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General Certificate of Secondary Education

Biology 4411

BLY3H Unit Biology 3

Report on the Examination

2008 Examination – June Series

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Biology
Higher Tier BLY3H

General

There were a number of particular problems which occurred quite frequently. Paying insufficient attention to information provided in the stem of a question in order to guide a reasoned response and careless reading of the question resulting in an inappropriate, or insufficient, answer eg when asked for a *description* of patterns in data *and* an *explanation*, full marks can only be achieved if *both* are addressed.

The inability to express ideas clearly and unambiguously, such as patterns shown in data was frequently apparent. Excessive verbosity rather than making specific points succinctly and precisely was also common. This merely wastes time as no marks are available for re-stating the question or for making the same point more than once.

Candidates' inability to read data accurately from a graph as well as mathematical weakness in calculations also occurred quite frequently.

Question 1 *(Standard Demand)*

For part (a) more than two thirds of candidates were able to describe two features they could see in the diagram of the villi that helped in the functioning of the small intestine. A good blood supply and a large surface area were the two most common correct answers.

Nearly all candidates were able to describe, in part (b)(i), one difference they could see between diagrams 1 and 2. The terminology used by candidates was often less than precise.

Candidates were generally less successful in part (b)(ii); answers were sometimes phrased in such a way that it was not possible to tell if the candidate thought the villi helped food move along the intestine or into the blood.

Question 2 *(Standard Demand)*

For part (a) a majority of candidates scored full marks in this section, correctly selecting plant B as the one which probably lived in a dry region. Most were able to link stomata with water loss and hence argue that a low number of stomata was an adaptation to dry conditions.

Part (b) proved to be more demanding, with only a third of candidates scoring both marks. Successful candidates realised that having stomata mainly on the lower surface of the leaf might help to reduce water loss as the lower side might be more shaded or cooler. Many were concerned, however, that stomata on the upper surface might let *in* too much water when it rained or become blocked by dust in dry conditions.

Question 3 *(Standard Demand)*

90% of candidates were able to detect two trends in the data in the table in part (a). These were that heavier people required more energy during exercise and that more energy was also needed for faster movement.

In part (b) nearly two thirds of candidates scored full marks. Most realised that a higher breathing rate would supply more oxygen for respiration and / or energy release. Some concentrated on the need to reduce anaerobic respiration, or to get rid of the lactic acid produced by this process. Fewer remembered to comment on carbon dioxide removal.

Question 4 *(Standard Demand)*

Only about half of the candidates stated that both alcohol and carbon dioxide were produced by yeast in fermentation in part (a). Extra substances such as beer and bread were ignored by examiners.

Over 90% of candidates in part (b)(i) were able to describe two control variables for the given investigation, temperature and time being the most common.

In part (b)(ii), while nearly two thirds of the candidates correctly stated that both sugars **A** and **C** could be fermented by the yeast as both of these produced a gas, some gave just one of the sugars, generally **A** (because it produced *more* gas). A sizable minority selected sugar **B**, which was odd as the appearance of the apparatus remained unchanged; but these candidates seemed to think that anaerobic respiration involved neither use nor production of a gas.

Question 5 *(High Demand)*

In part (a)(i), less than half of the candidates understood that protein was not present in the filtrate due to its molecules being too large to pass through the filter. There was some confusion about the relationship between proteins and amino acids. Some candidates thought that protein existed in the blood only in the form of amino acids, despite evidence in the table to the contrary.

This contrasted with part (a)(ii), where over three quarters of the candidates were able to explain correctly that glucose must have been filtered out of the blood and then completely reabsorbed, due to its presence in the filtrate and its absence from the urine. Some scored only one mark, mainly for comparing the blood plasma with the urine and omitting any reference to the filtrate.

Candidates were also very successful in part (a)(iii), with over two thirds being able to give two differences between active transport and diffusion. These were generally that active transport could occur against a concentration gradient and so it required a supply of energy. Relatively few candidates mentioned specific protein carriers in the cell membrane.

In part (b) very few, a mere 4%, of candidates understood that the concentration of urea in the urine was increased, relative to that in the filtrate, due to water reabsorption. A common misconception was that the concentration of urea built up in the bladder as more arrived in fresh supplies of filtrate, conveniently forgetting that water also arrived with it.

Question 6 *(High Demand)*

Most were able to make 3 or 4 points out of 5 in part (a). These were mainly for describing the pattern shown in the graph, with most forgetting to include an *explanation* as well. Most recognised the 3 phases shown by the graph and often made use of numbers from one of the scales to make their descriptions more precise, or *less* precise if the scale was misread. There were some misconceptions, such as the idea that the horizontal part of the curve represented no growth, forgetting that the horizontal axis measured protein concentration rather than time. Some had difficulty expressing clearly that the middle section of the curve showed a less steep increase in growth rather than growth slowing down. If an explanation was included, the most common points made related to *limiting factors,* a term often used by candidates, or to the idea that the rates of cell production and cell death were equal at higher protein concentrations.

Around 40% scored full marks in part (b). Although most candidates selected the value 5 grams of protein per dm^3, as the growth rate increased up to this point but levelled off above it, many misread the scale quoting, for example a value of 4.5. Others presented a sensible argument for a value such as 0.8 grams of protein per dm^3 as productivity per unit of protein added declined above this value, this was accepted by examiners.

Question 7 *(High Demand)*

In this question about the growth of *Fusarium* in an industrial fermenter, most made the point, in part (a), that the air would supply the fungus with oxygen. Fewer went on to explain that it would also circulate or mix the contents of the fermenter or that it would contribute to temperature maintenance. Only around a third of candidates were able to give two valid points and relatively few, who had mentioned oxygen, went on to explain that this could be used in *aerobic* respiration.

In part (b) just under three quarters of candidates were able to explain why the fungus required glucose, generally as a supply of energy or for respiration. Answers such as for growth were considered too weak without further qualification, for example to make cell components.

In part (c) 62% of candidates appreciated that respiration, or exothermic reactions in the fungus generated heat and hence warmed the fermenter.

Responses to part (d)(i) were somewhat disappointing, with less than half of candidates being able to explain that contaminating microorganisms might either compete with the *Fusarium* for resources or might make toxic products which had an adverse effect either on the *Fusarium* or on the human consumer. Answers such as, other microorganisms might be harmful, without further qualification, for example to human health, were discounted as being too vague.

In part (d)(ii), the vast majority of candidates were able to suggest at least one way that contamination of the fermenter could be prevented, either by sterilisation of apparatus or materials before use or by ensuring the apparatus had no leaks. However, less than a third of candidates were able to suggest *two* precautions. Some, presumably having practised on the January paper, thought that bent tubes on the supply lines, as in Pasteur's flasks, might have been helpful!

Around 30% of candidates were unable to make any valid deductions from the data for part (e), but most could give at least one or two points. Most noticed that beef had the highest content of each of the four given amino acids and hence deduced that the statement suggesting mycoprotein was the best source was incorrect, these were the two most common valid points made by candidates. Some pointed out that mycoprotein would be a good source for vegetarians and a few noticed that mycoprotein was a better source than wheat for just three of the amino acids, perhaps naming phenylalanine as the one exception. Too much value was often placed on the relationship between the absolute amounts of the different amino acids per 100 grams of each food compared to the human daily needs – forgetting that a person is not obliged to eat merely 100 grams and that any excess amino acids are generally deaminated in the human body, the waste excreted and the residue used for other aspects of metabolism. There was also much irrelevant use of the given numbers, with candidates adding up columns of figures for no apparent reason. Better candidates were able to extract more *relevant* information from the data. Others introduced their own ideas that went beyond the data, such as discussing the fat content of beef, which they then often used to contradict themselves, having already stated that beef was the best source. Such considerations were entirely irrelevant to the question which was restricted to *source(s) of amino acids*.

To gain full marks it was essential to give either a conclusion based on the evidence or to state that information for just three foodstuffs provided insufficient evidence upon which to base a valid conclusion. Only the more able candidates had the courage of their convictions in this latter respect.

Mark Ranges and Award of Grades

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