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General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Report on the Examination

2010 examination – January series

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Additional Science / Biology
Foundation Tier BLY2F

General

Examiners noted a number of candidates who may well have achieved a higher grade had they been entered for the Higher Tier examination. There were almost 1000 candidates who achieved marks well above the C grade boundary. Conversely there were also a number of candidates who found the Foundation Tier examination very difficult. Centres are encouraged to try to make sure their candidates are entered for the appropriate tier of the examination.

Most candidates now use black ink and few wrote in colours that were difficult to see as a scanned image. However, candidates do need to be aware that when drawing in pencil the problem of visibility may create difficulties.

Candidates need to keep their answers inside the box as instructed on the paper. The space provided should be adequate however if the candidates need more space they should extend their answers onto additional sheets, suitably identified with name, and correct candidate and centre numbers. Furthermore, should candidates write answers elsewhere than on the lines or in the space provided they would be advised to make it clear on the lines or in the space that their answer has been written elsewhere. If this is on the same page, an arrow to where it is written or a mark such as a star is enough to alert the examiner to look elsewhere on the page. Of course, these problems would be avoided if candidates considered their response, before committing pen to paper, as a good answer need fill no more than half the available space.

A number of examiners noted that candidates did not always recognise the command words, and other candidates failed to make answers clear and concise.

There was no evidence that candidates had been unable to complete the paper in the allotted time.

Question 1 *(Low demand)*

(a) The large majority of candidates achieved full marks; the most common of the few errors was to link kidneys to faeces. A number of candidates also drew an extra line, thus invalidating one of their marks. Candidates should be encouraged to read the instructions in the question carefully to ensure that marks are not thrown away needlessly.

(b) (i) Most candidates arrived at the correct figure, drawn from the graph, the most common error being to choose 1600, perhaps as a result of reading the scale too hastily.

(b) (ii) Having established that the value for part (b)(i) was for the water loss from the skin on a warm day, most candidates were able to suggest that on a cold day, water loss in this manner would decrease.

(b) (iii) Most of the candidates went on to explain that this reduced loss was due to a decrease in sweating, the need for reduced cooling or to conserve heat. A small, yet significant, number of candidates included references to shivering, hair erection and vasoconstriction in their answers, which the examiners ignored, along with the idea that more water would be taken in to cool the body, resulting

in a greater loss. A common misconception was that the water retained in the body would, itself, provide heat.

(c) Candidates seemed unsure of the consequences of reduced sweating on the amount of urine produced. Only a little over one-third of candidates arrived at the correct response, perhaps considering that less might be drunk on a cold day, so a smaller amount of urine would be produced.

Question 2 *(Low demand)*

The majority of candidates were confident enough in parts (a) and (b) to score well.

(a) Here particularly, candidates showed a good understanding of the events at fertilisation, only a relatively small proportion not achieving both marks

(b) Again candidates showed that they could handle the terminology referring to alleles and again the majority gained both marks.

(c) (i) In this part however candidates appeared less confident. The part of the cell labelled B was identified as the cell wall, almost as often as it was correctly named, cell membrane.

(c) (ii) Identifying part C proved to be less of a problem for most candidates.

(d) This proved to be more difficult, as a whole, for most candidates. The examiners were surprised that so many candidates had failed to read the question, which clearly asked them to choose between labelled parts A to D, and instead merely ticked one box or the other or often both of them, rather than select letters.

Candidates are advised to practice reading and completing past papers in their preparation for the examinations, so that they may be ready to respond to questions in such a way that they at least give themselves a chance of gaining the marks.

(d) (i) Many could not identify the cell structure containing the allele

(d) (ii) The great majority of candidates chose anything other than the correct answer, B, with A being a far too attractive distracter for many.

Question 3 *(Low demand)*

Most candidates did well in this question.

(a) Pancreas was correctly chosen from the list by the majority although liver was by no means uncommonly ringed.

(b) Once more the failure to read the instructions was a common failing for many. Candidates should be aware that two marks would not be available for a single tick, even if they had missed the emboldened two in the instruction line. A significant minority of candidates ticked only one statement. Very few selected more than two boxes, which would have limited them to a maximum of one mark, had they selected the two correct statements in their three. Although most candidates recognised that the diabetic would

get less energy from carbohydrate, fewer were able to interpret the charts sufficiently well to identify that, to compensate, more energy would need to come from fat. Those who did note the instruction and used the charts effectively were frequently rewarded with two marks.

(c) This again showed the need for careful reading. The examiners are confident that a number of candidates simply read past the first three words, either choosing to ignore them or simply not recognising their significance. These candidates often gave ways in which the diet may be adjusted to deal with diabetes, offering suggestions such as eat less sugary food or, worryingly, eat more sweet food or simply repeating information from part (b). Once this hurdle had been overcome, the examiners were looking for some degree of detail, thus injections, medicine and tablets were considered to be too vague for the mark. References to exercise were considered to be insufficient, but were ignored, if a creditworthy suggestion was also given. A few candidates suggested pancreatic or stem cell transplants both of which were acceptable, although a small minority with kidney transplants were confused.

Question 4 *(Low demand)*

(a) Although a large majority of candidates correctly identified the root as the organ absorbing mineral ions, it remains surprising that almost one in every six candidates suggested leaf. A similar number of candidates correctly identified chlorophyll.

(b) (i) A word that, in everyday terms, must be much less familiar than mineral.

(b) (ii) Candidates did not always read the question carefully and described the importance of leaves rather than chlorophyll. There was confusion between chloroplasts and chlorophyll, with statements about chlorophyll containing chloroplasts. Attracts light was not given credit as it conveys the wrong idea, but words such as absorbs, traps and captures were accepted when linked to light. Attracting insects, protection, respiration, absorbing minerals and showing the leaf was healthy and contained minerals were not acceptable responses.

(c) The examiners expected this part to be more challenging for many candidates, so were pleasantly surprised that nearly half drew two correct lines. However, almost as many drew either two incorrect lines or only a single line. Of those who scored only one mark, magnesium was more commonly correctly linked, to yellow leaves, than nitrate to stunted growth. It was perhaps this link that prompted some candidates to add references to magnesium to their answer in part (b)(ii).

Question 5 *(Low demand)*

(a) More candidates selected either the two incorrect responses or ticked only one of the boxes, than identified both correct answers. Once again, failure to read the instruction to tick two boxes was missed by far too many candidates. Not unexpectedly, fatty acid was the most commonly correct answer; after that the other three responses were chosen in almost equal proportion.

(b) A significant number of candidates drew arrows to swap their answers to the two sections around. Whilst this is an acceptable way of changing an answer, it would be more helpful to examiners if an answer a candidate feels is incorrect was crossed out

and replaced by an alternative. It would appear that many candidates, having selected a response for part (b)(i), then arrived at part (b)(ii) and changed their minds, hence the need to swap answers around. Interestingly, many of these swapped what would have been correct answers, around and thus gained neither mark.

(b) (i) Answers such as fat or lipase were considered to be insufficient, as they do not indicate the factor that is being controlled.

(b) (ii) Candidates were clearly confused about the variables, particularly the independent variable, with time and amount of fat or lipase frequently seen amongst the incorrect answers.

(c) Careful thinking was required, and many candidates only got part way through the process, recognising, for one mark, that carrying out the investigation at more temperatures would help to identify the best temperature. The second mark was much less often scored, as candidates then had to go on to explain which additional temperatures it would be better to use. Those who used the results in the table to recognise that the lipase was most effective between 20 and 60 °C and either quoted this range or any value within it were rewarded for their efforts.

Unfortunately, having established that experimenting at more temperatures would be helpful, many candidates then went on to disqualify this mark by including all sorts of additional improvements. Thus further suggestions such as leave the tubes for longer, change the pH and add more lipase all cost candidates the mark, although testing at shorter time intervals was ignored, as this would probably be required in an investigation involving smaller temperature intervals. Other candidates simply repeated some or all of the experimental details they had already been given.

(d) (i) Most candidates chose strong acid, and many went on to give a correct reason by relating it to the table in part (d)(ii).

(d) (ii) Common errors were thinking that the water would neutralise it or that the water bath would get cold. Some candidates thought that the low temperature would have already destroyed the enzyme.

Question 6 *(Standard demand)*

(a) Examiners were looking for an understanding of the principles of a pyramid of biomass. The first mark was awarded for a three layered triangular shape, whether it was a triangle or a series of boxes. The examiners gave credit here whether the shape was conventionally the correct way up, or upside-down. However, candidates should be encouraged to work from the bottom upwards. The second mark was available for correctly matching the three organisms to the layers. Some candidates who drew the shape correctly went on to label the boxes in reverse order and so only gained one of the marks. Nets and sun were sometimes included as a layer in the pyramid, sometimes as an additional layer, whilst others omitted humans and included trout again in the top layer.

(b) A significant number of candidates only ticked one box and so limited themselves to the possibility of only one mark. A considerable number chose Soya bean plants absorb energy during photosynthesis, which was not a correct answer to this question.

(c) Most candidates were able to suggest an acceptable advantage. However, ideas about not letting fish escape, fish not catching diseases or ideas about making profits did not gain marks. There was apparent confusion, perhaps caused by poor choice of words, about less energy being *used* by the fish in the net, as these fish would have used more energy, for growth; but will have *lost or wasted* less energy, in movement.

(d) Many candidates gained one mark for a reference to decay (or any suitable synonym), but fewer went on to make a second point about microbes, their respiration or their release of carbon dioxide. Candidates often referred to the release of carbon, rather than carbon dioxide which was required for the mark. Some candidates scored no marks for suggesting that dead trout (themselves) respired or burst open and released the carbon dioxide stored inside them.

There were frequent descriptions of the minerals being released from the trout then absorbed by plants from the soil, or of minerals going into cycles, for which no credit was given. This question was asking about the cycling of carbon however some candidates described the relationship between photosynthesis and respiration and how oxygen was released, which was not required by this question (some going as far as to suggest alchemy in that carbon turns into oxygen).

Question 7 *(Standard demand)*

(a) Care was required in reading the scale along with selecting the right bars to read, and, whilst most successfully completed the latter, fewer achieved the former, with the majority of incorrect answers showing that 100 had been selected for the locally grown carrots. The most common incorrect responses were 800 and 4, showing either a poor reading of the question, 'how many times...', or poor mathematics.

(b) Most candidates gave more heat or more light as correct reasons, but then simply restated 'made beans grow faster' from the stem of the question and did not go on to make the required link with increased photosynthesis. Increased protein production did not gain credit, as it is not a direct effect, whilst better weather was considered too vague to gain a mark. There were only a few correct creditworthy statements about faster enzyme activity. In this question the examiners were prepared to accept the idea of more sun, this is because both more heat and more light will be acquired from the sun. It is not the intention of the examiners to imply acceptance of this type of vague answer in cases where only more light would be appropriate.

(c) There were many correct answers about less pollution or less carbon dioxide from using less transport or less fuel. Candidates appear to recognise the environmental concerns heard both from inside the classroom and from everyday sources. Some confused candidates thought that fuel was released into the air by transport, or that less carbon dioxide would be <u>used</u> by transport. Some candidates found it difficult to express their ideas clearly. Others did not read the question carefully and gave information about costs, jobs or freshness of food, which were not relevant here, as the question required an explanation of how the environment would be helped, although these were ignored in an otherwise correct answer.

Mark Ranges and Award of Grades

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