Version 1.0 27/07/10

General Certificate of Secondary Education

Biology 4411

BLY3F Unit Biology 3

Report on the Examination

2010 Examination – June series

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Set and published by the Assessment and Qualifications Alliance.

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Registered address: AQA, Devas Street, Manchester M15 6EX

Biology
Foundation Tier BLY3F

General

Particular problems which occurred quite frequently included:

- the inability to express ideas clearly and unambiguously or giving extra alternative answers
- 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
- limited ability to apply what has been learned to a novel situation
- poor understanding of certain topics, such as digestion, diffusion, kidney function, the production of biofuels.

Question 1 *(Low Demand)*

(a) (i) A large majority of candidates were able to identify structure X correctly as a root hair.

(a) (ii) Although more than three quarters of candidates scored both marks for naming both water and mineral salts or a named example as two substances taken in from the soil by X, some only gained one mark as they gave the general answer minerals, salts or ions and then a specific named example of an ion, usually nitrates.

(b) (i) Most knew that carbon dioxide was taken into a leaf via the stomata.

(b) (ii) Less than half knew that this occurred by diffusion.

Question 2 *(Low Demand)*

(a) Fewer than half the candidates selected the alveoli as the point on the diagram where oxygen entered the blood in the lung.

(b) Most candidates deduced that a person with asthma would find it difficult to breathe due to the narrowing of the bronchioles shown in the diagram. Some ascribed this to a reduced surface area presumably confusing the bronchioles with the alveoli.

(c) (i) A similar number correctly described the trend shown in the graph which showed how the drug salbutamol reduced contraction of the muscle fibres in the walls of the bronchioles.

(c) (ii) Two thirds were able to go on to explain that this would result in widening of the air passages or that it would make it easier to breathe.

Question 3 ***(Low Demand)***

(a) (i) Just over half of candidates correctly selected carbohydrase as the enzyme that digested starch into glucose.

(a) (ii) Almost three quarters went on to select yeast as the organism responsible for converting the glucose into ethanol.

(a) (iii) Only one third knew that the ethanol could be separated from water in the reaction mixture by distillation.

(b) In assessing the advantages of ethanol rather than petrol, as a fuel for cars some candidates wrote about only one of these two fuels and hence could not make any sort of comparison, thus gaining only one mark. Some answers contained very vague statements about affecting the environment. There were, however, some very full answers which explained how the ethanol from maize was renewable while supplies of oil were running out.

Question 4 ***(Low Demand)***

(a) (i) Nearly all of candidates were able to read the correct figure from the graph for the maximum heart rate of the athlete before the training programme.

(a) (ii) A similar proportion were able to give at least one difference between the pattern for the athlete before and after training, but only half of these could go on to describe a second difference.

(b) Most candidates successfully selected both oxygen and glucose as the two substances that needed to be supplied to the muscles in larger amounts during exercise.

Question 5 ***(Low Demand)***

(a) Relatively few candidates realised that, for the given design of biogas generator, the concentration of solids fed into the reactor would have to be kept low in order to allow ease of stirring.

(b) (i) It was somewhat disappointing that only three quarters were able to select methane as the main gas present in the biogas.

(b) (ii) However, most were able to calculate from the data in the pie chart that this gas made up 60% of the biogas. The most common error in the calculation was the answer 320, where candidates had subtracted the values 35% and 5% for the other two gases from 360°.

(c) Most candidates knew that extra carbon dioxide would be produced if air leaked into the generator due to an increased rate of aerobic respiration and that this was caused by the presence of oxygen in the air.

Question 6 *(Low Demand)*

This question, on the functioning of the kidney, consisted of six multiple-choice items.

(a) (i) Just under two thirds knew that protein molecules were too large to pass through the filter.

(a) (ii) Slightly more knew that glucose passed through but was then reabsorbed by the blood.

(a) (iii) However, more than three quarters did *not* understand that the concentration of urea in the urine was much higher than in the filtrate due to the reabsorption of water from the filtrate; most thought this was due to urea having been made by the kidney.

(a) (iv) Again a good two thirds knew that urine contained water, urea and sodium ions.

(b) (i) Over three quarters knew that that on a hot day an athlete produced less urine.

(b) (ii) Two thirds knew that this urine would be more concentrated.

Question 7 *(Standard Demand)*

(a) (i) At least one of the structures, A, cell wall, and B ,cytoplasm, was named correctly by nearly all of the candidates. There was the inevitable confusion between cell wall and cell membrane and a term that appeared to be a hybrid between cytoplasm and chloroplast, cytoplast, was quite common.

(a) (ii) Just under three quarters were able to correctly describe from the diagram one way in which the bacterial cell differed from the yeast cell, usually the absence of the vacuole or of the nucleus. A substantial minority, however, stated that the bacterium contained DNA, with the incorrect implication that this was absent from the yeast cell.

(b) Often it was difficult to tell whether the candidate was writing about the yeast or about the bacterium.

(b) (i) Very few candidates scored two marks with just over a third scoring one mark. 27°C was the optimum temperature for the growth of the *yeast*. Very few pointed out that respiration, or carbon dioxide production, was responsible for the bread rising.

(b) (ii) Here a tenth gained two marks and nearly a half one mark. In this part 32°C was optimum for the *bacteria* growth. It was often thought that the bacteria *were* acidic rather than being responsible for the release of the acid.

(b) (iii) Only a tenth of candidates scored the mark, most failing to realise that if the yeast could still function in these acidic conditions then the bread would still rise; some were heading in this direction when they stated that the yeast would not be killed but they failed to point out the relevance of this to bread production which was, after all, the subject of the question. Many suggested that, since the yeast was able to grow over a broad range of pH values, there would be no need to expend resources on control of the pH: this idea was credited.

Question 8 *(Standard Demand)*

(a) (i) Just under three quarters of candidates appreciated that the purpose of boiling the flask of nutrient broth was to kill microorganisms.

(a) (ii) Less than a half understood that the shape of the swan neck prevented more microorganisms from entering. Many thought the absence of microorganisms was due to a lack of air or oxygen.

(b) The principle of repeating an experiment in order to improve reliability rather than to make the investigation more accurate, precise or fair was known to just over half the candidates. Some spoiled their answers by stating that repetition made the investigation reliable and accurate.

(c) While around two thirds of candidates realised that microorganisms must have entered the broth when the flasks were tilted, it was not always evident where they had come from, eg either from the outside air or from where they had previously settled in the bend of the swan neck of the flask. A few noted that the presence of nutrients in the flask would enable the growth of microorganisms.

(d) One fifth of candidates knew that this investigation provided evidence for the theory of *biogenesis*.

Mark Ranges and Award of Grades
Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.