



General Certificate of Secondary Education

Biology 4411

BLY3F Unit Biology 3

Report on the Examination

2009 examination – June series

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Biology
Foundation Tier BLY3F**General**

Particular problems which occurred quite frequently included:

- the inability to express ideas clearly and unambiguously, such as patterns shown in data or linking an observed effect to its specific cause
- excessive verbosity rather than making specific points succinctly and precisely as this merely wastes time as no marks are available for re-stating the question nor for making the same point more than once
- paying insufficient attention to information provided in the stem of a question in order to guide a reasoned response
- careless reading of the question resulting in an inappropriate answer
- not reading data accurately from a graph, or selecting the wrong part of the data
- mathematical weakness in calculations
- poor understanding of certain topics, such as digestion and absorption, diffusion, kidney function.

Question 1

This question was well answered by most candidates.

- (a) Over three quarters of candidates were able to label structure **A**, an alveolus, and structure **B**, the diaphragm, correctly.
- (b) Slightly fewer recognised that the alveolus was where oxygen entered the blood.
- (c) While two thirds of candidates knew that haemoglobin was found in red blood cells, less than half knew that carbon dioxide was carried mainly in the blood plasma.

Question 2

Overall, candidates were very successful in answering this question about the use of dialysis for treating people with kidney disease.

- (a) Half of the candidates correctly selected both mineral ions and water as constituents of urine, with the large majority knowing at least one of these.
- (b) The vast majority of candidates understood that, during dialysis, urea would leave the blood plasma and enter the dialysis fluid, that it did so by diffusion through the partially permeable dialysis membrane and was able to do so because molecules of urea are small.
- (c) Similarly, most knew that a major problem associated with kidney transplantation is that drug treatment is needed to suppress the immune system.

Question 3

- (a) Over two thirds of candidates got this section completely correct, demonstrating that they understood the purpose of each of the three techniques given for successfully growing microorganisms.
- (b) (i) The majority of candidates were successful.
- (b) (ii) In accounting for the difference in appearance between the Petri dish to which UHT milk had been added and that to which untreated milk was added, only a third of candidates successfully explained that living bacteria were present only in the untreated milk or that they had been killed by the ultra-heat treatment.
- (b) (iii) Similarly, only half of the candidates were able to explain that the unopened, control dish had no bacterial colonies growing in it because it had been sterilised or because it had not been opened. Many candidates seemed to believe that a closed Petri dish prevents the entry of air or oxygen as well as preventing the entry of microorganisms.

Question 4

- (a) Despite being told in the stem of the question that the photograph showed part of a plant root, about a quarter of candidates selected stoma or villus for the name of structure **X**, rather than root hair.
- (b) (i) Most were able to measure the length of the root hair, **Y–Z** on the photograph, with the millimetre scale provided. Unfortunately, some measured the distance **Y–X**.
- (b) (ii) However, using the scale factor of x100 to find the real length of the root hair proved more problematical, just over a half were able to do this. The most common error was to multiply by 100 rather than dividing by it. Those who made an error in assessing the correct position of the decimal point might have gained some credit if only they had shown their working; thus, the answer 0.085 scored zero marks, while $85/100 = 0.085$ gained one mark out of the two available.
- (b) (iii) Most candidates were able to make at least one sensible point about the benefit to the plant of possessing thousands of root hairs. Many failed to emphasise that more water or ions could be absorbed due to the larger total surface area. Errors included references to absorption of food, light or carbon dioxide.

Question 5

- (a) (i) Nearly all of the candidates could deduce from the data that, of the six organisms given, it was the bacteria that grew the fastest.
- (a) (ii) However, only just over half could calculate that the soybeans grew 8 times faster than the cattle which was somewhat disappointing, as the calculation only involved manipulation of the digits 8 and 1.

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- (a) (iii) Despite the multiple choice nature of the question, even fewer candidates correctly deduced that after 8 hours, equivalent to 2 rounds of replication, 1 tonne of *Fusarium* would have grown to 4 tonnes.
- (b) Candidates were much more successful in this section, with most being able to select two correct points from the given information which indicated that mycoprotein might be a healthier option than beef in the human diet and one reason why, conversely, beef might be more advantageous. Problems arose for those candidates who cited information about only one of the two foods rather than making a comparison.

Question 6

- (a) Many Foundation Tier candidates had difficulties in using the graphical data for deciding which of the two blood pressure traces represented an artery rather than a vein. Many attempted, inappropriately, to use other features of the blood vessels in their answers, such as relative sizes of the blood vessels or the presence or absence of valves. Those scoring just one of the two marks available were more likely to select the higher pressure of blood vessel **A** as indicative of it being an artery, apparently not recognising the pulsations as being significant.
- (b) (i) Around two fifths of candidates were able to count correctly the number of heart beats that occurred in the 15 second period of the graph.
- (b) (ii) Approximately two thirds were able to convert their answer from part (b)(i) correctly into the number of beats per minute.
- (c) (i) Only a third were able to name two useful substances supplied to the muscles at a faster rate during exercise; inadequate answers, such as blood and water were common.
- (c) (ii) Candidates were much more successful in naming a waste product, such as carbon dioxide, although fat, urine and sweat were common incorrect answers.

Question 7

- (a) (i) Although nearly two thirds of candidates were able to select two control variables from the six experimental details given in the stem of the question, many spoiled their answers due to lack of precision, eg the milk rather than the volume of milk or type of milk. pH was also a common, incorrect suggestion.
- (a) (ii) Here less than half of candidates appreciated that repetitions leading to the calculation of a mean could make the investigation more reliable, or more representative, or would make anomalies more obvious. A common, incorrect answer was to state that it would make the investigation more accurate or that it would prevent anomalies (rather than just reducing their effect).
- (a) (iii) A similar proportion understood that a pH meter would have been more *accurate* than pH indicator papers. Some candidates appeared to be unaware of the difference between pH indicator papers and litmus paper.
- (b) As in part (a)(i), lack of precision sometimes lost candidates the mark. Thus, the result for Flask 2 was not an anomaly, although Flask 2 at 200 minutes was.

- (c) Very few candidates understood that it was the production of lactic acid that caused the yoghurt to thicken. A common misconception was that it was merely the increasing number of bacteria that caused this.

Mark Ranges and Award of Grades

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