LEVEL 3
Applied General Science

ASC4 Unit 4: The Human Body
Report on the Examination

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General

This paper gave students the opportunity to apply their knowledge and understanding across a range of topics in Unit 4.

Some aspects of the paper proved to be challenging for the majority of students. For example, how creatine phosphate is regenerated, mechanism of co-transport and uptake of calcium ions.

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.

Question 1

1.1 The vast majority of students could give two correct functions of the skeleton, and all possible answers were seen, including mineral store. A small minority of students used vague terms such as 'structure', without giving enough further detail to clarify their answer and gain credit.

1.2 Nearly 90% correctly identified cartilage as the material covering the ends of bones.

1.3 Over 90% of students correctly identified the shoulder joint as a ball and socket joint. Incorrect answer seen were hinge and gliding.

1.4 Over three quarters of students correctly identified hinge joints as those that move in one plane only.

1.5 Approximately 80% of students gained full credit for identifying two bones in the axial skeleton. A common misconception that was seen in previous series was also present this year in terms of students incorrectly naming the pelvis as a bone in the axial skeleton.

Question 2

2.1 Approximately 80% of students correctly named serotonin as the neurotransmitter linked to depression.

2.2 There is a range of correct answers students could give for this question and the vast majority of students gained full or partial credit. All possible answers on the mark scheme were seen, but the most common ideas were:

- low mood
- tearful
- tired
- suicidal thoughts
- changes in weight.

2.3 Just over 50% of all students gained full or partial credit in this question, often this was for the idea of insulation, as an energy store or to protect organs. A small number of students described the idea of protection in terms of protecting bones, which was not credit worthy. Production of hormones and cell membranes was less frequently seen.

2.4 Students struggled to give credit worthy ideas and only 20% gained credit. Often, incorrect answers gave suggestions that would change the focus of the study, such as looking at age. All possible answers were seen in student scripts.

2.5 The vast majority of students scored full or partial credit in this question, with most students giving the idea that the underweight category experienced the most severe symptoms of depression. A relatively common incorrect idea related to the number of people with depression in each BMI category.

2.6 The vast majority of students scored full or partial credit in this question.

2.7 Just under one third of students gained full or partial credit in this question, with 6% gaining full credit. Many of those students gaining credit described the similar shape but didn't always go on to clearly describe that this means it could bind to the dopamine receptors. Some students described the drug preventing the breakdown of dopamine as the mechanism of action and some students focussed on the carbon dioxide and how this additional carbon dioxide in the body might help a person with Parkinson's disease.

Question 3

3.1 This question discriminated well, with 22% of students gaining full credit, 30% gaining 2 marks and 30% gaining 1 mark. Of the students who only gained 1 mark, this was most commonly for myosin.

3.2 Just over 75% of students gained full or partial credit in this question.

3.3 A quarter of students correctly selected the speed at which actinomyosin cross bridges and formed and broken.

3.4 70% of students correctly identified where the energy for breaking cross bridges comes from.

3.5 This question discriminated very well and 30% of students were able to give clear and logical answers that gained all three marks. Some students described the calcium ions binding to tropomyosin or the troponin changing shape which did not gain credit.

3.6 Only 14% of students gained full or partial credit in this question, with many answering in terms of the release of calcium ions ceasing.

3.7 Just over 50% of students gained full credit in this question, but all incorrect options were chosen by some students.

3.8 Approximately 20% of students gained full or partial credit in this question, with many incorrectly answering in terms of how creatine phosphate is used in the body to provide energy to muscles.

Question 4

4.1 Just over one third of students gained full credit in this question. Some students gave answers relating the effect the sympathetic nervous system would have.

4.2 Two thirds of students correctly selected the part of the brain that is likely to be damaged.

4.3 Two thirds of students correctly gave a role of the frontal lobe in the brain. All possible answers were seen, but reasoning and emotions were most common.

4.4 60% of students correctly named the two parts of the neurone.

4.5 Approximately 42% of students correctly identified this as a sensory neurone. Many described this neurone as myelinated but did not go further to identify the type. Some students incorrectly stated, 'motor neurone'.

4.6 60% of students correctly selected the description of how the sodium-potassium pump maintains the resting potential of a neurone.

4.7 This question discriminated well and approximately 13% of students gained full credit, with a further 43% gaining one or two marks. In a small minority of cases, students did refer to sodium moving into the neurone and omitted the idea of ions, and thus did not gain credit for marking point 2.

4.8 Just under half of students gained full credit. Marking point 1 was most commonly seen and a small minority describe the conduction of the impulse as moving from myelin sheath to myelin sheath.

Question 5

5.1 This question discriminated well, although students found it challenging and only 8% gained two or three marks. The most common marking point seen was the first for the idea of co-transport. Some students did refer to active transport and diffusion but either gave the direction incorrectly or did not make it clear where the sodium ions were moving from and to.

5.2 Just over 50% of students gained full credit for giving two pieces of evidence to support the conclusion given. The most common correct answers were for marking points 1 and 2.

5.3 Most students gained at least one mark in this question for identifying a reason why the student's conclusion may not have been valid. Most common correct answers referred to the idea of sample size of lack of repeats, or that there was more than one variable changing.

5.4 Just over half of all students gained full credit in this question and this percentage decrease was much better attempted than in previous years. Those students that did not gain full credit, often divided the drop by the final value instead of the starting value.

5.5 Only one third of students correctly identified a correct reason for the addition to drink C in this context.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.