

Examiners' Report/ Principal Examiner Feedback

Summer 2010

GCE O

GCE O Biology (7040) Paper 02

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O level Biology 7040 / 02 Report - Summer 2010

Question 1

The comprehension, this year, was about asexual reproduction and candidates were able to demonstrate excellent knowledge of this process. The vast majority appreciated that sexual reproduction involves the fertilisation of gametes to produce offspring that possess genetic variation. The differences between meiosis and mitosis were also well understood and expressed in a way that impressed the examiners. Most candidates recognised that artificial propagation is a quick method to use, certainly when compared to sexual methods. Only the better candidates also appreciated that the desirable phenotype would also be maintained.

Most appreciated that the relevant feature of a tuber is that it is a stem and that a bulb is made of leaves. They also were able to recall the starch test, though a surprising number confused the use of iodine to produce a blue-black colour with other food tests. As such, they discussed boiling or dissolving with ethanol, or boiling with Benedict's solution. Most candidates were able to describe the digestion of starch into monosaccharides that can be used in respiration. A mark was available for naming amylase as the enzyme involved in the digestion but very few mentioned this point. Almost all candidates made use of the clue 'rooting powder' to correctly link this with the idea of root growth. Candidates who only mentioned growth did not gain credit.

Question 2

In part (a), most understood that boys tend to be more muscular and more active than girls, both of which require more energy. Many stated that boys tend to work harder, which is certainly not true in one sense, but examiners were kind in their interpretation of the language. Most appreciated that girls need more protein than women because they are still growing and the vast majority linked the need for more calcium in boys to their growing bones. The better candidates linked the need for more iron in a woman to the menstrual cycle, though many stated the need for iron to make haemoglobin and stopped their explanation a little short. About half the candidates seemed unaware of the importance that vitamin D has in normal bone development. Many wrongly quoted deficiency diseases such as night blindness and scurvy, or believed that skin diseases would be caused.

In part (d), candidates confused the ideas of growth and development. The majority of candidates got two marks, although a significant number of weaker candidates didn't understand the question. Some of these candidates suggested that protein was needed, others mixed up the scientific concept of energy with 'feeling energetic', so said that running around would give you more energy. Some candidates who mentioned temperature thought that hot temperatures increased the energy requirement.

Question 3

Most candidates were able to draw a correct food chain though the weaker ones produced a pyramid or a food chain with the arrows going in the wrong direction. The fact that springtails were the primary consumers in this food chain was appreciated by the vast majority. The graph was well done by most. Marks were given for linear scales covering at least half the grid, axes correctly aligned and labelled, points plotted correctly, straight lines through the points and a key to show which line belonged to springtails and which line belonged to mites.

Most managed in part (b)(ii) to describe the changes in numbers of springtails, and most could give a reason for at least one of the changes. Most average and above average candidates achieved 3 or 4 marks. There were also many fluent answers showing good biological understanding, for example, ascribing changes in springtail numbers to mutation leading to the development of resistance, or to predator - prey interactions. Weaker candidates didn't describe the trend, but instead said numbers were high or low at a particular time. Some didn't read the introduction carefully, and thought that spraying was carried out every month. Some thought the numbers of months referred to years, and some thought that the numbers referred to the months of a year, for example, that month 1 was January, and referred to seasonal or climate changes as being responsible for changes in numbers. A common mistake, (although reasonably based on food chains) was to ascribe changes in numbers of springtails to the availability of the food they ate (dead plants) rather than to the changes in the population of the mites which fed on them. Part (b)(iii) was poorly answered with very few candidates discussing random placement or the importance of using several quadrats.

Question 4

In part (a), the better candidates realised that the layer of oil is important to prevent the evaporation of water. Weaker candidates made reference to preventing air getting in or to help measure the water level. The calculations in (b) posed little difficulty for the majority of candidates but part (c) was more challenging. Few stated that the plant gained mass, although, from their answers, they were clearly assuming that more water had been taken up than had been lost in transpiration. About a third made reference to photosynthesis, but few mentioned growth or the idea that water was being kept in the plant. The weaker candidates just described the factors that affect the rate of transpiration. In part 4(d), most candidates were able to gain one mark for less photosynthesis. Average and better candidates gained full marks, usually for mentioning less transpiration, but better candidates also mentioned the stomata being partly closed, and also referred to the results, as asked - that less mass would be lost.

Question 5

Most were able to identify the trachea, bronchus and lung in part (a) and most understood that pulling the rubber sheet downwards would increase the volume and decrease the pressure to allow air into the balloons in part (b). In part (c), it was clear that some didn't understand the meaning of ventilation so wrote about alveoli and gas exchange. Weaker candidates named the other structures as larynx, pharynx, pleural membranes, diaphragm, and so on. However, most average and above average candidates managed at least two marks, and usually three. In part (d), most appreciated that the breathing rate would increase in order to supply oxygen for respiration or to remove carbon dioxide and lactic acid. Weaker candidates wrote about increasing the heart rate.

Question 6

Some excellent answers, and most did manage at least three marks. Candidates who remembered the principles for designing an experiment usually gained all five marks. The idea of many plants, or repeating, was frequently forgotten. In general, candidates didn't measure a specific parameter such as height or mass, but looked to see 'how well it had grown'. Many described the results they would expect, but failed to give a specific feature they would have measured. Sadly, many candidates left this question blank or described the effects of acid rain on buildings. The contrast between the responses of those who used CORMS and those who didn't was striking.

Question 7

In part (a), most candidates did well and gained 3 or 4 marks. Others mixed up gas exchange with ventilation or got the two processes the wrong way round. It was surprising to see how few candidates linked diffusion to gas exchange, and how few mentioned that respiration takes place in cells. A misconception for some was that gas exchange referred to the carbon cycle, that is, the exchange of gases between plants and animals.

In part (b), it was evident that there were several misconceptions: egestion about storing waste and excretion about expelling it; mistaking egestion for ingestion; thinking that excretion and egestion are the same process, or that egestion is the removal of waste such as urine, while excretion is the formation of the waste (urea becoming urine).

Question 8

In part (a), most managed to get two marks, often repeating the same points over again, rather than thinking about further advantages to get more marks. Some gave lengthy discussions of just one point - such as specificity - they need to read the question carefully and think about how they should respond for the marks that are allocated. The examiners frequently saw the idea that pesticides harm humans or harm crops, ideas not credited, nor was credit given to general comments about harm to the environment, being 'easier to use', or 'cheaper to use' or to the misconception that pesticides cause eutrophication.

In part (b), most managed to get two marks for cloning, although many responses were muddled because they described the procedure for the cloning of Dolly the sheep and imperfectly described the principles of producing a genetically identical

copy. Few could get more than one of the points for transgenic, usually by making reference to the transfer of a gene from one species to a different species.

Question 9

In part (a), candidates were challenged to explain the differences between two concepts that are often confused in their minds. Their answers were quite good in general with most appreciating that immunity involves white blood cells whilst resistance involves genetic mutation. Again, in part (b) there were many good answers, though a significant number interpreted lifestyle diseases as HIV or vitamin deficiency. A surprising number believed that inherited disorders were also due to lifestyle.

Question 10

Responses were generally well-organised and candidates tended to get good scores, 9 - 12, if they understood the principles. A significant number didn't mention partially permeable membrane in connection with osmosis. Some described examples in far too much detail, and many simply described experiments on diffusion and osmosis in the classroom rather than giving examples of substances moving into and out of cells by diffusion, osmosis and active transport.

Question 11

This was the least popular essay choice. Some excellent answers gave a full overview of all methods. Weaker candidates seemed to think of only one aspect and went into a lot of detail. For example, a significant number thought this was about methods of improving the plant features and described genetic engineering, selective breeding and cloning in detail, but no other methods. Others described the use of fertilisers and crop rotation in detail.

Question 12

This was the most popular essay choice. A large proportion of the weaker candidates chose this question, and most managed to gain some marks for either the constituents of smoke that cause tissue damage and/or the diseases resulting from smoking. It was good to see that some candidates had some understanding of how the damage to lungs or heart was caused. However, the examiners were shocked at the answers that many candidates gave in which ideas were confused and biological errors were frequent. For example, some believe that nicotine will make you go insane!

BIOLOGY 7040, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	149	130	111	101	79

Note: Grade boundaries may vary from year to year and from subject to subject, depending on the demands of the question paper.

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