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January 2012

International GCSE
Biology (4BI0) Paper 1B
Science Double Award (4SC0) Paper 1B

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International GCSE 4BI0 & Double Award 4SC0 Paper 1B – Janaury 2012

Once again the examiners were very impressed by the knowledge and understanding shown by some of the candidates on the paper. Candidates were able to demonstrate skills in application of knowledge and understanding, analysis, evaluation and investigations. Many centres have worked hard to prepare candidates carefully for the examination and this was evident in the biological knowledge and understanding and in the evaluative and analytical skills shown.

Question 1

Part (a) required candidates to select examples of major groups of organisms from the list provided. Most were able to do this but some wrongly selected *Amoeba* as an animal and *Mucor* as a bacterium. In (b), many candidates were able to give three ways in which viruses differed from other living organisms. Common answers referred to lack of respiration, movement, sensitivity or excretion as well as being smaller and only reproducing inside other organisms and having a protein coat. In (c), most could name a viral disease and give the organism it infects along with its effects. Some answers did not give the organism infected, stating "the immune system" but not giving the organism.

Question 2

Candidates had to fill in the gaps with the appropriate word in a passage describing inheritance. Many scored full marks but some confused which bases paired with adenine and cytosine. Some spelling errors were tolerated with thymine and guanine, yet others could not be credited as they were not recognisable.

Question 3

This question described a situation in which the growth of flowering plants could be affected. In (a)(i), many gained marks for the idea of genes being passed on or were able to describe the parents' growth and link that to the offspring. Some candidates also gained marks for the idea of competition – but others missed out on marks because they did not mention 'competition' or didn't specify how the growth was affected. In (a)(ii), candidates gained marks for the idea of increased nutrients. Some candidates wrote confused answers about nitrifying or denitrifying bacteria and some were unsure about what was being converted and what it was being converted into. A common mistake seen in several candidates was also to write about the idea of competition and that the bacteria were using up the nitrates. In (b)(i), most candidates used the term 'unwanted' to describe weeds. In (b)(ii), many candidates were able to score highly as they chose suitable examples of the resources the weeds would be competing for. In (b)(iii) most candidates were awarded the mark for suggesting using herbicide.

Question 4

This question presented candidates with experimental data showing the effect of temperature on insect numbers. In (a), most were able to identify the anomalous result and better responses suggested that this could be due to the temperature not being at 30^{o}C, more food being present in the tube or a particularly fecund female. In (b), almost all candidates correctly counted the male and female flies and identified which tube they came from. Only the best candidates gained both marks in (c) for explaining that the results were reliable because they were close together and repeated. In (d), many gained full credit for describing the effect of

temperature on insect numbers. Centres should remind candidates that repeating the raw data is not describing and will not earn credit.

Question 5

Here, candidates were given information about Emperor penguins. In (a), some candidates were able to explain that being large reduces the surface area to volume ratio and therefore reduces heat loss. In (b), many responses described the role of fat and down feathers as an insulator by trapping air. In (c)(i), candidates were asked to suggest why the muscles for the feet are located in the body of the penguin. Only the very best candidates were able to describe how the muscles would be warm and therefore enzymes could work at an optimum temperature to enable respiration and contraction. In (c)(ii), many thought that the tendons should be elastic rather than inelastic. In (d), most could explain why penguins huddle together with the best answers describing less exposure to cold, sharing body heat and decreasing the overall surface area to volume ratio.

Question 6

Candidates were shown a donor card and asked, in (a), to match the illness with the organ named on the card. Most gained full marks but some confused hepatitis and diabetes and others did not name the organ on the card. In (b), most could describe the liver as producing bile and its role in emulsifying fat and neutralising stomach acid. In (c), most could describe a clone as being genetically identical and suggest two advantages of using cloned organisms to provide transplant organs.

Question 7

The question gave data from a variation on a familiar experiment on osmosis in potato. In (a)(i), most were able to calculate the percentage change in mass but in only the best candidates were able to explain that calculating the percentage change enables us to compare different starting masses in (ii). This is a common practice in many experiments and the examiners were disappointed that many candidates did not understand its purpose. However, in (c), almost all were able to explain why the potato cubes gained mass. Most could also calculate the surface area, volume and surface area to volume ratio of the cubes when given the formula. In (d), many could describe the relationship between cube surface area to volume ratio and rate of osmosis. In (e), candidates had to draw and label a plant cell, with most gaining full marks although a few confused cell wall and cell membrane.

Question 8

In (a), candidates were required to place stages of human reproduction in order and most responses were correct. Candidates then had to identify the differences between a diagram of a fetal heart and an adult heart in (b). Most were able to identify the gap between the atria and the joining of the aorta and pulmonary artery. In (c), most could identify the gender and give the correct number of chromosomes.

Question 9

This was a longer prose item and most responses gained full or nearly full marks for describing how the leaf is adapted for photosynthesis.

Question 10

The question gave a picture of a water plant growing on a lake. In (a), most candidates were able to suggest a mineral ion required by a plant and its role in the plant. We would expect candidates to give the ions required in the specification - magnesium for chlorophyll or nitrate for amino acids. However, other ions were also credited. Candidates then had to plot a line graph of some experimental results in (b). Those from centres who had practiced graph plotting scored very well. In (d), many candidates could identify three variables to be kept constant with light intensity, carbon dioxide level and temperature being the most common correct answers.

Question 11

This also required a longer prose response on the evolution of the peacock's tail. The best responses described how competition exists between male birds to attract a female to mate with. A genetic mutation that gave a larger or more attractive tail would therefore confer an advantage on those birds. These would reproduce more and the genotype would increase in frequency over many generations. Most candidates were able to gain some marks for their accounts.

Question 12

This was the experimental design item. Many candidates have been encouraged to use the CORMS prompt to design an experiment. Many used it here to good effect gaining full or nearly full marks. For those centres still unfamiliar with the CORMS prompt used to mark this question, this bases the marking on (1) what is going to be Changed e.g. the use of a control group; (2) a statement about the Organism to be used to ensure validity; (3) the need for Replication of the experiment; (4) ideas about what will be Measured and over what period; and (5) factors that would have to be kept the Same and controlled in the experiment,

Question 13

Students were given a food chain and data from which they had to plot an accurate pyramid of numbers. Although many gained full marks in (a), some presented the data in the wrong order or did not draw the pyramid to scale. In (b), most could describe how a pyramid of biomass would be a regular pyramid and that the producers would have a larger biomass than for example the primary consumers. In (c), some candidates did not realise the question asked about energy transfer from the producer to the primary consumer so that answers referring to losses due to movement or excretion were not relevant. The best candidates gained full credit for describing losses due to respiration in the plant and the primary consumer not eating all of the plant or not being able to digest some parts of it. Many candidates gained full marks for describing how the removal of the bushes would decrease the caterpillar population and therefore reduce the dunnock population.

Question 14

This was the last prose question and candidates had to explain the methods used to produce large numbers of fish in a fish farm. Those candidates who had learned this part of the specification had no problem in gaining full credit. Some weaker candidates wrote only about GM or mating systems. The best responses included controlling intraspecific completion, reducing predation, controlling disease by using antibiotics, maintaining oxygen levels, removing waste products, frequent feeding in small amounts using high protein food and using hormones and selective breeding to improve yield.

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