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Examiners' Report / Principal Examiner Feedback

Summer 2010

GCE O

GCE O Human Biology (7042) Paper 01

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Human Biology 7042 / 01 Report - Summer 2010

There were some excellent high scoring candidates who demonstrated a thorough knowledge and understanding of the biological principles involved. However, there were a number of candidates who failed to filter information and apply it to the question and instead contented themselves with writing all they knew about a topic whether it was relevant or not.

Question 1

Many candidates scored both marks for correct differences in structure between the two types of blood cell. However, a number thought that a red blood cell possessed a nucleus. The function of the two cells was well known though a number of candidates thought that the phagocyte secreted antibody.

In part (b) the epithelial cell was usually well drawn though many candidates drew several cells and drew cells that were hybrids of an epithelial cell and a goblet cell. Many included goblet cells despite not being required and a number of candidates drew cells that were square rather than oblong.

The answer to part (b)(ii) caused the usual problems with many candidates having dust/bacteria trapped by the cilia rather than mucus. Again, a significant number used the term 'germs' for which no credit is given.

The role of the cell membrane was well known with most candidates securing maximum marks. However, the role of the nucleus is not as well understood with many candidates scoring one mark for a reference to DNA/chromosomes/genetic/hereditary material. Far fewer made reference to protein and enzyme synthesis and many made a vague comment about controlling the cell's activities rather than being specific and stating that it is metabolic activities that are controlled.

Question 2

Most candidates could supply an adequate definition of a hormone as being secreted by an endocrine gland and being transported in the blood to a target organ. However, very few could provide an adequate description of negative feedback. There were vague comments about secretions stopping and starting rather than a clear-cut message that the increase or decrease in a metabolite stimulates the mechanism to increase or decrease its output.

Most candidates scored at least five out of seven marks for the table. The commonest errors were to transpose the answers for testosterone and testes and a failure to describe fully the way that insulin lowers blood glucose level by converting glucose into glycogen. FSH was often described as causing ovulation rather than the development of the follicles.

Question 3

Most candidates could give a correct pH of 8.2 but a sizeable number gave 8.1. Most knew that the end product of digestion is amino acids. The stomach was usually correctly identified as the location of enzyme A though a number placed it in the mouth or the pancreas. The role of bile/pancreatic juice neutralising the acid chyme was well known and a number made reference to sodium bicarbonate as being present in the secretion which raised pH.

The function of the villi caused some problems with many failing to state that it absorbed *digested* food, rather than just absorbs food.
The large surface area and the presence of a dense network of capillaries and the presence of lacteals for the absorption of glycerol and fatty acids were mentioned by many candidates in answer to (c)(ii).
The movement of food by peristalsis was generally well known but there were few references to the muscular contractions being wave like, or that the food is pushed along as a result of the muscular contractions.

Question 4

There were a few problems with the answers to (a)(i) in that in describing the movement of **X** some candidates failed to mention that the ribs move both up and out rather than just up. Also the diaphragm is flattened and does not move down, this latter comment being prevalent. Many candidates in answering part (a)(ii) only commented on the contraction of the intercostal muscles and omitted to mention that the diaphragm muscles contract as well.
A common mistake in answer to (a)(iii) was to state that the volume of the lungs increased as a result of the movement of the ribs and the diaphragm. Clearly, it is the volume of the thorax that increases causing a fall in pressure in the lungs. Many candidates had difficulty in expressing the idea that there is a pressure gradient developed between the higher pressure of the atmosphere and the lower pressure inside the lungs which causes air to be forced in.
Part (b) caused difficulties. Most candidates did not appreciate that the composition of the air on top of the mountain meant that there would be less oxygen taken in during each inhalation, therefore, more air had to be taken in which was difficult because of the low difference in pressure between the external and internal air. Therefore, deeper inhalation was required as was an increase in the rate of breathing and that the diaphragm and intercostal muscles would have to work harder.

Question 5

Identification of the various structures was usually well answered though in some cases **C** was identified as the uterus wall. The function of part **C** was often described in vague terms such as 'protection'. It is important that candidates qualify such answers with a reference to protection from knocks or bumps or physical damage. The term 'shock absorber' was quite widely used and was given credit, however, in reality the amniotic fluid is spreading the force rather than absorbing it.
There was much confusion with answers to part (a)(iii) where many candidates thought that it was the umbilical artery that possessed the higher concentration of oxygen rather than the vein. Those candidates who correctly named the vein often could not give a valid reason for their assertion.
Part (b) was well answered with many candidates referring to the presence of villi giving rise to a large surface area for the exchange of glucose amino acids and oxygen. However, despite the question asking about the transfer of molecules from mother to foetus, many candidates described the transfer of urea and carbon dioxide in the reverse direction.
A common mistake in answer to part (c) was to describe maintenance or reduction in thickness of the *wall* of the uterus rather than the lining or endometrium. In addition many candidates referred to the foetus as being born early rather than describing it correctly, in terms of a miscarriage.

Question 6

The graph was usually drawn correctly though a number of candidates insisted on extrapolating the line or attempting to join the points without the use of a ruler.
A common mistake in answers to part (a)(ii) was to miss out the units and in part (a)(iii) many candidates failed to mention that the change was a 200kJ **decrease** in energy intake.
Although most candidates gave a correct response to part (b)(i) with a number describing it as an inverse relationship, few candidates could give a full explanation as to the reason. Whilst many recognised that the body had to maintain a constant temperature, though many described this as 'keeping warm', few could explain the variations in body heat loss.

Question 7

Most candidates were able to interpret the data given in the graph to answer the parts to section (a) and there was no pattern to incorrect responses. Part (a)(iv) caused problems with many candidates discussing better living conditions and less overcrowding which were not accepted, in preference to increased vaccination/X-ray screening and use of antibiotics which were accepted.
Descriptions of the trend were usually correct but the reasons given were often simply the opposites of the incorrect ones given in part (a)(iv). The answers expected were mutation leading to resistant forms emerging and a reduction in the uptake of vaccinations.

Question 8

Most candidates scored well on part (a) with only the iris mark causing problems to many candidates.
Part (b)(i) proved difficult for candidates to express themselves in a clear and concise way with long rambling explanations being common. The simple answer was a statement that the condition was inherited from the mother because it is carried on the X chromosome and the boy must have inherited his Y chromosome from his father. References to the mother being a carrier were allowed as a possible explanation.
A variety of incorrect answers were provided for part (b)(ii) but there was no particular theme. Many left the space blank.

Question 9

Part (a) was answered correctly by most candidates but a common mistake in the answers to part (b) was yet again, a failure to include units or to include only partial units. Candidates need to appreciate that they will not be given any credit if they do not use units or they use incorrect units since the figures without the correct context are meaningless.
Part (b)(iii) also proved difficult for most candidates with many thinking that it had to do with the condition of a brain haemorrhage or the volume of air taken into the lungs during breathing. Few realised that it was the volume of blood pushed out of the ventricles during one contraction. In answer to part (iv) most could identify the heart rate as being the significant factor but failed to give a detailed explanation, using figures from the table, which required a comparison of the values of heart rate and stroke volume with changes in cardiac output.

HUMAN BIOLOGY 7042, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	**142**	**124**	**107**	**97**	**80**

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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