LEVEL 3 CERTIFICATE AND EXTENDED CERTIFICATE

APPLIED SCIENCE

ASC1: Key Concepts in Science
Report on the Examination

1775 (1776 & 1777)
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General

The paper gave students opportunity to demonstrate their knowledge and understanding across a range of topics from the specification.

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). There appeared to be sufficient time to complete the paper as the vast majority of students wrote answers to all questions.

Students usually showed working for the calculations but this was often set out in a way that made it unclear which quantities were involved and this, invariably, led to incorrect answers. Students should be encouraged to always write the formula down from the formulae sheet and substitute in the required data.

There were a number of questions for which a single answer was required. It would help students if they were aware of the list principle, as there were a significant number of answers with students gave more than one answer. If only one answer is required only one should be given.

Section A – ASC1/B (biology)

Question 1

1.1 Only a third of all students gained credit in this question. Many students stated that light was a raw material for photosynthesis which was not creditworthy. When students gave water as a raw material, they often stated rain as a source. But it was often vague and could have meant uptake of water through leaves which was not creditworthy.

1.2 A significant number of students interpreted this question as which stage of the method produced the results shown in Figure 2 instead of answering the stated question about the stage of photosynthesis.

Approximately 40% of students gained full or partial credit for stating the stage as the light dependent stage and often for giving the idea of oxygen gas being formed. In some answers it was clear that students were writing about the whole process of photosynthesis. Very few students wrote about photolysis of water**.**

1.3 Most students correctly gave a possible reason for the results specified. Most commonly this was for the idea that the light intensity had dropped, and a number of specific scenarios were seen, eg it was cloudy.

Question 2

2.1 16% of all students did not attempt to answer in this question.

Approximately 50% gained the mark for correctly adding the third phosphate to the molecule of ADP. Incorrect answers showed variety of ideas, with the phosphate being drawn in various places and other bases being added.

2.2 50% of all students gained two or three marks in this question and ~25% gained one mark. Students who didn't score fully often gave incorrect answers for glycolysis. However, a wide range of incorrect answers were seen.

2.3 Most students did not gain credit in this question. There was very little evidence of students being familiar with the detailed process of glycolysis.

2.4 Over a third of all students gained one mark for either the idea of increased ATP production in aerobic respiration or the idea that lactic acid is not formed. Many students simply defined aerobic respiration as using oxygen compared with anaerobic which does not use oxygen.

Question 3

3.1 Less than a fifth of all students correctly gave the range for normal body temperature. Answers given went as low as 20 °C.

This question was recall of content from the specification and, as such, students need to be familiar with the ranges given.

3.2 The vast majority of students gained one or two marks in this question. When students gained only one mark, they had often given two synonyms for the same symptom. Most commonly seen correct answers were headache, dizziness, nausea and fatigue. The ideas of rapid, shallow breathing, confusion, blurred vision and poor balance were rarely seen.

3.3 Students struggled to answer this question. If they did gain a mark it was for the appreciation of the involvement of aldosterone.

Section C – ASC1/C (chemistry)

Question 1

1.1 There was evidence that many students did not have sufficient understanding of titration curves.

1.2 A significant number of students identified the indicator correctly. However, many seemed unaware that the indicator needed to change colour in a pH range that coincided with the vertical portion of the curve. mA few students discussed endpoint and equivalence point correctly.

1.3 Only a small number of students calculated the average of the two volumes that were concordant. Many included the anomalous result and some also included the rough result in their calculation. A significant number were unable to calculate an average.

1.4 Many students tried to calculate the number of moles by incorrectly dividing the volume of solution by the relative molecular mass of sodium hydroxide. Most of the students who did manage to select the correct equation from the formula sheet did not recognise the need to convert the volume from cm^3 to dm^3. A number of those who attempted the conversion, incorrectly divided by 100 and so still failed to score.

1.5 17% of all students recognised that the reaction was 1:1.

1.6 Only a small number of students recognised that a 25 cm^3 sample of ethanoic acid was in the conical flask and therefore 25 cm^3 needed to be used in the calculation. Some students realised that there was a dilution factor of 10 and so correctly multiplied by 10.

Question 2

2.1 94% of all students gained full or partial credit. Most students plotted all points accurately with very few errors were seen.

A significant proportion ignored the obvious trend and incorrectly drew a straight line. Some drew a curved line but included their anomalous point when determining their line of best fit.

2.2 Some students identified three or four anomalous points when there were only six points in total. 44% of all students correctly answered the question.

2.3 Many students appeared to believe that the outer shell expanded and accommodated any extra electrons rather than an extra shell being added.

Some incorrectly discussed reactivity. Others simply stated that the number of protons, neutrons and electrons increased which was insufficient to gain credit.

A significant number appeared to believe, incorrectly, that an increase in number of protons would give an increase in radius.

Question 3

3.1 25% of all students gained credit in this question. But a considerable number of students seemed unaware of the total number of electrons an aluminium atom would have or how many electrons fit into s, p, and d sub-levels.

3.2 A significant number of answers were seen where the student incorrectly stated, 'aluminium is a metal and so is covalently bonded'. A very large number discussed ion formation rather than metallic structure. Many diagrams of Giant Ionic lattices were seen.

A significant proportion of students state every term that relates to bonding. For instance 'the intermolecular forces in metallic bonding' were frequently incorrectly discussed.

Section C – ASC1/P (physics)

The paper gave students the opportunity to apply their knowledge and understanding across all three topics of the Unit (Useful energy and efficiency; Electricity and circuits and Dynamics). It was clear, as with last January's exam, that most aspects of the paper proved to be challenging. As in previous series, it was clear that students struggle with the basic concepts of electrical circuits. It was encouraging to see that overall performance has improved over the last year.

Question 1

1.1 This question required students to select the renewable energy resources from a list: 35% of students gained the mark here. Renewable and non-renewable energy resources are named in the specification and most students would have encountered these in GCSE Science courses.

1.2 This question required students to use the formula for gravitational potential energy using data given in the stem and in a diagram. Just over 10% of students gained full marks for this question. Those who lost marks generally used the wrong numbers or included an incorrect unit in their answer.

1.3 This calculation proved more demanding than the previous question as it required students to convert 440 MW into W and use their answer from 1.2 to calculate the efficiency. Over 85% of answers gained zero marks.

1.4 Similar questions to this have appeared over many years in the Applied Science legacy examinations. However, only just over a third of students could identify two ways energy is wasted.

1.5 The specification says, 'Learners will develop their knowledge and understanding of the generation of useful energy through nuclear fuels.' It was clear that this was not the case for just over 40% of students who scored zero marks. Indeed, 10% of students did not attempt this question.

The most common marks gained were for describing the steam being produced by heating water and turning a turbine. Few students knew about the process of fission and, indeed, thought that nuclear fuel was burned in the same way fossil fuels are. There were though some very detailed, complete answers.

1.6 For a Level 3 course, students must give more detail in their answers. There were too many students simply writing 'pollution' or 'dangerous'. We were looking for specific examples of the dangers or impact on the environment of nuclear radiation or waste. Just over a quarter of students were awarded the mark.

Question 2

2.1 This question required students to identify the parallel combination of resistors as having the lowest resistance and the series combination as the highest. Over 40% of students were able to do so.

2.2 Students should have had much experience of setting up circuits including voltmeters and ammeters. However, only 40% of students knew that a voltmeter should be connected in parallel across a component. Whilst most students knew the symbol for a voltmeter, they drew it in series.

2.3 Whilst most students knew which formula to use, very few (a little over 20%) were able to use the correct total resistance of 20 Ω.

2.4 Approximately half of students deduced that the voltage should be split equally between the resistors.

2.5 This was the second most demanding question on the paper with only 15.6% of students gaining the mark. Students should understand that energy/voltage is 'lost' in wires; that ammeters have some resistance, and voltmeters do not have the assumed infinite resistance.

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