

Examiners' Report/ Principal Examiner Feedback

Summer 2010

GCE O

GCE O Biology (7040) Paper 01

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O level Biology 7040/01 Report - Summer 2010

Over the period that the Edexcel O level Biology papers have run we have been privileged to look at many examples of outstanding work from centres throughout the world and look forward to welcoming these centres to join us in the new Edexcel IGCSE examination that we have developed from May 2011.

The examiners continue to be impressed by the answers that the candidates gave on the two papers. This shows that the teaching and learning in the centres is enabling candidates to develop, not only a sound knowledge of the specification material, but also a good understanding of biological principles that they can apply to unfamiliar data and new situations.

Question 1

- (a) This required candidates to complete a table to show the effects of adrenaline on various body functions. Most candidates were able to gain full marks on this item.
- (b) Candidates then had to explain the advantages to an organism of the increase in heart rate caused by adrenaline. Most were able to describe the provision of increased blood flow to muscles delivering more oxygen and glucose to allow faster respiration so enable escape.

Question 2

- (a) This item required candidate to complete a table to show some features of plants, animals, fungi, bacteria and viruses. Most responses correctly matched the features of the groups but some candidates were unable to give a correct example of each group.
- (b) In this item candidates needed to give two examples of the internal conditions controlled by mammals. Suitable examples included blood glucose, temperature and osmoregulation.

Question 3

- (a) This item showed a plastic shopping bag that was made from oil, a non-renewable resource, and asked candidates to explain the term non-renewable. Only the best candidates were able to describe the term as meaning a finite or limited resource. Weaker candidates described the term as meaning cannot be recycled, writing about the plastic bag rather than the oil.
- (b) This described the process of using genetically modified bacteria to produce biodegradable plastic. Candidates were required to complete a table to put the stages of the process in the correct order. Most were able to do this well and gained full marks.
- (c) Finally in this question candidates were required to suggest the two substances produced when biodegradable plastic bags decomposed. Many candidates correctly stated carbon dioxide and water but some also mentioned ammonia and methane.

Question 4

This showed a photograph of a human embryo containing eight cells.

- (a) Candidates had to name the type of cell division that produces the embryo from the zygote. Almost all correctly named this as mitosis. Candidates could also correctly give the number of chromosomes present in each human embryo cell. The next part asked candidates to identify the correct description of an allele. Again, most could do this part correctly.
- (b) This item required candidates to describe the role of the placenta in the development of the embryo. Many candidates gained full marks for a clear and detailed description. Credited points included: the provision of a large surface area to enable diffusion of glucose, oxygen, amino acids and antibodies from the mother to the foetus; removal of carbon dioxide and urea from the foetus to the mother; a source of progesterone during development and to prevent direct mixing of foetal and maternal circulations.

Question 5

This provided candidates with a diagram of a section of the human eye. They then had to complete a table to identify the functions carried out by parts of the eye labelled on the diagram. This was generally well done but some candidates confused the role of the ciliary muscles with the role of the iris.

Question 6

This item required candidates to identify the organ affected by conditions given the symptoms and the name of the condition. Candidates did well on this with only a few weaker students failing to identify lack of sperm as being due to the testes not the penis.

Question 7

This provided candidates with a diagram showing three-dimensional section through a leaf with some parts labelled.

- (a) Most could identify the upper epidermis, lower epidermis and the guard cell. Some candidates however wrote stomata rather than guard cells.
- (b) Almost all candidates could describe how the arrangement of cells in the palisade layer enables them to carry out their function. Good answers mentioned the location of the cells near the top surface of the leaf and the large number of chloroplasts in the cells allowing maximum absorption of light for photosynthesis. In the spongy layer most candidates described how the air spaces enabled efficient diffusion of carbon dioxide.
- (c) In this item candidates needed to explain the role of the vascular bundle. Most could explain the function of the xylem as transporting water and mineral ions but, although most could name the phloem, fewer were able to explain its function.
- (d) Finally candidates were asked to suggest the benefits to a tree of having a leaf mosaic. The best responses described how the arrangement prevents shading of leaves and ensures that a maximum leaf surface area is exposed to light for efficient photosynthesis.

Question 8

This presented candidates with a flow diagram showing five stages in malaria.

- (a) Most were able to name the malarial parasite and explain how the mosquito can become infected by biting and sucking the blood of an infected individual. Most candidates were also able to identify the correct stage when symptoms first appear.
- (b) Almost all candidates could give two methods used to control the spread of malaria.

Question 9

This gave candidates a diagram of the human kidney nephron.

- (a) In this part almost all candidates could correctly name the glomerulus and the Bowman's capsule labelled on the diagram.
- (b) Candidates could usually name two other substances removed from the blood plasma during ultrafiltration and almost all gave the correct reason why some substances remain in the blood plasma during ultrafiltration.
- (c) This item gave candidates a graph of working nephrons against age. Almost all candidates were able to use the graph to determine how many years it takes for the number of working nephrons to decrease by 50%. Only a few of the best candidates could correctly calculate the rate of loss of working nephrons per year between 15 and 25 years.
- (d) In this item candidates had to suggest why the tissues in the body may swell if the concentration of blood plasma increases. Here more candidates gained full credit for explaining that dilute plasma would mean that water would stay in the tissues and not return to the plasma as the water potential of the plasma is higher than the tissue fluid.

Question 10

This question showed a photograph of a red blood cell.

- (a) Most candidates were able to explain how the structure of the red blood cell helps it transport oxygen, giving its biconcave shape, large surface area and the absence of a nucleus as explanation.
- (b) Candidates were required to draw a white blood cell and then describe how the two types of white cells help destroy pathogens. Many candidates gained full marks for a clear drawing of a white cell with the nucleus, cytoplasm and cell membrane labelled. Most were also able to describe the role of the phagocytes in engulfing pathogens and then digesting them and the role of lymphocytes in secreting antibodies.

Question 11

This question was on digestion in the human gut.

- (a) Most were able to correctly complete a table to give the large substrate molecule the small soluble molecule produced and the enzyme responsible for the digestion. Some candidates gave maltase as the enzyme used to produce maltose rather than amylase.
- (b) This item gave candidates a section through a villus and almost all could name the capillary and the lacteal and name the liquid found in the capillary.
- (c) Almost all candidates were able to calculate the surface area for absorption. Most could also give two other ways in which villi are adapted to help in absorption such as short diffusion distance, presence of capillaries and microvilli.

Question 12

The last question on the paper described a way of classifying desert animals based on the methods they have evolved to cope with high temperatures.

- (a) Almost all candidates could describe the relationship between body mass and rate of evaporation shown in the graph.
- (b) Most were able to suggest why the body size of evaders means they are at greatest risk from high temperatures. Creditworthy responses included their small size leading to a high surface area to volume ratio a tendency to overheat and from the graph a high rate of water loss from evaporation.
- (c) In this item most responses correctly linked the high water loss from sweating with the need for access to water. Candidates could also suggest that eating desert plants such as cacti would provide much needed water for these animals. Again most could also suggest that being nocturnal will avoid high daytime temperatures and so reduce water loss by sweating.
- (d) Most candidates realised that the 'endurers' were unable to hide in crevices because of their large size. Some were able to explain the lower activity during the day by noting that activity or respiration produces heat and could lead to enzyme function being affected as well as increasing water loss due to sweating. Only the very best candidates were able to suggest why it is important that the water content of a camel's plasma is maintained. Correct answers included: no damage to cells due to osmotic movements of water, changes in the viscosity of the blood, prevention of delivery of glucose and oxygen and strain on the heart.

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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