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Examiners' Report Summer 2008

GCE

GCE O Level Human Biology (7042)

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GCE O Level Human Biology

Examiners' Report June 2008

7042-01 Paper 1: Theory (Short Answers)

General Comments

A very wide range of performance was seen with some excellent scripts being produced. Many candidates displayed weaknesses in knowing the basic biological facts and many were unable to carry out the simple calculations required by certain questions. Many candidates having made correct calculations failed to understand the importance of units and so lost marks. One other common error made by candidates was a failure to focus their answers to the question asked. Instead there was a tendency to write as much as possible rather than what was relevant. Candidates must learn to be precise in their descriptions and explanations.

Question 1

The names of the parts were usually well known but a number of candidates gave part Y as the fibula or even tibula. Part (b) usually secured a correct reference to red blood cells or just blood cells. Many candidates were able to make a correct reference to the bones being lighter in answer to part (b)(ii) but failed to expand upon their answer for a second mark with a mention of the need for less energy required for movement. Easy movement was often seen which was not acceptable.
The function of cartilage as reducing friction or acting as a shock absorber was well known.
The table of comparison was very poorly done. Candidates find comparison questions difficult and often feel a positive comment on one side of the table and a different positive comment on the other is a comparison. For example some candidates made reference to the presence of calcium salts (though all too often this was simply calcium which was not accepted), in bone but then failed to say that there were no calcium salts in cartilage. Some candidates made reference to the presence or absence of marrow and the attachment/non attachment of muscles. Few candidates scored more than one mark and the norm was zero.
Few candidates recognised that the presence of cartilage at P and Q permitted subsequent elongation of the bone.
In answer to (b)(iv) many candidates made reference to ear nose or trachea and maximum marks was not unusual.

Question 2

Many candidates knew the relationship between fibre content of the diet and the incidence of deaths from bowel cancer, though many struggled to express the relationship in simple terms. The principle of 'as one goes up the other goes down' should be applied to this sort of question.
The answers to the rest of part (a) were characterised by the inability to read accurately from the graph and a failure to appreciate that it is vital to put units rather than just leave figures unqualified. In parts (ii) and (iv) the units were per 100,000 population which was often

omitted even when the readings were correct. The lack of units was not such a problem in part (iii) perhaps because g is a more familiar unit of mass.
Most candidates could give two foods with high fibre content though many confined themselves to fruit and vegetables rather than giving specific names.
The role of fibre in preventing constipation was well known and many candidates made reference to peristalsis though significant numbers described peristalsis rather than naming it and many talked about making the passage of food along the alimentary canal easier.

Question 3

It was rare for a candidate to score maximum marks for this question. The commonest errors occurred with statements 6-8.

Question 4

Candidates were able to identify the relevant lung structures in part (a)(i) and the heart as the correct answer to part (a)(ii), though there were a number of livers and stomachs.

Distinguishing between breathing and respiration proved to be much more difficult. Too many candidates described breathing as the taking in of oxygen and the giving out of carbon dioxide or the body taking in and giving out these gases. Many described breathing in terms of breathing in and breathing out.

References to ventilation were all too rare and many candidates failed to include a reference to the lungs in their answers. References to gaseous exchange often failed to make it clear that the exchange occurred between the atmosphere and the lungs. Many candidates appreciated that respiration involved the use of food and oxygen and that energy was involved. However, many candidates talked about producing energy from the process rather than ATP. Release of energy during the process was accepted and the message needs to be put over that energy is not produced during respiration.

In answering part (b) many candidates gave full and detailed answers but, a significant minority described exhalation rather than inhalation. Many candidates did not describe the diaphragm as being flattened on contraction instead, they said it moved down and in many cases pulled the lungs down with it. Candidates should be reminded that the diaphragm is domed shaped prior to inhalation and on contraction of the diaphragm muscles it flattens and causes an increase in the volume of the thorax, and not the lungs as many candidates stated.

In answer to part (c) there was the usual confusion between the roles of the cilia in moving accumulated mucus and the mucus itself which traps the bacteria. The word ‘germs’ appeared far too regularly and was not given any credit wherever it was used on the paper. Many candidates forgot, or at least did not mention that the air is warmed and moistened though many candidates seemed to think that gaseous exchange occurred in the trachea because they described changes in oxygen and carbon dioxide concentrations.

Question 5

Most candidates could name the tube although there were variations on the correct spelling. Again, most knew that the fluid was urine though a minority thought, incorrectly, that it was urea.

The roles of the cortex and medulla were often confused and in many cases both ultra filtration and reabsorption were cited as the processes occurring in both. Many candidates are using the term absorption when they should be using the term selective reabsorption. Whether this is a slip of the pen or a failure to understand the process is a debatable point.
In answer to part (b) few candidates appreciated that the glucose would be used in respiration.

Part (c)(i) caused problems. Although some candidates commented that urea would not be reabsorbed very few made any reference to the fact that other components of the filtrate would be reabsorbed thereby increasing the concentration of urea.
The reabsorption of glucose was well known in answer to part (a)(ii) but fewer mentioned that it was passed into the blood.

Many of the answers to part (d)(i) were detailed with candidates recognising that there was increased sweating resulting in the pituitary gland secreting increased amounts of ADH. However, candidates were not very precise in explaining that the ADH increased the permeability of the walls of the collecting duct and distal convoluted tubule to allow more water to be reabsorbed. Instead there were often vague references to the kidney absorbing more water. Some candidates also made references to the concentration of water in the blood reducing because of increased sweating. References should be in terms of water potential or osmotic potential.

Most candidates recognised that there would be an increase in the concentration of urea, though a sizable number thought that it would decrease.

Question 6

This proved to be a difficult question for the majority of candidates. It was rare to see full marks for the question and problems were encountered in the ability of many candidates to express themselves. The majority knew that it was males who were most likely to show the condition but of the significant number who thought it was females, most attributed this to the fact that the allele is carried on the X chromosome and as females have two X chromosomes they would be more likely to suffer. Candidates often failed to state that because of the presence of only one X chromosome in males, if the allele for haemophilia was present it was bound to be expressed, unlike in females where the presence of an allele for normal clotting would be dominant over the recessive allele.
Approximately a third of candidates could not give the correct genotype in answer to (a)(ii).
Answers to part (b)(i) were often very rambling but eventually candidates were able to make the point that mother and grandmother were carriers but then, often failed to make the point clearly that the allele was passed from mother to the son.

Candidates could not express their thoughts clearly in answering part (b)(ii). The simple fact that as Colin did not suffer the disease meant that he had an X chromosome with the dominant allele present which must have been passed to his daughter eluded most candidates.

Question 7

Overall, this question was not well answered.

Part 7 (a) answers were often confusing with all types of toxins passing the placental barrier and many candidates made reference to carbon dioxide rather that carbon monoxide. Clearly, the combination of carbon monoxide with haemoglobin reduces the amount of oxygen carried which in turn means that the fetus (often referred to as the baby) receives less oxygen resulting in a lower birth weight.
The answers to part (b) were better, with most candidates making reference to skin cancer, though a few just referred to cancer for which they did not gain a mark. References to sunburn, mutations and damage to the chromosomes or genes were seen in many answers.
Part (c) was very poorly answered with most candidates only being awarded a mark for a reference to deafness being induced. Few candidates made any reference to the increased vibrations cause to the tympanum or the effect that this would have on the malleus and ultimately leading to damage to the cochlea.

Question 8

The functions of the cerebral hemisphere and the cerebellum were usually well known. In answers to part (b) most candidates could name a process controlled by part C and usually went on to assert that death would occur. Although able to name part D as the spinal cord most candidates were not able to say much more. Of those who commented most drew attention to the fact that paralysis would occur but only a few candidates made any reference to the loss of sensation and even fewer to the fact that no impulses would pass beyond the cut.

Question 9

Many candidates, instead of giving platelets as the first correct answer to 9(a) said thrombokinase. Many candidates did not appear to know that fibrinogen is to be found in the plasma and only a minority appreciated that it was red blood cells that become trapped in the mesh of fibres. The role of blood clotting was well answered in part (b)(i) but, perhaps somewhat surprisingly, the fact that a blood clot in a blood vessel could lead to stroke or a heart attack was mentioned only by a minority of candidates in answering part (b)(ii).

Question 10

Most candidates could state a function for the teeth labelled A, and also knew that they were the ones that did not appear in the milk dentition. In answering part (a)(iii) many candidates described the presence of bacteria or plaque at the base of the teeth but omitted to say that brushing would remove this accumulation.
Mistakes in the answers to part (b) included the transposition of the first two answers or in giving pulp for the second answer. Many candidates thought that toxins were released by

bacteria and many failed to state that the acid produced would dissolve or corrode the enamel instead, they referred to decay which was not accepted.

GCE O Level Human Biology

Examiners' Report June 2008

7042-02 Paper 2: Theory (Essays)

General Comments

The examiners take great care to ensure that sufficient space is provided within the paper for candidates' answers and most candidates managed to respond to most sections within the spaces provided. Those candidates who tried to squeeze several lines of writing into a one line space, almost always included irrelevant material. There were also a number of candidates who completed responses on separate answer sheets and these often included irrelevant material, but in many cases the extra material was only one or two lines in length and could easily have been written on the original page.

SECTION A

Question 1

This was a popular and high scoring question for those who looked at the whole question and decided what was needed in each section before beginning their response. Part (a)(i) was usually well answered, with only a minority of candidates beginning or ending their accounts in the wrong place. Unfortunately in (a)(ii) many repeated the information from (a)(i) all over again instead of dealing with the changes that occurred in the blood on its journey. The marks available here and the use of the term 'explain' should have indicated that more was required than just listing the loss of carbon dioxide and the uptake of oxygen in the alveoli. In (b) those candidates who chose two clear differences and described each separately scored more highly than those who just wrote a paragraph on each.

Question 2

This question produced some very high scores but also some misunderstandings of basic topics.

In (a) a significant minority confused a receptor organ with an effector organ. Some candidates also named a sense such as touch rather than the receptor organ, the skin. The explanation needed in (b) involved detailed knowledge of both the structure and functioning of the eye. Apart from confusion between the iris and the ciliary muscles, most responses were quite good. In part (c) many just repeated the question without biological explanations. Most candidates had some idea what a homeostatic mechanism was but some limited their response to a mechanism for temperature control. The iris reflex mechanism was generally well known.

Question 3

In (a)(i) many candidates gained maximum credit but few really understood the role of ATP in energy transfer. Once again those candidates who selected three clear differences and dealt

with each in turn scored far higher marks than those who just wrote a paragraph on each of the two types of respiration. Most knew of the problems caused by lactic acid accumulation. In general candidates knew how the body disposed of waste carbon dioxide and water but not the fate of lactic acid produced in anaerobic respiration.

Question 4

This was the most popular question on the paper. Candidates, who read the question with care and selected the materials for the three sections of part (a) correctly, scored highly. Unfortunately some candidates failed to note that (a)(i) was about the structure of the small intestine while (a)(ii) was about digestion. Some repeated the same material in both sections and often failed to give details of digestion in the small intestine. A few gave details of digestion in the mouth and stomach as well as in the small intestine. In part (b) the role of the liver was well known.

Question 5

This was the least popular question in this section but proved to be high scoring for some of those candidates who chose it. Once again careful reading of the question was required and candidates who failed to do this often included a lot of irrelevant material or failed to respond to the question set. In (a) details of fertilisation or of the journey of the sperm through the female reproductive system were not required. Candidates should have described how the zygote travelled along the oviduct to the uterus and subsequent events leading to the formation of the placenta. In (b) most candidates mentioned the interlocking of parental and fetal tissues but a surprising number implied that maternal blood diffused into the fetus. In (b)(ii) candidates were expected to consider the functions of the organs listed in the question and explain how the placenta carried out each of these but the responses were very vague. The role of progesterone was generally well known, although a few confused it with prolactin and some suggested that oestrogen had the same role as progesterone.

SECTION B

Question 6

This was the most popular question in section B. A surprising number of candidates failed to give a clear definition of a vector, with comments such as ‘causes a disease’ or ‘carries a disease’ being common. Details of the transmission of each of the pathogens were well known but a number of candidates confused typhus with typhoid and consequently described the wrong mode of transmission.

Question 7

A number of candidates chose to answer part (a)(i) by means of a labelled diagram, which was usually accurate. Parasitic and saprophytic nutrition were well described in (a)(ii) and a

number of candidates also mentioned photosynthetic and chemosynthetic bacteria. In (b)(i) very few candidates selected non-bacterial diseases. In some cases the measures described to control the disease were too general, and the term 'drugs' was considered too vague.
In (b)(i) it was apparent that many consider yeasts to be bacteria as there were many details of brewing and baking. Some candidates also tried to suggest that the development of a vaccine against a bacterial disease was a use for the bacterium concerned!

Question 8

Many candidates failed to explain that a dead or weakened form of the pathogen was used to create a vaccine. Knowledge of the working of the immune system was not as thorough as in previous years and the role of memory cells was often not mentioned in (b)(i) or (ii). In (b)(iii) most candidates realised that the baby gained immunity from its mother but not why this immunity was short lived.
Most candidates realised that white blood cells are produced in the bone marrow but the need for careful matching of the tissue types of donor and recipient was often overlooked

Question 9

The process of photosynthesis was well known and most candidates were able to suggest a suitable food chain in (a)(ii). The loss of energy between trophic levels was understood. In (b)(i) most candidates were able to suggest ways in which farmers could increase the supply of nitrates available to their crops but why nitrates were needed was less well understood. The process of eutrophication was usually fully described in (b)(ii) although a number thought that the algae on the surface would die from lack of oxygen.

HUMAN BIOLOGY 7042, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	**131**	**111**	**92**	**82**	**61**

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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