

# HUMAN AND SOCIAL BIOLOGY

Paper 5096/01  
Multiple Choice

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

## General comments

A total of 403 candidates sat this paper and a standard deviation of 9.16 (22.9%) was obtained, with a mean score of 27.33 (68.3%). All the statistics show a distinct overall improvement in the standards shown by the candidates this year. The mean score being 2 marks higher than in December 2008 illustrates this improvement. Only one of the forty questions this year had a facility below 50. This was the genetics **Question 28**. **Questions 4, 6, 10, 16** and **25** each obtained a proportion correct above 80. However, all these statistics illustrate an improvement in standards. Maybe the smaller number of candidates entered means they are selected more carefully. The discrimination index obtained by most questions was particularly good, with the exception of **Questions 26** and **28**.

### Comments on specific questions

#### **Question 4**

In retrospect it is easy to see why this question had a facility of .92. The candidate only had to know that the first stage in the slide preparation was to peel the onion and they had the correct answer.

#### **Question 6 and 16**

These straightforward questions had a facility of .82 and .87 respectively. **Question 6** demands a good understanding of the carbon cycle and **Question 16** the parts of the thorax, so both show thorough teaching of these topics.

#### **Question 10**

While this question had a facility of .86, it is pleasing that so many candidates can correctly interpret experimental results from the examination of bacterial plates. With 4 options and 3 variables to consider we expected this to prove more testing.

#### **Question 26**

The low discrimination for this question is difficult to explain particularly when over half the candidates obtained the correct answer. The top graph shows that the oestrogen from its highest concentration is starting to reduce at point B, so clearly indicating ovulation. The next point C, showing the lowest oestrogen concentration during the cycle, was chosen by nearly a quarter of the candidates. This would be several days too late.

#### **Question 28**

The low discrimination index may indicate that even the better candidates find such genetics questions difficult. This same comment was made in last years report, indicating that teachers should spend more time and consider their methods for teaching genetics. In this question, both parents must be heterozygous for cystic fibrosis, because they have an affected child. Consequently there is a 25% (1 in 4) chance of having a child at each conception with cystic fibrosis.



# HUMAN AND SOCIAL BIOLOGY

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Paper 5096/02

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 number of candidates (approximately 5% total entry) failed to comply with the rubric for **Section B** and answered both **Question 10 (Either)** and **Question 10 (Or)**. Most of these candidates also answered both **Questions 8 and 9**.

In general, the overall performance of candidates slightly improved as compared with recent examinations. The proportion of stronger candidates was again increased, confirming the trend established in recent years. In **Section A**, none of the questions appeared to be especially difficult. In **Section B** most candidates gave relatively strong answers to **Questions 8 and 9**, but found parts of **Questions 10 (Either)** and **10 (Or)** to be more demanding.

## DETAILED COMMENTS

### SECTION A

#### Question 1

- (a) This required candidates to identify blood vessels linked to the heart as shown in **Fig. 1.1**. Whilst stronger candidates provided comprehensive correct answers, weaker candidates often confused vessels which transport *oxygenated* blood with those which transport *deoxygenated* blood. Confusion between vessels associated with the *left* and *right* sides of the heart was common.
- (b) This required candidates to identify heart chambers **G** (*right atrium/auricle*), **H** (*left atrium/auricle*) and **I** (*left ventricle*). Stronger candidates usually provided correct identification. Confusion of the *left* and *right* sides of the heart was again a common failing amongst weaker candidates. Some candidates confused *atria/auricles* with *ventricles*.
- (c) This required candidates to identify vessel F (coronary artery) as being associated, via blockage, with heart failure. Whilst stronger candidates usually provided the correct identification, there was much confusion amongst weaker candidates with a wide variety of incorrect vessels being given.
- (d) This required candidates to list three ways in which the **structure** of arteries is adapted to withstand high pressure. The three relevant features were *thick, muscular and elastic walls*. Weaker candidates often listed features which were not relevant to the question asked e.g. narrow lumen, absence of valves.
- (e) This asked candidates to explain the two readings quoted for blood pressure (120, 80 millimetres of mercury). The answers sought were 120 = systole/ventricular contraction/maximum arterial pressure, 80 = diastole/ventricular relaxation/minimum arterial pressure. The general standard of answer given was disappointing, with many candidates showing little/poor understanding of the subject. Common errors included reference to venous pressure and pulse rate.



- (f) This was concerned with aspects of blood flow to various named tissues/organs during rest and heavy exercise as shown in **Table 1.2**. (i) required candidates to state which two organs show the greatest reduction in percentage blood flow during exercise. The majority of candidates were able to correctly identify *kidneys* and *gut*. Weaker candidates provided a variety of incorrect answers, with guesswork common. (ii) simply required candidates to calculate by how many times blood flow to the muscles increases during exercise. The increase shown was from 22 to 88 giving an increase of 88/22 i.e. **4 times**. Many candidates incorrectly subtracted 22 from 88 and gave the answer 66.
- (g) This required candidates to describe the role of muscular activity in returning blood to the heart from the extremities of the body. In general, the standard of answer was somewhat disappointing with the failure to describe the effect of muscular contraction upon movement of blood in *veins* being a common failing.

### Question 2

This was concerned with aspects of the interpretation of **Fig. 2.1** which showed an experiment to demonstrate the digestion of starch to sugar by an enzyme in saliva.

- (a)(i)(ii) This required candidates to complete **Table 2.1**. More able candidates completed the four spaces correctly, but weaker candidates often showed poor understanding/knowledge of the subject material and provided a variety of combinations of incorrect answers.
- (b) This was concerned with the testing of a sample of liquid for sugar. In general this was reasonably well answered with the *Benedict test* often being adequately described. Many candidates failed to mention boiling being required during the test, and often made only vague references to *heating* or the use of a *water bath*. Weaker candidates erroneously described the use of *biuret reagent* or *iodine*.

### Question 3

- (a) This required candidates to list two ways in which the two sections differed. A majority of candidates correctly identified *production of sweat* and *vasodilation* as being the required differences.
- (b) This required candidates to explain how the differences which they had identified in (a) would increase heat loss from the skin. With regard to sweat, most candidates correctly mentioned *evaporation* but then failed to mention *loss of latent heat from the skin/blood*. With regard to vasodilation, most candidates correctly described *more blood closer to skin surface* (occasionally candidates incorrectly described *the movement of blood vessels*), but often omitted to mention the mechanism of heat loss namely *conduction, convection, radiation*.

### Question 4

This was concerned with the bones and related tissues of the elbow joint, as shown in **Fig. 4.1**.

- (a) This required candidates to identify *cartilage, ligament, tendon, muscle* in **Fig. 4.1**. In general, this was well answered with more able candidates correctly identifying all four. A common error amongst remaining candidates was confusion of *tendon* and *ligament*.
- (b) This required candidates to state two advantages of bone being a living tissue. In general, this was well answered (i.e. *growth, repair*) except by the weakest candidates who often made incorrect reference to *movement*.



### Question 5

This was concerned with female reproductive organs, a vertical section through which was shown in **Fig. 5.1**.

Candidates were required, using label lines and the letters **J** to **N**, where meiosis occurs (*ovary*) a ciliated region (*oviduct/oviduct funnel*) urethra (*passage between bladder and exterior*) where implantation occurs (*uterus*) and where oestrogen is formed (*ovary*). The most able candidates were able to identify all correctly. Weaker candidates usually correctly identified two or three, with the location of **K** and **L** often being problematic. The weakest candidates showed little knowledge/understanding and provided a wide range of incorrect answers.

### Question 6

Candidates were required to complete five spaces in the given descriptive paragraph by selecting their choices from a list of ten terms provided. Many candidates were able to complete the paragraph correctly. Amongst weaker candidates, confusion was evident between *lymphocyte/phagocyte*, *antibodies/antigens*, *serum/plasma*, *passive/active*, *short/long*. In each of the preceding pairs of terms, the correct answer (in the context of the paragraph given in the question) is shown first.

### Question 7

- (a) This required candidates to interpret **Fig. 7.1** (which showed the distribution of rods and cones within the retina) and to state in which part of the retina are (i) the most rods found and (ii) the most cones found. Most candidates were able to interpret **Fig. 7.1** correctly and give the two required answers (*edge of retina* and *fovea* respectively).
- (b) This required candidates to identify region **X** in **Fig. 7.1**. Most candidates were able to correctly identify the *blind spot*.
- (c) This required candidates to state which region of the eye contracts (i) to reduce the amount of light entering the eye (*iris*) (ii) to focus on a near object (*ciliary body/muscle*). A majority of candidates were able to identify (i), but fewer were able to correctly (ii). For the latter, *lens* and *suspensory ligament* were often incorrectly given.

## **SECTION B**

### Question 8

- (a) This required candidates to state the uses of water in the body. The uses sought were *reagent (in hydrolysis)*, *solvent*, *transport*, *constituent of cytoplasm/body fluids*, *lubrication*. A majority of candidates scored at least two of the four available marks, with many scoring all four. The most common failing was candidates listing numerous body fluids, but failing to mention any of the other important uses.
- (b) This required candidates to describe the actions of different parts of the kidney tubule in taking water from the blood and passing it into the urine, for which there were seven available marks. A majority of candidates gave detailed descriptions and usually scored five or more marks. Descriptions of the filtration of water, from blood under pressure, at the *glomerulus/Bowman's capsule* were usually particularly detailed/accurate. Descriptions of *reabsorption* of water into blood in *proximal/distal convoluted tubules*, *loop of Henle* and *collecting duct* prior to passage of urine into *ureter* tended to be less detailed/precise and marks awarded were accordingly lower. Some candidates, including some very able ones, gave a detailed description of the reabsorption of a variety of solutes (glucose, amino acids, ions etc.) into the previously mentioned structures but did not mention **water** as required by the question and thus failed to score the relevant marks. Weaker candidates provided sketchy answers, with the sequence of the passage of water from blood to urine through the kidney often incorrect. Weaker candidates often confused *proximal/distal tubules* and *ureter/urethra*.

Overall, the general standard of answer to **Part (b)** of this question was much higher than the standard of answer to **Part (a)**, and the scores achieved by many candidates reflected this. Nonetheless, this question was reasonably well answered by the majority of candidates. Most candidates scored at least six or seven of the available fifteen marks, whilst scores of thirteen marks or higher were not uncommon.

### Question 9

Candidates were asked to describe the possible hazards to health for the inhabitants of the village. Marks were awarded for a relevant hazard to health being correctly named and linked to a feature which could be seen in (or deduced from) **Fig. 9.1**. Numerous combinations were available from which to score the fifteen available marks. Hazards included *intestinal diseases (typhoid/cholera), tuberculosis, influenza, ringworm, tapeworm, bilharzia (schistosomiasis), tinea, malaria, Weil's disease, mosquitoes, flies, rats, snails* whilst the features included all of those shown in **Fig. 9.1** plus *the effects of flooding, proximity of the latrine and shallow open well*. Many candidates scored relatively highly on this question, which provided the opportunity to draw upon knowledge/understanding of many diseases and their mode of transmission against the background of the interpretation of the information provided in the question. The most common failing, especially amongst weaker candidates, was the provision of a list of (usually relevant) diseases without linkage to the features which could be seen in (or deduced from) **Fig. 9.1**.

Overall, the standard of answer to this question was pleasingly high. The large majority of candidates managed to score at least seven of the available fifteen marks, whilst scores of thirteen marks or higher were relatively common.

### Question 10(Either)

This was based upon alcohol consumption and the effects upon the body. This question was of equal popularity to the **Question 10 (Or)** option, being answered by approximately 50% of candidates.

- (a) This required candidates to state which two organs are affected by long-term excessive alcohol intake. Most candidates correctly identified the *liver* and many also correctly identified *the brain*. Common incorrect answers include the *kidney* and the *stomach*.
- (b) This required candidates to explain why it is very unwise to drive a car after drinking alcohol. Many candidates provided full/detailed answers and scored at least five of the seven available marks. Even the weakest candidates usually managed to score at least two of the available marks. Most candidates managed to describe *reactions slowed, braking time increased, effect upon vision, sleepiness/drowsiness*. Other factors including *poor decision making, poor judgement, reduced coordination, reduced inhibition/increased aggression* appeared less often in answers.
- (c) This required candidates to explain what *alcohol is said to be addictive* means. Many candidates scored at least one of the two available marks, but relatively few gave sufficient detail in order to score the second mark. The *affect of alcohol upon the brain* was usually not mentioned, whilst *the need to take increasing amounts to achieve the same effect* was relatively seldom seen.
- (d) This required candidates to describe how the simple apparatus shown in **Fig. 10.1** could be used to measure the effect of drinking alcohol upon the subject. Overall the standard of answer was generally disappointing with relatively few candidates scoring all four of the available marks. Lack of experimental method/detail was, by far, the most common failing. Many candidates failed to provide any detail at all and simply described that alcohol consumption would have an adverse affect upon the ability to catch the ruler. Of those who did provide experimental detail many described the use of a stop watch (not shown in **Fig. 10.1**) instead of using the graduations on the ruler.

Overall the standard of answer to this question was disappointing, especially (d). High scores of twelve marks, or greater, were relatively uncommon.



**Question 10 (Or)**

This was based upon smoking and the effects upon the body. This question was of equal popularity to the **Question 10(Either)** option, being answered by approximately 50% of candidates.

- (a) This required candidates to state two possible effects on the body of smoking cigarettes for a long time. Many candidates correctly identified *bronchitis*, *emphysema*, and *heart disease*, but fewer made reference to *addiction*. *Cancer* was often given, but many candidates failed to specify either *lung/mouth/tongue/throat* which was required to score one of the two available marks.
- (b) This required candidates to explain why a woman who smokes when she is pregnant is likely to have smaller than average babies. In general, this part of the question was well answered, with a majority of candidates scoring four or more of the available seven marks. The roles of *nicotine* and *carbon monoxide* in reducing foetal growth were generally well understood, although the links between these substances and *respiration/energy release/growth* were often sketchily described and, sometimes, not mentioned at all.
- (c) This required candidates to state what is meant by the term *vital capacity*. A majority of candidates manages to score one of the two available marks. In most such cases, lack of detail (especially with regard to *exchange*) was the reason for failure to score the second mark. Weaker candidates usually showed poor knowledge/understanding of *vital capacity*.
- (d) This required candidates to describe how they would use apparatus shown in **Fig. 10.2** to measure the effect of prolonged smoking upon vital capacity. Stronger candidates usually provided detailed answers and scored three or four of the available four marks. A significant number of candidates gave accounts which were sketchy and lacking in experimental method/detail. A common omission was the need of a subject to *inhale fully* before *exhaling as deeply as possible into the tube*. The need to use *groups of smokers and non-smokers* in the experiment for *statistical validity* was seldom given.

Overall the general standard of answer to this question was mixed. The most able candidates often scored all of the fifteen available marks, but the majority of candidates scored between seven and twelve marks.

