
APPLIED GENERAL L3

APPLIED SCIENCE

ASC4 The Human Body
Report on the Examination

1775
June 2022

Version: 1.0

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General

The paper gave students the opportunity to apply their knowledge and understanding across all six topics of the unit. It was clear that while some students were able to attain high marks, some 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, with only a limited number of students needing to use the additional paper at the end of the question booklet. It was also clear that students had sufficient time to complete the paper as all questions were attempted by the vast majority of students.

Question 1

- 1.1 The vast majority of students correctly identified the artificial joint shown as a ball and socket joint, and thus gained credit.
- 1.2 Approximately three quarters of all students correctly named another ball and socket joint in the body. The most commonly seen correct answer was the shoulder joint, with hip joint also seen. Common incorrect answers included the wrist, ankle and elbow.
- 1.3 Over half of all students gained credit for correctly giving a reason and most commonly this referred to the smooth surface reducing friction in the joint. A small, but significant, number of students wrote about smooth movement, but did not add any more to their answer and the idea of smooth was already given in the question.
- 1.4 Just under half of all students gained credit for suggesting why part of the joint has a rough surface. Although this was expressed in a variety of ways, the general idea given was for 'keeping the joint in place.'
- 1.5 Nearly two thirds of all students gained full credit in this question, with just over one third gaining partial credit. The most common correct answers seen were for the idea of pain or restricted movement. The idea of swelling was also seen, but answers referring to falling over or unstable joints were rarely seen. At times, students used synonyms for 'painful' and thus could only score 1 mark for one idea.
- 1.6 Approximately 60% of all students correctly identified the role of ligaments in a joint. The most commonly selected incorrect answer was 'to attach a muscle to bone.'
- 1.7 Approximately 60% of all students correctly identified the role of tendon in a joint. The most commonly selected incorrect answer was 'to hold the bones in place in the joint.'
- 1.8 Over half of all students could correctly identify a pivot joint in the axial skeleton, giving the neck as their answer. Answers of 'vertebrae' were fairly common amongst incorrect responses that were not credit worthy.
- 1.9 Approximately half of the students gained credit in this question for describing the range of motion of a pivot joint. Some answers were vague or spoke of movement in one or two planes. The best answers used 'rotation' to clarify their descriptions.

Question 2

- 2.1 Over four fifths of all students correctly identified the production of bile as a function of the liver.
- 2.2 Approximately 70% of all students gained one mark for identifying the small intestine as the site of absorption of vitamin D. The most common incorrect answer seen was 'stomach.'
- 2.3 Approximately four fifths of all students gained full or partial credit in this question for identifying features of an effective absorption surface. Of these, over one third scored two marks and approximately one fifth gained all three marks. The most commonly seen correct answer was for a large surface area, followed by the idea of a good blood supply.
- 2.4 Approximately one quarter of all students gained credit for giving the difference between macronutrients and micronutrients. However, a small but significant number of students gave examples of macronutrients and micronutrients.
- 2.5 Four fifths of students gained full or partial credit in this question, with over 15% gaining full marks. The most commonly seen correct answers were fatigue or tiredness, pain in the bones, and rickets. Answers referring to muscle pain and weakened immunity were seen, but much less frequently. A significant minority of students wrote vague symptoms such as dizziness, pale skin and being sick, which are not credit worthy.
- 2.6 Nearly two thirds of students correctly identified serotonin as the neurotransmitter that is linked with depression. A variety of spellings were seen, but these were credited if they were phonetic.
- 2.7 In this question students had to give two conclusions from the data in the table, and not simply describe the data. Therefore, answers that wrote only about the prevalence of depression in the two groups generally did not gain credit because the students often did not link this to the level of vitamin D. However, nearly one third gained full marks and a further half gained 1 mark, often for the effect of vitamin D level on depression.
- 2.8 Over two thirds of all students gained credit for suggesting why vitamin D levels are lower in the winter than in the summer. Lack of precision in answers meant that students often implied or directly stated that the sun provides the vitamin D or the 'sunlight turns into vitamin D', instead of making it clear that sunlight is needed to make vitamin D.

Question 3

- 3.1 Nearly two thirds of all students gained credit for describing how a pulse oximeter is used to measure oxygen saturation. Some students incorrectly describing strapping a cuff around the arm, presumably confusing this with a sphygmomanometer.
- 3.2 Almost four fifths of all students gained credit for completing the word equation to show the carriage of oxygen in red blood cells.

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- 3.3 Almost three quarters of all students gained credit for giving blood pressure as the use of a sphygmomanometer. Incorrect answers often referred to heart rate.
- 3.4 The vast majority of students gained some credit in this graph plotting question, with around half gaining full credit. The question required students to complete the plot for an oxygen dissociation curve and as such students should know that this is a sigmoid curve and draw the line of best fit accordingly.
- 3.5 Over half of all students gained credit for reading the partial pressure at which haemoglobin is 75% saturated.
- 3.6 Over two thirds of all students gained credit for selecting carbon dioxide as the cause of the Bohr shift.
- 3.7 In this question two thirds of students gained full or partial credit. The first mark was for recognising that the line would shift to the right of the existing dissociation curve and the second was for having a sigmoid curve that started and ended at the same level as the original line, which was more challenging. Some students drew their line left shifted and many finished their line lower than the existing one.
- 3.8 Nearly two thirds of all students recognised why the rate of increase in oxygen saturation of haemoglobin is low at low partial pressures of oxygen.
- 3.9 Approximately half of all students correctly suggested a way in which the number of red blood cells in a person can be increased. Most commonly this was for the idea of training at high altitude or for a blood transfusion. Answers of 'blood doping' were insufficient unless qualified with the idea of using EPO or giving a blood transfusion.

Question 4

- 4.1 Over half of all students gained at least one mark for explaining why protein is needed in the diet on a training day. Often the mark was gained for linking protein to increasing the size of muscles or building muscle mass. A relatively small number of students suggested this was needed due to damage to muscles during training.
- 4.2 Over two thirds of all students could give two valid sources of protein in our diet. The most common answers seen were meat and eggs or fish. As is similar to questions of this nature, all possible answers were seen. Answers that did not gain credit often referred to pasta or green vegetables.
- 4.3 Around three quarters of all students gained full marks for giving two, low-fat sources of carbohydrates. Most commonly this was for pasta and rice, but potato and bread were also seen.
- 4.4 Over half of all students gained some credit in this question but less than 5% gained full marks. Students that referred to fatigue did not often relate this to lactic acid or lactate, but most correct 1-mark answers wrote about anaerobic respiration.
- 4.5 Nearly one third of all students gained 1 mark in this question and under 5% gained full marks. A number of students referred to the release of energy, but this was often linked to

ATP transferring this energy. The idea of energy being produced, made or created was only rarely seen.

Question 5

- 5.1 Less than one third of all students correctly identified a neurotransmitter as a chemical messenger.
- 5.2 Over one third of all students correctly identified the temporal lobe as that associated with memory. Parietal lobe and frontal lobe were seen as incorrect answers.
- 5.3 This question discriminated well with nearly one quarter of all students scoring each of 1, 2 and 3 marks. One fairly common and not credit worthy answer was for saying B was neurone Y or the post-synapse, without stating 'membrane.'
- 5.4 Less than one fifth of all students gained credit in this question for recognising that acetylcholine will not have an effect if the neurones do not have the correct receptor.
- 5.5 This question saw the highest percentage of students not attempting an answer and over half did not gain credit. The most common mark awarded was for the idea of the neurotransmitter or acetylcholine being broken down. Marking point 2 was not awarded for the idea of the existing neurotransmitter moving back to the pre-synaptic membrane. For the fourth marking point, students needed to make clear that after the neurotransmitter was reformed it was either reused or stored in vesicles.
- 5.5 Less than half of all students gained credit for explaining two mechanisms of drug action to treat the symptoms of Alzheimer's. Some students gave the idea of stopping the breakdown by enzymes and mimicking but did not go on to explain the effect these would have on the synapse.

Mark Ranges and Award of Grades

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