



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

ASC4: The Human Body
Report on the Examination

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General

This was the first examination opportunity for Unit 4 and it was clear that some students had an appropriate level of understanding in some topic areas. There were areas where students did not gain credit due to a lack of precision and accuracy in their answers. It was good to see that most students attempted most questions and had time to answer all questions in the time given.

Question 1

- 1.1 This question was generally well answered, and half of all students gained two marks, with a further 21% gaining one mark. There were some issues with spelling and many students wrote reabsorption instead of resorption.
- 1.2 The vast majority of students correctly identified the elbow joint as a hinge joint. The most common incorrect response was a ball and socket joint, but all possible responses were seen.
- 1.3 Most students gained one mark in this question, most commonly for the idea of the joint bending, flexing, extending or straightening. However, the idea of movement in one plane was not seen as frequently. Some students described extension and flexion but then went on to say 'so the joint can rotate' which contradicted their answer.

Students need to ensure they can describe the range of movement for each type of joint and be familiar with examples of these joints.

- 1.4 This question was well attempted, and all students attempted an answer. 85% of all students gained full or partial credit. The most commonly seen correct idea was for protecting the bones from rubbing against each other or to reduce friction. The idea of shock absorption was also seen.
- 1.5 60% of all students gained credit in this question. However, a significant number of students gave full lists of the bones of the axial skeleton but included incorrect bones and thus lost the mark. Most commonly the pelvis was cited as part of the axial skeleton.

Question 2

- 2.1 This question was well attempted and over 85% of all students gained full or partial credit. When giving symptoms of deficiency diseases, students should avoid vague catch-all symptoms such as 'sick'.

The most commonly seen correct answers referred to the inadequate bone and tooth development. The idea of reduced blood clotting or reduced nerve development was rarely seen.

- 2.2 Over a third of all students gained two marks in this question and a further 49% gained one mark. Of those students who only gained one mark, they often gave synonyms of one symptom and therefore had only identified one symptom, ie light-headed and dizzy only scored one mark.

A significant number of students gave vague symptoms such as a headache or nausea which are not key symptoms of anaemia. All possible answers were seen, although the idea of increased infection was only seen once or twice.

- 2.3 Students scored well in this question with over 90% gaining full or partial credit. A range of specific examples of iron-rich foods were given, and most commonly these were red meat, spinach and kale.

- 2.4 Almost two-thirds of all students gained credit in this question. However, a significant minority did not gain credit due to a lack of precision in labelling the gall bladder: many label lines ended on the liver and thus the mark was not gained. The most commonly seen misconception was labelling of the pancreas as the gall bladder.

- 2.5 This question was well attempted and only 0.2% of students did not attempt an answer. Approximately half of all students gained credit, but only 17% gained two or three marks.

Most commonly students did write about the role of bile in emulsifying fats, although a few did imply the bile 'breaks down' the fat, which wasn't acceptable as an answer. Only a small number went on to explain the importance of the emulsification in increasing surface area and allowing the lipase to breakdown the lipids into smaller/soluble molecules.

The idea of enzymes lowering activation energy for hydrolysis was not seen.

- 2.6 22% of all students gained credit in this question and only 3% gained full credit. Students should be aware of the type of bonds in lipids as well as carbohydrates and proteins.

Question 3

- 3.1 This question had the third highest percentage of non-attempts by students, and only 43% of all students correctly identified this part of haemoglobin as an iron ion.
- 3.2 Three-quarters of all students correctly named the equipment used to measure oxygen saturation of the blood as a pulse oximeter. The most common incorrect answer was sphygmomanometer which is used to measure blood pressure.
- 3.3 Three-quarters of all students correctly stated the normal range for oxygen saturation. Students should ensure they are fully aware of the ranges given in the specification.
- 3.4 In order to gain full credit in this question the line needed to follow the same pattern as the existing line but left-shifted and to show the end saturation level as approximately the same as the existing line. 41% of all students did this and gained full credit. A further 65% gained one mark.

Most commonly the end saturation level was too high, going above 100% and less frequently the line was drawn as a right-shifted line.

- 3.5 This question was attempted by the majority of students with only 0.2% not attempting an answer. Approximately 70% of all students gained one or two marks. This was most often for the idea:
- of a lower partial pressure at high altitude and therefore more red blood cells are made to carry enough oxygen
 - that upon return to sea level there would be more red blood cells to carry more oxygen.

In some accounts it was unclear whether the carriage of more oxygen was whilst at high altitude or at sea level.

The ideas of the oxygen being available for a faster rate of respiration or respiration continuing for longer meaning more energy release for muscles were rarely seen. Only 3% of all students gained four or five marks.

Question 4

- 4.1 Approximately 80% of all students gained full or partial credit in this question. In a small minority of answers students gave a correct examples and definitions of the two branches of the peripheral nervous system, but gave them the wrong way around, ie somatic as involuntary and autonomic as voluntary. A significant minority of students gave a list of examples for each and at times negated their mark if they had a wrong example in the list.
- 4.2 30% of all students gained two marks in this question and a further 24% gained one mark. The most commonly seen correct answers were:
- slows heart rate
 - constricts pupils
 - slows breathing rate
 - increases digestion
 - salivation.
- When incorrect responses were given they were often the opposite answer, eg increases heart rate as opposed to vague answers, eg affects heart rate.
- 4.3 35% of all students correctly identified the cerebellum. Incorrect answers included the different lobes of the brain and the cerebral cortex.
- 4.4 49% of all students gained full or partial credit in this question. Generally, answers were often too imprecise to award marks and words such as 'affect' should be avoided.

Question 5

5.1 Over half of all students could correctly name the different sections of the myofibril. When students didn't gain marks they often had the correct names but in the wrong places or referred to the z-line or m-line.

5.2 The marks in this question were evenly distributed with approximately a third gaining two marks, another third gaining two marks and the final third gaining zero.

Most commonly students correctly stated that B/I-band gets shorter, however a significant number also thought section C/A-band also shortens.

5.3 Many students wrote at length about the entire process of muscle contraction in this question and often went on to additional pages. The detail of troponin and tropomyosin were not needed in this question, but an appropriate level of detail was seen.

Many students struggled to clearly and precisely express what was happening to the myosin head in terms of its changing shape or position and to describe how the actin moves over the myosin filament. Answers often wrote of pulling the actin along, which is insufficient to clearly describe the motion that is taking place.

5.4 In this question students needed to use their knowledge of calcium and tropomyosin to suggest how a drug prevents muscle spasms. 13% of all students gained three marks, 20% gained two marks and 18% gained one mark.

Question 6

- 6.1 Only 41% of all students gained credit for suggesting the resting potential of the neurone. The most commonly seen incorrect answer was -70 mV. And in some cases students didn't give the minus sign for their answer.
- 6.2 54% of all students correctly identified the section of the graph during which potassium channels open as section C. The most common incorrect answer was B, although A and D were also seen less frequently.
- 6.3 57% of all students correctly identified the section of the graph during which sodium channels open as section B. The most common incorrect answer was C, although A and D were also seen less frequently.
- 6.4 64% of all students gained one mark in this question. This was often for the idea that myelinated neurones have faster conduction speeds than non-myelinated.

Most students also stated that an increase in axon diameter also increases conduction speed, but this is only true for myelinated neurones in the data given. Where data is given, it is essential that students use the data to form conclusions.

- 6.5 42% of all students gained two or three marks in this question and 30% gained one mark. There was evidence that this area is well understood. The first two marking points were most commonly seen. However, in some answers the calcium was binding with the neurotransmitter or was being released in the synapse.
- 6.6 Only 20% of all students gained credit in this question for the idea of a build-up of serotonin in the synapse which can continue to bind to receptors. Many answers incorrectly described blocking of serotonin release or the idea that this stops the 'negative thoughts' being passed along the neurone.

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](#)