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

ASC1: Key Concepts in Science  
Report on the Examination

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1775 (1776 & 1777)  
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## General

The paper gave students the opportunity to apply their knowledge and understanding across many areas of unit 1 from the specification. 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.

In the questions that required the use of a formula, many students were unsure which one to use from the formulae sheet. This was particularly true with the *suvat* equation required in section C, question **01.4**. Moreover, where students showed working for the calculations it was often poorly set out, making it unclear which quantities were involved and this, invariably, led to incorrect answers. Students should be familiar with the formulae sheet so that they can identify the correct equation to use and be encouraged to always write the formula down and substitute in the required data.

One common error in calculations was the lack of correct rounding in students' answers (for example, 1.709 was often rounded to 1.70 and this led to the mark being missed). Students should be reminded to check their answers to avoid such mistakes.

## Section A: ASC1/B (Biology)

### Question 1

**01.1** In this question, students were required to convert their measured length of line AB to micrometres to obtain the correct magnification. The vast majority of students made errors in this conversion and so they were orders of magnitude out, however, these answers achieved one mark.

12% of students correctly converted the units and used the equation to correctly calculate the magnification.

**01.2** This question was well answered with 71% achieving the mark for identifying the part of a cell where chromosomes are found. Common incorrect answers seen included chromosomes, DNA and cytoplasm.

**01.3** This question discriminated well, with 13% achieving all three marks, 11% achieving two marks and 22% achieving one mark.

Commonly students simply wrote 'sugar' for part B, which was not specific enough to gain the mark. For part C we were looking for 'base', but if students gave a correctly named base the mark was allowed.

**01.4** All possible mark scheme answers were seen for this question, although the idea of RNA being single stranded or having uracil instead of thymine were most commonly seen. Many students describe RNA as being a single helix which should be discouraged. 51% of students achieved a mark.

### Question 2

**02.1** Students struggled with the first marking point in this question and a variety of incorrect answers were seen ranging from food group types to ATP / ADP. Where students attempted acetyl-coA, they often missed the second part and stated acetyl or adenine or adenosine which did not gain credit.

The second marking point was more commonly seen for a six-carbon compound and a few references to citrate were also seen, although this is beyond the scope of the specification. 9% of students achieved full marks for this question.

**02.2** 14% of students achieved credit in this question and all possible answers on the mark scheme were seen. Common incorrect answers included combustion, respiration and photosynthesis.

- 02.3** 27% of all students achieved credit in this question. Students needed to read all the information to make sense of the question, and in order to link fumarase to the Krebs cycle to ATP production. The most common answer that did not gain credit was to state that children with fumarase deficiency are often tired due to a lack of energy.
- 02.4** 92% of all students achieved credit in this question and could give a conclusion about BMR. Some students just stated there was a negative correlation, but this was insufficient to gain credit at this level. A small number of students seemed to think BMR was something that you catch and that you are less likely to catch it as you get older.
- 02.5** Most students correctly described how the BMR of a male would be higher than that of a female of the same mass and 27% went on to achieve the second mark for either stating males have more muscle or that women have more fat. However, the following statements were not creditworthy:
- women are fatter
  - men are bigger
  - women eat more
  - men have more testosterone
  - men have bigger lungs.

### Question 3

- 03.1** 70% of all students correctly identified chemoreceptors in this question. All other options were seen, with baroreceptors being the most popular incorrect answer.
- 03.2** 0.5% of all students achieved maximum marks for this question, with a further 9% achieving two marks and 41% achieving one mark.
- Most commonly students stated that the pacemaker sends an electrical impulse across the heart. Those students who only wrote impulse did not gain the first marking point. The second and third marking points were not seen as often, and a significant number of students described how the normal pacemaker cells control heart rate without answering the question that had been asked.
- 03.3** 39% of all students achieved full or partial credit for giving advantages of the micro pacemaker. The most common error students made was in simply copying information from that which was given without adding value as to why it was an advantage.

## Section B: ASC1/C (Chemistry)

### Question 1

- 01.1** 41% of all students achieved credit in this question, although a considerable number of answers in terms of atomic mass were seen, which was not creditworthy.
- 01.2** 36% of students achieved credit for naming the halogens. However, many students appeared to be unaware of specific group names, with a significant number of students incorrectly stating 'Noble gases' as their answer.
- 01.3** In this question, students needed to describe the electronegativity decreasing as you move down the group. However, some answers stated that each element in group VII has seven electrons on their outer shell, which is not a trend. Likewise, some students said that all elements in group VII had a low electronegativity. Other students described an increase in atomic radii or in shielding, and some discussed reactivity or atomic mass which was not creditworthy. 17% of all students could correctly describe the relationship.
- 01.4** 55% of students could state that elements in the same group had the same number of electrons and therefore achieved a mark. A significant number then restated the phrase 'similar chemical properties' and as this was part of the question it did not gain a mark.

Students needed to explain why the chemical reactions were similar in terms of the gain, loss or sharing of electrons or in terms of the number of bonds formed. 6% of students received full credit.

### Question 2

- 02.1** Whilst 55% of all students achieved full or partial credit in this question, some students confused isotopes with ions and consequently discussed loss and gain of electrons and charges on ions.
- 02.2** Many correct calculations seen in answer to this question. However, a large percentage of students seem unaware of significant figures. 12% of all students did not attempt to answer this question.

- 02.3** Many students could identify the correct type of bonding in silicon, with 66% of all students achieving one or more marks. However, statements were frequently ambiguous and as such marks could not be awarded.

Incorrect statements included phrases such as ‘the ionic bonding is covalent’ and ‘intermolecular forces are present when there is metallic bonding’. It should be emphasised that students must describe the correct type of structure and bonding and will not gain credit if other bonding types are mentioned in addition to the correct one.

### Question 3

- 03.1** Students who drew a Hess’s cycle generally were able to calculate the required answer or get very close to it and so gained the majority of marks. 33% of all students achieved two or more marks, with 14% achieving the full four marks available.

Many of those who did not draw a cycle seemed completely unaware of the correct approach and frequently achieved no marks.

- 03.2** The majority of students answered this well although a significant number suggested insulating the beaker with a flammable material. 30% of all students achieved both of the available marks and a further 51% achieved one mark. Several ambiguous answers were given that could not be given credit.

- 03.3** 27% of students achieved credit in this question. Answers need to be specific to gain credit: ‘faulty equipment’, ‘room temperature’, the ‘amount of water’, ‘thermometer’, ‘fuel’ are a few examples of answers that required more detail.

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## Section C: ASC1/P (Physics)

### Question 1

- 01.1** 56% of students correctly identified the energy of the ball as gravitational potential in this question. Marks were often missed due to the omission of the word 'potential'.
- 01.2** This question required students to identify the two forces acting on the ball (the force due to gravity and the magnetic force due to the electromagnet) and state that they were equal and acting in opposite directions. 29% of students were able to give one of these marking points. 4% of students achieved both marks here.
- 01.3** The equation (average)  $v = s/t$  is given on the formulae sheet and it was required in this question. 60% of students gave the correct answer.

A significant number of students incorrectly rounded their answer. Many students rounded the answer seen on their calculators (1.709401) to 1.7 (giving a wrong answer of 1.7777...) or 1.70.

- 01.4** This question proved to be one of the most demanding on this section of the paper, requiring students to select the equation  $s = ut + \frac{1}{2} at^2$  from the formulae sheet and rearrange it to get  $a = 2s/t^2$ .

Some excellent calculations were seen where students set their work out clearly and got the correct answer. These were few and far between with 3% of students achieving full credit. 27% of students achieved one mark and this was largely due to stating the correct unit for acceleration in their answer. 10% of students did not attempt this question.

- 01.5** This question was generally well answered with 32% of students being able to give two ways the effect of errors can be reduced in practical work. This is to be expected as these skills are assessed widely in Unit 2: Applied experimental techniques.
- 01.6** 45% of students were able to calculate the kinetic energy. Common errors were failing to square the speed (this was compounded through the lack of a written down equation with correct data) and the conversion of 0.060 kg to grams.
- 01.7** 9% of students achieved full credit here. 19% of students were able to refer to one of Newton's Laws in their answer but could not correctly apply it to the situation so achieved one mark.

However, 72% of students did not get credit. Students need to practice applying Newton's Laws of Motion in a wide range of situations to fully prepare them for these types of questions.



## Question 2

**02.1** Students are generally good at plotting graphs (a skill they would have had much experience of in Unit 2: Applied experimental techniques) and 56% of students achieved both marks. 36% of students achieved one mark here, largely due to drawing a straight line of best fit when a curve was required.

**02.2** 37% of students could give a definition of U-value.

**02.3** Students were expected to use the equation for U-value as given on the formulae sheet. 24% of students were successful here.

Where students achieved one mark, this was generally due to not calculating the difference in temperature ( $\Delta T$  in the equation). Another common error was to incorrectly round 17.846153 (as seen on their calculators) to 17.8, indicating an answer of 17.888.

Again, it must be stressed that students should be familiar with all the equations on the formulae sheet and recognise when they should be used. Many students confused U-value with the symbol  $u$  (initial velocity) in the *suvat* equations. 11% of students did not attempt this question.

**02.4** The specification says that learners will develop their knowledge and understanding of situations where thermal transfer needs to be maximised and minimised. 27% of students were able to give two examples where thermal transfer is maximised.

Marks tended to be missed where students chose ambiguous examples such as a fridge which has parts which are designed to minimise and maximise thermal transfer. More detail was needed, for example, the heat exchanger of a fridge. Many students incorrectly gave situations where thermal transfer is **minimised**. 56% of students did not receive any credit for this question.

### **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](#)