

HUMAN AND SOCIAL BIOLOGY

Paper 5096/11

Multiple Choice

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

General comments

There were a number of deductive type questions requiring the application of knowledge to solve the question. There was evidence that candidates are not performing the experiments required by the syllabus.

Questions 3, 31 and 32 were easy.

Comments on specific questions

Question 4

Evidence strongly indicates that candidates are not performing similar experiments as expected. The candidate is told that iodine is a small molecule and they must deduce it will diffuse through the dialysis tubing and turn black in the presence of starch. The large starch suspension cannot diffuse through the tube and so the iodine stays brown.

Question 9

The 'cannot' in the question was emphasised in bold type. Some more able candidates ignored this and chose the incorrect option of malnutrition (because it is associated with obesity). However ringworm was the only option that 'cannot' be associated with malnutrition.

Question 15

Candidates should be reminded to take care in reading the question. Candidates wrongly chose distractors showing signs, when the question asked for symptoms.

Question 17

Candidates need to appreciate that during inspiration, the alveoli will contain less air, and consequently more carbon dioxide will diffuse in from the blood. At expiration there will be more carbon dioxide in the alveoli, so less will diffuse in. Some of the more able candidates, knowing expired air contains more carbon dioxide, consequently chose the period of expiration.

Question 18

Nicotine and tar was the correct option. Nicotine in the blood constricts the bronchioles and has been shown to paralyse the cilia.

Question 22

This question showed evidence of guessing as many candidates just chose a commonly shaped graph. All the glucose will be absorbed back into the blood before the loop of Henlé in the kidney tubule, so the graph showed a lack of glucose in other regions.

Question 28

The answer is most easily obtained by excluding all the distractors that are clearly wrong, because they are not functions of the prostate. A large prostate gland would not affect sperm production, or affect the urine concentration, since it has nothing to do with either of these processes. The answer can also be deduced from its position on the diagram, so if the prostate is enlarged it will constrict the urethra and slow down urination.

Question 30

This year the genetics question was generally well answered indicating an increase of understanding.

Question 36

A surprising number of candidates wrongly thought the mosquito pupa were able to feed, when only the adult and larva are feeding stages.

HUMAN AND SOCIAL BIOLOGY

Paper 5096/12

Multiple Choice

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

General comments

Questions 1 and 33 were very easy. Questions 3, 4, 8, 9, 10, 22, 24, 25, 32, 36 and 37 were easy for the majority of candidates. Nevertheless, most of these questions were testing recall of facts required to satisfy syllabus objectives and consequently illustrate a very good standard of knowledge. Questions 18 and 31 were found to be hard.

Comments on specific questions

Question 16

Nicotine and tar was the correct option. Nicotine in the blood constricts the bronchioles and has been shown to paralyse the cilia.

Question 18

Candidates need to appreciate that during inspiration, the alveoli will contain less air, and consequently less carbon dioxide will diffuse in from the blood. At expiration there will be more carbon dioxide in the alveoli and less will diffuse in. It is easy to see how even the more able candidates, knowing expired air contains more carbon dioxide, consequently chose the period of expiration as the answer.

Question 23

The deductions from the graph needed to relate to kidney tubule structures, and many candidates used the information in the graphs to select the correct answer.

Question 27

Most candidates made the correct deductions from an unfamiliar diagram of the retina.

Question 31

This question proved the most difficult on this paper. The answer is most easily obtained by excluding all the distractors that are clearly wrong, because they are not functions of the prostate. A large prostate gland would not affect sperm production, or affect the urine concentration, since it has nothing to do with either of these processes. The answer can also be deduced from its position on the diagram, so if the gland is enlarged it will constrict the urethra and slow down urination.

HUMAN AND SOCIAL BIOLOGY

Paper 5096/21

Theory

GENERAL COMMENTS

The large majority of candidates were able to complete both **Section A** and **Section B** questions as required, thus confirming that the time allowed for completion of the paper was adequate. A higher than usual proportion of candidates did not comply with the rubric for **Section B** and answered both **Question 10 (Either)** and **Question 10 (Or)**. Most of these candidates also (correctly) answered both **Questions 8** and **9**.

In **Section A**, most candidates appeared to find **Questions 2** and **7** to be more testing than the other questions in the section.

In **Section B**, the majority of candidates found **Question 8** to be more challenging than other questions in the section.

DETAILED COMMENTS

SECTION A

Question 1 was concerned with *various aspects of malaria*. Overall, the standard of response was moderate, with generally poor responses to some parts of the question.

Part (a)(i) and **(ii)** required candidates to name the organism which causes malaria and to state the name of the group to which this organism belongs. A minority of candidates correctly identified 'Plasmodium' and 'protozoa / protists' respectively to gain credit. Whilst some candidates confused the two terms or did not provide answers, a large number incorrectly answered 'mosquito' and 'insects'. There is clearly confusion amongst the latter between a causative organism and a vector.

Part (b)(i) required candidates to name the blood vessel and blood cell as illustrated in Fig. 1.1. A minority of candidates correctly named capillary. The most common error was 'vein' although 'artery' also appeared. Most candidates were able to correctly name red blood cell/erythrocyte.

Part (b)(iii) required candidates to state two signs or symptoms of malaria. The majority of candidates gained some credit for their answer.

Part (c) required candidates to state different methods to control malaria at stages **A**, **B**, **C** as shown in Fig. 1.1 and to explain how each method controls the disease. Few candidates were able to answer the question as asked. In many cases, candidates did name valid methods of control together with reasonable explanations but did not correctly link them with the three stages **A** (larva) **B** (adult) **C** (plasmodium) as required by the question. Credit was only given for methods correctly linked.

Part (d) asked candidates to explain why boiling water before drinking provides protection against some diseases but not against malaria. Most candidates made correct reference to the link between boiling / heat killing (pathogenic) bacteria but then did not point out that the causative organism of malaria (plasmodium) does not live in water to gain full credit.

Question 2 was concerned with *aspects of the genetics of the inheritance of sickle cell anaemia*. The overall standard of answer was disappointing. Candidates should practice genetics-based questions in particular 'simple' genetic crosses with dominant and recessive alleles.

The question required candidates to *draw a labelled genetic diagram to explain why, in areas where malaria is present, there is an increased risk of children being born with sickle cell anaemia*. What was required was

a simple heterozygous cross ($Aa \times Aa$), gametes (A, a, A, a) and resulting offspring (AA, Aa, Aa, aa) being identified suffering from the disease. Very few candidates provided answers to gain full credit. The majority of candidates, however, gave poor answers demonstrating little understanding of the subject.

Question 3 was concerned with *antibiotics and required candidates to interpret Fig. 3.1* which was a graph showing, with the passage of time, the quantity of an antibiotic used to treat a particular disease and the number of causative organisms which survived the treatment.

Part (a) required candidates to name the type of organism likely to be responsible for the disease. The majority of candidates were able to name the target organisms for antibiotics to be bacteria.

Part (b) required candidates to suggest a possible disease and the name of an antibiotic used to treat it. Only the more able candidates were able to gain credit. Common mistakes included the naming of diseases not caused by bacteria and/or the naming of substances which were not antibiotics.

Question 4 was concerned with *drug dependency and the effects of alcohol*. This question was well answered.

Part (a) required candidates to define the term drug dependence. The majority of candidates gave answers gaining credit.

Part (b) required candidates to state two long term effects that alcohol might have on the body. Most candidates were able to some credit. Errors frequently seen included the naming of incorrect organs (e.g. 'kidney' instead of 'liver') suffering damage, and the naming of short term effects rather than long term ones.

Part (c) asked candidates to suggest how alcohol might affect the performance of a car driver. This part of the question was generally well answered, with a majority of candidates gaining full credit.

Question 5 was concerned with *aspects of nutrition, and required candidates to interpret data shown in Table 5.1*.

Part (a) asked candidates to state which nutrient is used for growth / repair. Almost all candidates correctly named 'protein' gaining credit.

Part (b) required candidates to explain why a woman who is breast feeding and an adult man require different quantities of vitamins C, D, and calcium. The more able candidates made the correct links between the uses of the nutrients and their roles in the developing baby, gaining full credit. Many candidates made correct reference to the baby but did not make one or more of the links between nutrient and use.

Part (c) asked candidates to suggest a reason for the difference in calcium requirements between a pregnant woman and one who is breast feeding. Reference was sought either to bones hardening / teeth developing in the baby after birth or the need for the mother to top up her own levels of calcium following the birth. For many candidates this proved to be a difficult link to identify.

Question 6 was concerned with *aspects of the control of blood glucose as shown in Fig. 6.1*. In general, this question was reasonably well answered.

Part (a) required candidates to state the type of process occurring in Fig. 6.1. Only a few candidates were able to correctly name 'homeostasis (or negative feedback)'.

Part (b) required candidates to identify **E, F, G** as shown in Fig. 6.1. A majority of candidates were able to correctly name insulin, glycogen, glucagon / adrenaline respectively to full credit. The most common error involved confusion of glycogen / glucagon and the mention of 'glucogen'.

Part (c) required candidates to name the gland that secretes **E** and **G**. The majority of candidates correctly named pancreas (or islets of Langerhans) to gain full credit. Weaker candidates named various incorrect sources, for example kidney or pituitary gland.

Question 7 was concerned with *aspects of breathing and required candidates to interpret graphs shown in Fig. 7.1*. Few candidates gained full credit for this question.

Part (a) required candidates to state the volume of air expelled after taking a full breath then breathing as much as possible. Fewer than expected candidates were able to correctly identify **3500** and **cm³** to gain credit. Often the calculation was incorrect and/or the volume units were omitted. Some candidates did not provide a numerical answer as required but named tidal volume.

Part (b) required candidates to name the muscles used in breathing and, for each muscle, to describe its action between times **T** and **U** on Fig. 7.1.

The most able candidates gave full / relevant answers with many candidates giving sketchy / inaccurate answers. Often the correct muscles were named but incorrect action was named with regard to the time interval between **T** and **U** (exhalation) as required by the question. In such cases, it was unclear whether the incorrect answer given was due to lack of knowledge / confusion or failure to read the question.

Part (c) required candidates to complete Fig. 7.1 to show what would happen to the breathing of the person between times **W** to **X** if strenuous exercise was undertaken between times **V** and **W**. Once again, many candidates did not gain credit for their answers. The answers sought were increased amplitude and frequency, together with volumes falling between 1500 and 5000.

Part (d) required candidates to explain *the changes to breathing which you have shown in your answer to (c)*. As parts **(c)** and **(d)** are closely linked, only a few candidates were able to gain credit for this part.

SECTION B

Question 8 was concerned with *aspects of cartilage, bone and the skeleton*. The majority of candidates were unable to gain more than half the available credit for this question. It appears that this part of the syllabus was poorly understood

Part (a) required candidates to describe how the structure of cartilage differs from that of bone. Responses were characterised by lack of relevant detail and candidates did not contrast the features of cartilage and bone.

Part (b) asked candidates to describe how the skeleton allows a person to move. Only the most able candidates answered this question well. A large number of candidates provided sketchy answers which lacked fundamental detail such as the roles of muscles, tendons and ligaments. Often such structures were not mentioned at all there was confusion / lack of knowledge especially between tendons / ligaments. An understanding of the basic mechanics of movement was also clearly lacking in many candidates.

Question 9 was concerned with *aspects of kidney function*. In general, this question was moderately well answered with the majority of candidates gaining more than half the credit available.

Part (a) required candidates to state and explain the importance of the kidneys. Many candidates gave full and accurate accounts of kidney structure and function and gained most, if not all, the credit available. A significant number of candidates gave unnecessary detail. The question was focused upon filtration, homeostasis and excretion. A number of candidates wrote details concerning the mechanisms of re-absorption etc. which, although correct, could not be given credit as it was not part of the question. By contrast, weaker candidates often gave sketchy answers which lacked basic relevant detail. Candidates should be reminded to answer the question that is asked.

Part (b) required candidates to describe how the work of the kidneys is affected by changes in diet and atmospheric temperature. The majority of candidates provided reasonable answers based upon diet and usually (correctly) mentioned the effects of increases in the levels of intake of protein and salt. A number of candidates gained full or nearly full credit for their answers on this. The answers based upon atmospheric temperature usually contained less relevant details / understanding. Many candidates did not identify the links between atmospheric temperature, sweating and associated water / salt loss and the role of the kidney and therefore were not awarded credit.

Question 10 (Either) was concerned with *hygiene, the spread of disease, and sterilisation*. It was moderately well answered with many candidates gaining good scores.

Part (a) asked candidates to discuss the importance of personal hygiene and of the sanitary disposal of human bodily waste. The majority of candidates provided sufficient relevant detail to gain the majority of available credit. Answers from weaker candidates usually included the key reference to faeces but then did not go on to provide sufficient relevant links for example bacteria, washing of hands, role of flies as vectors via food to gain further credit.

Part (b)(i) and (ii) required candidates to define the term sterilisation as applied to chemical agents, and then to describe the use of chemical sterilisation agents. Many candidates were able to provide a creditworthy definition sufficient, but fewer were able to provide further details to gain additional credit. Descriptions of the use of chemical sterilisation agents were variable. The most able candidates gave full answers, usually based upon the use of chlorine and swimming pools/drinking water.

Question 10 (Or) was based on the *accumulation of domestic waste and the large scale treatment of sewage*. In general, it was reasonably well answered with many candidates gaining credit.

Part (a) required candidates to discuss the dangers of allowing domestic waste to accumulate. A majority of candidates provided sufficient detail of the roles of flies and rats / vermin as vectors of (named) diseases to gain credit.

Part (b) required candidates to describe the large-scale treatment of sewage. The most able candidates provided a wealth of relevant detail and often gaining full credit. Weaker candidates either gave accounts lacking sufficient relevant detail or provided confused answers for example, the stages of treatment of sewage in the wrong order.

HUMAN AND SOCIAL BIOLOGY

Paper 5096/22

Theory

GENERAL COMMENTS

The large majority of candidates were able to complete both **Section A** and **Section B** questions as required, thus confirming that the time allowed for completion of the paper was adequate. A few candidates did not comply with the rubric for **Section B** and attempted both **Question 10 (Either)** and **Question 10 (Or)**. Most of these candidates also (correctly) answered both **Questions 8** and **9**.

In general, the overall performance of candidates was comparable with recent examinations. There was evidence that candidates had been well prepared with a number of candidates gaining high scores.

None of the questions in either **Section A** or **Section B** proved to be particularly difficult.

DETAILED COMMENTS

SECTION A

Question 1 was concerned with *movement of substances, with particular reference to the kidney*. In general this question was well answered.

Part (a) required candidates to identify a water molecule in Fig. 1.1. The vast majority of candidates correctly identified **A**.

Part (b) required candidates to state the type of membrane shown in Fig. 1.1. A large majority correctly stated 'semi/partially permeable'. The most common error was 'permeable'.

Part (c) required candidates to explain the processes by which molecules move through the membrane. The overall standard of answer was encouragingly high. Most candidates correctly identified osmosis and diffusion and linked them to concentration gradients. A relatively small number of candidates made reference to the importance of relative size of molecules in determining passage through pores in the membrane.

Part (d) required candidates to name the molecules which pass out of blood plasma during glomerular filtration. This, too, was well answered with a majority of candidates gaining credit.

Part (e) asked candidates to explain how filtration differs from the processes described in part (c). Only a few candidates gained full credit. A significant number of candidates appeared either to not understand the question or to have sufficient detailed knowledge to gain credit.

Part (f) required candidates to describe what happens to molecules in the glomerular filtrate before urine leaves the kidney. The general standard of answer was pleasingly high, with full descriptions of relevant molecules and their fate during passage through the kidney tubule, and beyond.

Question 2 was concerned with the *location of the diaphragm and aspects of the digestion of fat*. In general, the standard of answer to this question was moderate.

Part (a) required candidates to draw / label the diaphragm in Fig. 2.1. The majority of candidates correctly showed it to be located immediately above the stomach and liver. Common errors included it to be shown too high or too low.

Part (b) asked candidates, using a line labelled **X**, to show where fat is emulsified. A large number of candidates correctly labelled the duodenum.

Parts (c) required a description of the passage of a digested fat molecule from the intestines to the heart. A relatively small number of candidates gave a sufficiently detailed /correct description to score all three of the available marks. While most described the role of the vena cava, many did not go on to mention the role of the lacteals /lymph and the entry into the right atrium of the heart.

Question 3 was concerned with movement of the upper arm and the leg. Overall, the standard of answer to this question was moderate.

Part (a) required candidates to name the type of joint labelled **F** in Fig. 1.3. The large majority correctly identified ball and socket. Where this was not given, a hinge joint was usually given as an incorrect answer.

Part (b) required candidate to draw, in Fig. 3.1, the tendon of insertion of muscle **G** and the tendon of origin of muscle **H**. Relatively few candidates correctly showed the two tendons correctly, with incorrect answers showing either the incorrect tendons or, if correct, the wrong attachment.

Part (c) required candidates to interpret Fig. 3.2 to identify the flexor for the knee joint and to explain their answer. The overall standard of answer was poor, with few candidates showing sufficient knowledge/understanding to score both of the available marking points. The correct identification of **M** as the flexor was relatively uncommon. Many candidates, whilst identifying the wrong muscle, did realise that contraction is a key feature. Weaker candidates identified both the wrong muscle and referred to relaxation.

Question 4 was concerned with aspects of *reproduction and genetics*. The overall standard of answer was pleasingly high.

Part (a) required candidates to identify structures **O** and **P** as shown in Fig. 4.1. The large majority of candidates correctly identified them as nucleus and cell membrane respectively.

Part (b) required candidates to explain what is meant by the term chromosome. Whilst a majority of candidates correctly mentioned either DNA or location of genes / genetic material, a large number did not mention both and therefore could not gain full credit.

Part (c) required candidates to draw a diagram, using the symbols **X** and **Y**, to show how sex is inherited. Most provided full and well labelled diagrams sufficient to gain full credit. The most common errors were a failure to identify male / female on an otherwise correct diagram or identification of the female genotype as **X** instead of **XX**.

Question 5 was concerned with aspects of the *nitrogen cycle*. In general this question was reasonably well answered.

Part (a) required candidates to identify the nutrient cycle involving nitrate ions. The large majority correctly identified the nitrogen cycle.

Part (b) required candidates to outline the use of nitrate ions by the crop plant shown in Fig. 5.1. Most candidates referred to their role in the synthesis amino acids / proteins and growth thereby gaining credit.

Part (c) required candidates to interpret Fig. 5.1 in terms of the concentration of nitrate ions in the soil between time 0 and the planting of the crop. Most candidates correctly referred to the roles of nitrogen fixing and nitrifying bacteria, gaining credit. The use of fertilisers also appeared frequently, but the role of saprophytic bacteria in decay / decomposition less so.

Question 6 was concerned with aspects of *diet / nutrition / food groups and required candidates to interpret pie charts shown in Fig. 6.1*. This question was, in general, well answered.

Part (a) required candidates to compare the components of diet of a girl from country **Q** with a girl from country **R**. The large majority of candidates identified the correct comparisons and gained credit.

Part (b) required candidates to identify good sources of carbohydrates and fats. Once again, the least able were able to do this and gained credit.

Part (c) required candidates to suggest why the girl from country **Q** is more likely to suffer from poor wound healing and constipation as compared with the girl from country **R**. Most candidates were able to link vitamin **C** with relative amounts of vegetables and / or fruit for poor wound healing, and relative amounts of fibre / roughage with vegetable / fruit / cereals for constipation. As a result many candidates gained full credit. Amongst the weakest candidates, guesswork was often apparent.

Question 7 was concerned with *neurones and nerves*. This was less well answered than several of the other **Section A** questions.

Part (a) required candidates to state the difference between a neurone and a nerve. Whilst a majority of candidates made the correct distinction, many did not. A wide variety of incorrect answers were seen amongst the latter, including reference to transmission of impulses and even movement of blood.

Part (b) required candidates to identify the type of neurone shown in Fig. 7.1 and to explain their choice. A majority of candidates correctly identified a motor / effector neurone and gave a valid supporting reason, to gain full credit. The most common error was sensory neuron, but relay / intermediate neurone was also seen.

SECTION B

Question 8 was concerned with the *characteristics of viruses, bacteria, fungi and the life cycle of the housefly and its role in the spread of disease*. In general, this question was well answered.

Part (a) required candidates to describe the characteristics of viruses, bacteria and fungi. The majority of candidates described the characteristics of viruses and bacteria, but fared less well when describing fungi. Lack of relevant distinguishing detail was the most common problem.

Part (b) asked candidates to describe the life cycle of the housefly and to explain its role in the spread of disease. The very large majority of candidates provided full and accurate accounts of both of these aspects, gaining full or nearly full credit. It is clear that this part of the syllabus is well understood.

This question was reasonably well answered by the majority of candidates. The most common error was confusion between larva and pupa in the life cycle. Weaker candidates often referred to houseflies visiting 'dirty places' rather than contact with 'faeces'.

Question 9 was concerned with aspects of *breathing and respiration*. In general, this question was only moderately answered, with lack of relevant detail being a common problem especially in part **(a)**.

Part (a) required candidates to distinguish between breathing and respiration. Descriptions of breathing were often sketchy and inaccurate. There was often confusion between 'air' and 'oxygen' and the relevant roles of oxygen and carbon dioxide were often omitted. A large majority of candidates made no reference to the part played by muscles in breathing. It was noticeable that most candidates gave better descriptions of respiration than they did for breathing. Only a few candidates gained full credit for this part.

Part (b) asked candidates to describe mouth-to-mouth resuscitation, circumstances in which it should be given and its value. Most candidates gave full and accurate descriptions of how it is carried out and in what circumstances, scoring well. Many, however, gave sketchy answers with regard to its value e.g. role of oxygen, stimulation of heart etc.

Question 10 (Either) was based upon the practical advantages and disadvantages of the different methods of birth control. The overall standard of answer to this question was pleasingly high, with a number of candidates gaining full credit. It is clear that this part of the syllabus was well understood by a large majority of candidates.

The large majority of candidates correctly identified methods of birth control, both male- and female-based. The accounts given of the relative advantages and disadvantages of the named methods were also usually both full and accurate. Some candidates, perhaps not having read the question carefully, gave over-detailed

accounts of how each method worked. Candidates should be reminded to carefully read the question and answer what is asked.

Question 10 (Or) was concerned with *water pollution and its effects*. In general, this question was well answered.

Part (a) asked candidates to describe the ways in which water may become polluted. Most candidates gave full and accurate accounts of how this occurs. There was sometimes confusion between fertilisers and pesticides (insecticides, herbicides). Accounts of eutrophication were usually both full and accurate.

Part (b) required candidates to describe the undesirable effects of water pollution. Here, too, answers were full but occasionally were somewhat 'woolly', with the effects of different pollutants not clearly described.