between students well. 58% of all students gained one mark, often for discussing free or delocalised electrons. A few recognised that the outer shell electrons were the electrons in question.
- 01.3** Students generally seemed unable to construct this equation. Few correct answers were seen with 10% of all students gaining some credit. Of the correct answers, very few gave the correct state symbols.
- 01.4** Many correct answers seen with 49% of all students gaining one mark and a further 19% gaining two marks. Some students, however, drew a giant ionic lattice. A regular arrangement was drawn by many even if disrupted layers were not seen.
- 01.5** 14% of all students gained a mark in this question and a significant number simply stated, 'because it is an alloy'. This is a restatement of the question stem and therefore does not gain credit.
- 01.6** Many students did not realise that magnesium and strontium both needed to lose two electrons. Other incorrect answers referred to M_r and intermolecular forces. Some incorrect answers involved discussions of radioactivity. This question differentiated between students well with 5% achieving full marks.

Question 2

02.1 24% of all students gained full or partial credit in this question which differentiated between students well. Many students were unable to rearrange the mathematical expression. Of those that could rearrange the expression far less went on to convert the units of pressure.

Some scripts showed clear working and therefore could score compensation marks. Those with working that showed no clarity were highly unlikely to score any marks.

02.2 Most students incorrectly stated that this was a combustion reaction. 25% knew that this was a thermal decomposition.

02.3 This was generally well answered, with 22% gaining full marks and a further 42% gaining a single mark. A large number of these students scored the units mark.

02.4 18% of all students gained credit in this question; less than 1% achieved full marks. A large number of incorrect answers mentioned human error. Several students discussed energy inappropriately. Other incorrect answers mentioned sound, reactivity series, or an unbalanced equation. Several incorrectly referred to the zinc carbonate as zinc.

Many unspecific answers were seen. Students need to avoid general answers such as wrong measurement or broken equipment or temperature involved.

Section C: ASC1/P (Physics)

Question 1

- 01.1** 47% of all students were able to provide one way that the design of the heat exchanger maximised heat transfer. The most common correct answer was the fact that copper is a good conductor of heat. Few students were able to identify the large surface area as being the second way. 8% of students were awarded both marks. Many answers referred (incorrectly) to the insulating jacket.
- 01.2** This question required students to identify a disadvantage of using solar power to heat water. This question proved to be the most accessible question on the paper with over 48% of students gaining both marks.
- 01.3** This question required students to apply their knowledge of the equation $U = \frac{Q}{A t \Delta T}$, recognising which two measurements would be needed to calculate ΔT .
- 4% of students were able to state that the temperature on both sides of the insulating jacket would be required. 42% were able to gain one mark in this question, mostly recognising that ΔT was a difference or change in temperature. 2% of students did not attempt this question.
- 01.4** 56% of students correctly identified A as having the lowest U-value.
- 01.5** This question was generally well answered with 42% of students being able to interpret the graph correctly.

Question 2

02.1 88% of students were able to give one advantage or disadvantage for electric cars. 44% scored both marks on this question.

02.2 This calculation was well answered with 23% of students gaining the full three marks. This question also differentiated between students very well. Most students knew which equation to use and how to correctly rearrange it to make current the subject.

The most common error was the failure to convert 72 kW to 72 000 W. This led to the loss of the first mark. Also, a large number of students did not know that Amps (A) is the unit for electric current.

02.3 Students were required to rearrange the equation $I = Q/t$ to $t = Q/I$ and then substitute their current value from question **02.2**. This was a demanding question which 16% of students failed to attempt.

However, there were some very good answers here with 26% of students attaining full marks. The best responses were set out clearly, showing all working out and making a final conclusion that 4550 seconds \approx 76 minutes (4560 seconds).

02.4 This question required students to rearrange the equation $v = s/t$, making s the subject. 26% of students were able to gain full marks while 12% of students did not attempt this question.

A common error was the failure to convert 76 minutes to seconds which lost the second mark. It must be noted that this question was still accessible to those students who did not successfully complete question **02.3** as the time of 76 minutes was given in the question.

02.5 This question required students to describe why the current from the battery of the electric car was less when the car was being driven downhill. The majority of students were able to correctly refer to gravitational force or gravitational potential energy in their answers.

17% of students were also able to correctly state that the battery was required to provide less energy. No students were able to state that the car had the same kinetic energy travelling downhill as on the horizontal as it was driving at the same speed.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

[UMS conversion calculator](#)