HUMAN AND SOCIAL BIOLOGY

Paper 5096/11
Multiple Choice

Question Number	*Key*	*Question Number*	*Key*
1	**C**	21	**C**
2	**B**	22	**C**
3	**A**	23	**C**
4	**A**	24	**A**
5	**B**	25	**A**
6	**B**	26	**C**
7	**D**	27	**B**
8	**C**	28	**C**
9	**B**	29	**D**
10	**B**	30	**D**
11	**B**	31	**C**
12	**D**	32	**D**
13	**B**	33	**C**
14	**D**	34	**D**
15	**A**	35	**B**
16	**B**	36	**C**
17	**D**	37	**A**
18	**B**	38	**A**
19	**A**	39	**C**
20	**B**	40	**D**

General comments

A number of questions indicated that a more thorough knowledge of some basic syllabus objectives was required by candidates.

Comments on specific questions

Question 1

Two strong positive distractors highlighted the need for candidates to learn the features of bacteria. While likely to know that DNA is found in the nuclei of most cells, they did not take into account that bacteria lack a nucleus. Similarly, candidates did not know that bacteria, as in most cells, possess a cell membrane.

Question 2

Again, candidates found this question challenging. They needed to know that all viruses are pathogens which can only reproduce inside host cells and also that the malarial parasite is a pathogen which can only complete its life cycle in a red blood cell.

Question 8

This difficult question tests a highly significant current social biology problem, that increasing obesity is attributed to the high concentration of sugar in diets, particularly by young people drinking fizzy drinks. The meal in option **C** contains 7.1 g more of sugar than the meal in option **A**. This is much more significant than the 1.5 g more of fat in option **A**, yet this proved a positive distractor. All the figures have to be evaluated. Then it can be concluded that the meal in option **A** only had 2.3 g more of carbohydrate and most of it was fibre not contributing to obesity. Reinforcing the key, there was also 4.5 g more of fat in option **C** than the meal in option **B**, so excluding option **B** as an answer.

Question 13

Option **D** was a positive distractor. However, option **D** is incorrect because restriction of the artery lumen would reduce the flow of blood, but not its oxygen concentration, since this does not drop significantly until oxygen diffuses out of the blood upon reaching the capillaries. Option **B** correctly describes the events from fat deposition, formation of the fibrin mesh and restriction of blood flow.

Question 18

Candidates needed to identify a tendon on the diagram and know that tendons do not stretch. Option **A** was a strong distractor with candidates not appreciating that it showed a muscle which can contract.

Question 37

This more difficult question shows that many candidates could not work out what would go wrong in a faulty sewage works. The grit pit was drawn after, rather than before, the sediment tank, and candidates needed to deduce that this would cause grit to accumulate in sediment tank.

Question 39

Options **A**, **B** and **C** all contain correct statements, but only option **C** specifically answers this question. Candidates needed to read the question more carefully to appreciate this. Some candidates chose option **D** highlighting that they did not know that the pupa is a non-feeding stage.

HUMAN AND SOCIAL BIOLOGY

Paper 5096/12
Multiple Choice

Question Number	*Key*	*Question Number*	*Key*
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2	**B**	22	**C**
3	**A**	23	**C**
4	**A**	24	**A**
5	**B**	25	**A**
6	**B**	26	**C**
7	**D**	27	**B**
8	**C**	28	**C**
9	**B**	29	**D**
10	**B**	30	**D**
11	**B**	31	**C**
12	**D**	32	**D**
13	**B**	33	**C**
14	**D**	34	**D**
15	**A**	35	**B**
16	**B**	36	**C**
17	**D**	37	**A**
18	**B**	38	**A**
19	**A**	39	**C**
20	**B**	40	**D**

General comments

Again, very commendable standards were shown by candidates, particularly on questions requiring factual recall. Candidates demonstrated a very good knowledge of all the basic syllabus objectives. Even the more difficult questions, as illustrated by **Questions 2, 3, 22** and **24**, that demanded analysis and deductive skills, were well answered. Of the questions that candidates found most difficult, interpretation of unfamiliar diagrams, or value judgements, were required.

Comments on specific questions.

Question 8

This difficult question tests a highly significant current social biology problem, that increasing obesity is attributed to the high concentration of sugar in diets, particularly by young people drinking fizzy drinks. The meal in option **C** contains 7.1 g more of sugar than the meal in option **A**. This is much more significant than the 1.5 g more of fat in option **A**, yet this proved a positive distractor. All the figures have to be evaluated. Then it can be concluded that the meal in option **A** only had 2.3 g more of carbohydrate and most of it was fibre not contributing to obesity. Reinforcing the key, there was also 4.5 g more of fat in option **C** than the meal in option **B**, so excluding option **B** as an answer.

Question 13

Option **D** was a positive distractor. However, option **D** is incorrect because restriction of the artery lumen would reduce the flow of blood, but not its oxygen concentration, since this does not drop significantly until oxygen diffuses out of the blood upon reaching the capillaries. Option **B** correctly describes the events from fat deposition, formation of the fibrin mesh and restriction of blood flow.

Question 22

This was a challenging question because candidates are unlikely to be familiar with the diagram of the retina in this level of detail. They need to deduce that it showed an inverted retina, and then know that light passes through the neurones (an unlikely concept), and then recall that low light intensity is only detected by rods, enabling them to deduce which neurones are fired. That so many candidates obtained the correct answer demonstrates very good standards of learning and teaching.

Question 33

Many of the lower ability candidates in particular, answered this question correctly.

HUMAN AND SOCIAL BIOLOGY

Paper 5096/21
Theory

Key Messages

Candidates must read the questions carefully and answer the question asked.

General comments

Most candidates were able to complete all sections.

A very small number of candidates did not follow the rubric for Section **C** and answered both **Question 9** and **Question 10**. Almost all candidates answered **Questions 7** and **8**.

Overall, candidates completed the Question Paper in accordance with the instructions given.

Comments on specific questions

Section A

Question 1

This question is about the stomach and the role it plays in the body.

(a) Candidates were given a diagram of a vertical section of the stomach and asked to label the oesophagus and the duodenum. Gullet and small intestine were also accepted.

(b) Candidates had to explain the role of the muscles in the stomach wall; those who wrote about contraction and mixing of food with the gastric juices, scored marks. A reference to peristalsis was also accepted. The entry and exit to the stomach is controlled by sphincter muscles, which also gained credit. However, some candidates thought that the muscle secreted acid or enzymes, while others correctly wrote, in detail, about the digestion that takes place in the stomach, but scored 0 marks because they had not answered the question.

(c) (i) This question gave detailed information about an investigation and asked candidates to explain why some tubes had water added. This required more than a one word answer. Water was added to keep the volumes in each of the tubes the same. Wrong answers included to: dilute the contents; dissolve the proteins; and see how different volumes affect the experiment.

(ii) Test tube **1** changed from cloudy to clear. Candidates were asked to describe and explain the processes and conditions that cause the change in appearance. To score marks, candidates had to explain that the egg white was protein and it was digested / broken down into amino acids by an enzyme. The amino acids are soluble, so the contents went clear. Named enzymes were also credited. Further details regarding pH and temperature also scored marks. Wrong answers included a reference to CO_2 causing the cloudiness. Some candidates wrote about more than one test-tube.

(iii) Candidates were asked to explain why there was no change in the other three test-tubes. They needed to state that there was no acid in test-tube **2**, no enzyme in test-tube **3** and test-tube **4** contained no acid and no enzyme.

(iv) The emphasis changed in this question from explaining what had happened, to describing how to extend the investigation to find out more about the effect of unnamed factors on the action of pepsin. Firstly, candidates had to suggest what those factors were and then how they would investigate them. Factors included: pH, temperature, concentration of enzyme and different proteins.

(d) After leaving the stomach, the food moves into the next section of the alimentary canal where it is mixed with two new substances. This question asked where these substances are made. It refers to the pancreatic juice from the pancreas and bile from the liver. The gall bladder was not accepted as bile is stored, but not made, there.

Question 2

This question is about the eye and how it works.

(a) Candidates were given information about investigations into the blind spot. Candidates stated that there are no light sensitive cells at the blind spot and so no image is formed. Many scored one or two marks, but most needed to also explain that it is not the same for each eye and that it only happens at a certain distance.

(b) The advantage of having two eyes was well answered with candidates writing about a wider field of vision being good for judging distance, making perception of depth easier, and improving judgement of speed. 3D vision and stereoscopic vision also scored marks.

Question 3

This question is about nutrients and components of a human diet.

(a) Given two pie charts, showing the percentage of each of three nutrients, candidates were asked to calculate the missing value. Nearly all gave the correct answers of 41% and 68%.

(b) After being given some information about what a healthy diet consists of, candidates were asked which of two diets was the healthiest. There was no mark for the choice of **B**. The explanation scored the marks for why **B** was healthier. It has more than the 50% carbohydrates needed and the 18% fats are within the correct range. An alternative answer is that **A** has too much fat.

(c) (i) The reason cellulose is not included in the energy value is that it is not digested. Other acceptable answers were: it is not absorbed; there are no enzymes to break it down; and it is egested.

(ii) When asked to name two other components of the human diet that are not digested, it was expected that candidates would probably correctly state vitamins and minerals. Other answers that were credited included: named vitamins and minerals; two different vitamins or minerals; and water.

Question 4

This question is about the blood and the glucose it carries.

(a) The question asked how glucose moves from the capillary into the muscle cell. The process is diffusion and an explanation of diffusion was needed.

(b) The word equation for aerobic respiration was needed in this section. Oxygen should have been written on the left-hand side of the arrow, and water and carbon dioxide (in either order) on the right. Commonly, candidates gave energy on the right-hand side instead of one of the two chemicals.

Question 5

This question is about a plant cell being placed in different solutions which caused osmosis to occur.

(a) Candidates were given a diagram of a plant cell. They were asked to label four structures. These were the cell wall, cell membrane, cytoplasm and the nucleus.

(b) This question asked candidates to explain what happens when the cell was placed into sugar solution. The answer wanted detailed information about the process of osmosis. Candidates should have commented on the sugar solution being more concentrated than the cell contents causing water to move out of the cell / cytoplasm, into the solution, down a concentration / water potential gradient, through a partially permeable membrane. Reference to cell shrinkage was also credited.

(c) This section wanted an explanation of what happens when the cell was placed into a different solution. The candidates should have deduced that this solution was even more concentrated. Therefore, water continued to pass out of the cell, causing the membrane to detach from the cell wall. Reference to the cytoplasm volume being reduced, and the vacuole disappearing, also scored marks.

Question 6

This question is about the four stages in mouth-to-mouth resuscitation shown in the diagrams.

Candidates needed to look at the diagrams, then describe and explain what was happening. Some candidates did not relate what they were writing to the appropriate diagram. Many candidates incorrectly wrote about the carbon dioxide in exhaled air stimulating breathing, instead of explaining that when mouth-to-mouth resuscitation is given, it is to get oxygen into the lungs, and hence to the blood and to the body cells.

Stage 1 Here the head is tilted backwards to open the airway. This also ensures that the airway is not blocked by the tongue or any debris.

Stage 2 By pinching the nose, the air cannot leave the body by that route and therefore it must pass into the lungs.

Stage 3 This stage is when exhaled air, containing 16% oxygen, is blown into the patient's lungs. By placing the hand on the chest, the person can feel the chest rise as the lungs inflate. Candidates often failed to write about the oxygen in exhaled air.

Stage 4 During this stage, the patient should be exhaling through the mouth (and nose). The hand on the chest now feels the chest go down because the patient is exhaling.

Section B

Question 7

This question is about alcohol and how it affects various parts of the body.

(a) (i) This question asked candidates to describe and explain the effects of alcohol on the nervous system including the brain. Many of the answers correctly discussed slowing down nervous impulses and a longer reaction time. However, a significant number of candidates wrote this incorrectly by stating that reaction time decreases. The answers needed to cover more than one effect.

(ii) Candidates were asked the effect of alcohol on the liver. Most candidates knew that the liver breaks down alcohol or toxic products. A few wrote about fatty deposits, but they did know alcohol is a causal factor in cirrhosis. Liver cancer and hepatitis were also credited.

(b) The consequences to the unborn child if a pregnant woman drinks excessively are many. Candidates were aware of reduced birth weight and possible miscarriage. They were not so knowledgeable about how the alcohol gets to the foetus and did not refer to both maternal and foetal blood. The placenta was mentioned, but not always in the correct context. Reduced IQ, brain development, and head size, were written about by a minority of candidates.

Question 8

This question is about the structure and function blood.

(a) Here the candidates had to name the different types of blood cell and state their function. They could name the cells, but did not always state the functions. Red blood cells carry carbon dioxide as well as oxygen. White blood cells are for defence and a detailed account of lymphocytes and phagocytes was needed.

(b) The action of platelets was well known.

(c) The substances transported by plasma had to be named. Other marks could be scored by reference to tissue fluid formation and plasma proteins.

Section C

In this section, candidates were asked to answer either **Question 9** *or* **Question 10**. Some candidates attempted parts of both questions.

Question 9

This question is about the different tissues that make up the skeletal system.

(a) The similarities between bone and cartilage were asked for. Both are living tissues composed of cells and a matrix.

(b) The differences between bone and cartilage were asked for in terms of structure and function. Although there were 8 marks in this section, only six could be gained for information on bone; both structures had to be included to gain 8 marks.

(c) Most candidates knew that tendons were composed of collagen and were inelastic. Their function is to join bones to muscles. In contrast, ligaments are elastic and join bone to bone. They are made of elastin.

Question 10

This last question is about movement and how it is controlled.

(a) A description of how the muscles of the arm cause movement was required. Candidates knew that antagonistic muscles were involved and some could name the biceps and triceps. They knew that muscles contracted to cause movement, but also needed to write about the origin being fixed or insertion of the muscle moving.

(b) (i) The answer to this question should have included the idea that lifting a weight is a voluntary / conscious action, and is therefore controlled by the brain. Details of the transmission of impulses (not messages) from neurone to neurone were required. If synapses were mentioned correctly, more marks could be gained.

(ii) Withdrawal of the hand from a hot object is a reflex / automatic / involuntary action, routed through the spinal cord. It is very fast as it is a protective mechanism. Once again, marks could be scored by writing details of impulse transmission if this had not already been done in **(b)(i)**.

HUMAN AND SOCIAL BIOLOGY

Paper 5096/22
Theory

Key Messages

Candidates must read the questions carefully and answer the question asked.

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Most candidates were able to complete all sections.

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Overall, candidates completed the Question Paper in accordance with the instructions given.

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