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Examiners' Report / Principal Examiner Feedback

January 2010

GCE O

GCE O Level Human Biology (7042) Paper 01

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General Comments

There were some excellent high scoring candidates who demonstrated a thorough knowledge and understanding of the biological principles involved. However, a small minority write in such a way as to make it difficult to read what is written or do not appear to have read through their answer to check that it makes sense. Candidates should heed the advice on the front of the question paper to 'write … answers neatly and in good English'.

Question 1

Most candidates recognised that the level of vitamin decreases during boiling though some went on to give an explanation which was not required in part (a)(i). In part (a)(ii) a common error was to suggest that the vitamin had been denatured or evaporated. Leaching into the water as a result of cell membrane destruction or a breaking down of the molecule were the required answers.
The answers to part (b) were usually correct though some candidates did use Benedict's test. A relatively common error was not to state that it is iodine *solution* that is used.
Part (c) caused some problems and often the only point made was that boiled potatoes contained less fat/carbohydrate. Relatively few candidates gave adequate comparison figures for either fat/carbohydrate and few made reference to energy intake with the surplus energy being deposited as fat in the body.
A minority recognised that the overall differences in surface area of the two types of chips was the critical factor and then often went on to describe fat absorption into the chips rather than the coating on the surface. Even where those two points were made, few went on to discuss the extra energy/fat that would lead to a worsening of the obesity.
Most candidates could give an adequate description of digestion in the mouth.

Question 2

Although many candidates scored well on this question a particular problem arose with the last feature 'Involved in blood clotting' with most candidates ticking only the platelet box rather the plasma and red blood cell boxes as well.

Question 3

Most candidates recognised that there was a high pressure generated but often failed to link the pressure to ultrafiltration.
The answers to part (b)(i) often focused on the perceived need of the body for glucose rather than the issue of all of it being reabsorbed by the proximal convoluted tubule. The absence of protein in the filtrate was not fully explained with many candidates simply referring to the large size of the molecules but then failing to develop the logic of the argument that they could not pass through the glomerular membrane and enter the filtrate. If there is no protein in the filtrate there can't be any in the urine which is formed from the filtrate.
The majority of candidates knew that urea is formed in the liver. However, many struggled to explain why the concentration of urea increases in the urine. Many discussed the reabsorption

of glucose and other molecules but failed to mention the main reason being the reabsorption of the majority of the water coupled with the non-reabsorption of the urea.

Question 4

The reading in part (a)(i) and the calculation in part (b) were usually correct. However, candidates experienced difficulty in explaining why the vital capacity of a smoker might be less. A simple reference to damaged alveoli or emphysema was all that was required.
In answer to part (c) many candidates failed to develop the argument fully and simply focused on the need for more oxygen. Reference to additional energy requirements supported by increased oxygen demand should have been mentioned as should the increased uptake of oxygen as a result of an increased rate of breathing. This will prolong the process of aerobic respiration and reduce the likelihood of a build up of lactic acid.
Many candidates scored maximum marks for part (d). However, there are still far too many candidates who insist on stating that 'we breathe in oxygen and breathe out carbon dioxide'. The question is one of comparison and so, in each statement, a comparison needs to be made clearly. The previous examples are of a statement that is plainly incorrect.

Question 5

Candidates were able to name parts A and B with few problems but many of them labelled C as the *prostrate* gland rather than the prostate.
Whilst many correctly identified X as the bladder there were a variety of other structures offered as alternatives. The function of the bladder as a storage facility for urine was a common answer but far fewer discussed its role in the removal of urine.
Candidates struggled to give two differences. Many could give one, usually the differences between the fluids transported, far fewer recognised that there were differences in length.
Most candidates could label the testes accurately, though a significant number gave no answer to this question. The functions of the hormone testosterone were well known with secondary sexual characteristics being listed or sperm formation.
In answer to part (c) many candidates correctly identified the fact that C produces a fluid but then often omitted to give a role for the fluid such as sperm motility or nutrient provision.

Question 6

This question proved difficult for many candidates. The answers to part (a) were often given as the sense organs rather than the senses as the question demands.
There was a general appreciation in answer to part (b)(i) that no two people are the same but candidates then often went on to say that the results would be more accurate if several students were used. Candidates need to appreciate the difference between accuracy and reliability. The results were accurate but, if only one student had been used, unreliable. There was an appreciation by many candidates that the results allowed the calculation of an average or mean.
Part (b)(ii) caused great problems for the majority of candidates. General comments were required such as noting that students differed in their abilities to identify the food, that sight is not very important and that the identification is more accurate with both taste and smell.
Surprisingly few candidates appreciated that touch might be a sense that is used in identifying the food in answer to part (c).

Question 7

The characteristics of a reflex action were well known in the answers to part (a).
Candidates usually were able to correctly locate the positions of the white and grey matter but a number encountered difficulty in completing the diagram of the reflex arc. Many omitted to draw in the cell body of the sensory neurone; many placed the relay neurone in the white matter instead of the grey matter. Some omitted to show the position of synapses and a number did not draw the sensory/motor neurone to the correct position on the receptor/muscle.
The role of mitochondria in supplying energy for the transmission of the nerve impulse as it is an active process was well known. Most candidates could adequately describe the blink or iris reflex.

Question 8

Most candidates could give a definition of the term mutation but a number failed to state that it was a sudden or random change. Although there are a number of correct answers to part (a)(ii) many candidates could only manage one. Ultraviolet light and X rays were common acceptable answers but vague answers such as chemicals or smoking were not acceptable though credit was given for tar from cigarettes.
The genetic cross in part (b) was straightforward but a number of candidates failed to score maximum marks because they omitted to label the cross diagram i.e. parents, gametes, and phenotypes. Ratios should also be included on the diagram.
Although the harmful effects with respect to the skin were well known in terms of sunburn, skin cancer and cell/DNA mutation, this was not the case with the eye. The Examiners were expecting a reference to internal reflection occurring in the eye and the resultant blurred vision effect.

Question 9

Candidates usually identified the causative organism as a virus in answer to (a).
The need for a booster dose was not always fully explained despite three marks being clearly available. The points should have been made that the antibody level was falling and would have dropped below the safe level. However, a booster dose caused the antibody level to increase again and give protection against the disease.
In answer to part (c)(i) many candidates thought that advice to be given was that the child should not go to the country or that if she did she should avoid contact with sufferers. A further vaccination or booster dose was the expected answer the doctor having indicated that the antibody level would have fallen below the safe level.
Most candidates were aware of the mechanism of transmission of the polio virus.
The components of a vaccine caused problems to many candidates. Of those who scored one mark the commonest correct answer was to refer to weak or attenuated organisms as being the component but very few considered that toxins of the organism might be used.
Active artificial immunity is the required answer to part (d)(ii) and few candidates scored both marks.

HUMAN BIOLOGY 7042, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	**140**	**121**	**102**	**92**	**78**

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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