CONTENTS

FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

HUMAN AND SOCIAL BIOLOGY

GCE Ordinary Level

Paper 5096/01
Multiple Choice

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

General comments

This year a standard deviation of 6.364 (15.9 %) was obtained. The mean score was 25.15 (62.3 %) which is again higher than the previous year.

These numerical statistics are the best ever for this Paper and these statistics have progressively improved over the last three years. This partly reflects an increase in the standards shown by the candidates.

Questions 2, **4**, **10**, **12**, **19**, **32** and **36** all proved easy, with facilities over 0.80. Undoubtedly this shows an increase in the ability of the candidates entered. It is perhaps fortunate that the more difficult questions **3**, **6**, **17**, **23** and **29**, all with facilities below 0.39, proved difficult and redressed the balance for the Paper overall. Over half of the questions that were found easy by the candidates, were testing the social aspects of the Syllabus. This also reflected a good standard of knowledge in health and hygiene. Those questions found more difficult frequently tested interpretation and problem solving.

Comments on specific questions

Question 4

It must have been obvious that bone is not present in both the kidney and the heart and they proved totally ineffective distractors. The tooth was expected to prove a more difficult distractor, but perhaps it was too obvious that it lacked muscle.

Question 6

This proved the most difficult of all the questions on the Paper, with an almost equal number of candidates responding to each option.

Question 17

The positive distractor, chosen by half the candidates, shows they thought the diaphragm is raised during inspiration. This lack of understanding once again shows that the mechanics of breathing continues to prove a very difficult concept. The bell jar demonstration is a most useful aid to prevent misconceptions.

Questions 24

This question tests awareness that in a bright light, the pupil of the eye gets smaller and the iris enlarges due to contraction of the circular muscles. Although the facility here is ideal, the low discrimination indicates that the more able candidates could not deduce this answer. Perhaps candidates who obtain high scores overall rely on memory and are not so strong in deductive skills.

Question 29

The common knowledge tested in this question is that the contraceptive pill is the most effective of these forms of birth control. It is easy to see that **C** proved such a popular distractor because it coincides with the order in which the methods are listed in the question.

Question 32

Once again, a question which proved easy. However, it is heartening to know that candidates well understand the socially significant aspects of this Syllabus, such as the signs of gonorrhoea and AIDS.

Paper 5096/02

Paper 2

General comments

This Paper produced a wide range of marks from one to eighty-eight percent. Very few candidates failed to obey the instructions in ***Section B*** by answering both alternatives in **Question 10**, but a small percentage answered only two questions from this section instead of three. A significant number failed to limit their answers to the precise questions asked and may thus have run short of time. This was especially evident in ***Section B*** **Question 8**, where many described the entire blood-flow through the heart, instead of just that of oxygenated blood, as requested.

Comments on specific questions

Section A

Question 1

(a) The element all proteins contain, apart from carbon, hydrogen and oxygen, is nitrogen. Not sulphur or phosphorus.

(b) To test for protein add biuret solution and look for a colour change from *blue to mauve/purple*. Most candidates scored 2 here out of 3 by not mentioning blue.

(c) Enzyme **A** is pepsin/rennin or a protease. Enzyme **B** is trypsin/erepsin or a peptida… generally well-answered, although a few confused the two enzymes.

(d) From the graph, **B** is active in alkaline conditions and its optimum pH is 9. Common errors w… give a wide range of pH, while some referred to temperature!

(e) The function of villi is to increase surface area or to absorb the products of digestion; mucus protects the lining, lubricates the passage of the contents or maintains an alkaline pH; the muscle layers move, mix the contents of the gut or carry out peristalsis. Some answers here were too vague referring to 'movement' or 'moisture'.

(f) The answers expected here were: haemoglobin; antibody/antitoxin; fibrin; collagen and a suitable hormone such as insulin, glucagon, GH or ADH. Adrenaline and thyroxine are amino-acid derivatives not protein-based and sex hormones are steroids.

(g) Process **A** is deamination; **B** is respiration or oxidation. **X** is urea, not urine-a common error and process **A** occurs in the liver not the kidney. This was generally well-answered, although weaker candidates described the processes rather than *naming* them as requested.

Question 2

(a) Two symptoms of influenza include fever, headache and joint pains, not sweating or coughing which are *signs*.

(b) The pathogen is a virus and it is transmitted by droplet infection or airborne.

(c) Isolation or vaccination will limit the spread.

(d) One may catch it again because there are several different strains of the virus. Many answers were too imprecise here to score the mark.

Question 3

Generally poorly answered, with many candidates unable to transfer their knowledge of the reflex arc to a different situation. Sensory neurones only are found at **B** or **C**; motor neurones only at **G**; sensory and motor at **A**; sensory neurone cell bodies at **C** and motor neurone cell bodies at **F**. Many answers were guesses.

Question 4

This question on ovarian hormones and the menstrual cycle was often well answered with full marks not uncommon.

(a) **R** is estrogen; **S** is progesterone.

(b) **R** is produced by the follicle or ovum (not the *ovary*); **S** by the corpus luteum.

(c) The increase of **R** thickens or repairs the lining (not the *wall*). The decrease in **S** leads to shedding of the lining or menstruation.

(d) Ovulation occurs around day 14 - not necessarily *fertilisation.*

(e) Hormone levels remain high if fertilisation, implantation or pregnancy occur.

Question 5

This question on the synapse gave a diagram and an explanatory paragraph which candidates were expected to use in order to suggest what would happen in different situations. Although the necessary information was there, most candidates failed to use it and consequently scored poorly here.

(a) The delay is caused by the *diffusion* of the transmitter - a slow process. Transmission is only from **P** to **Q**, since only **Q** has the receptor molecules or only **P** has the source of the transmitter or since diffusion is from a higher concentration (**P**) to a lower one(**Q**). Any one of these answers was acceptable, the last being the commonest.

(b) If there were no enzyme to break down the transmitter, it would remain bound to the [illegible] that **Q** would keep firing impulses and the muscle innervated by Q would *stay* contracted.

(c) **X** is a mitochondrion. Many candidates got this last mark.

Question 6

(a) **V** has 5 million cells per mm^2 while **W** has 8 million. The percentage by which **W** is higher than **V** is 8-5/5 x 100 = 60%. Very few candidates could perform this calculation.

(b) **W** trained at high altitude, since his cell count is higher.

(c) **V** recovers more slowly from a long race, since having less red cells his blood will carry less oxygen; so it will take longer to pay off his oxygen debt or break down his lactic acid. Many candidates saw the first point but did not link it to the lactic acid.

(d) Iron is the mineral deficiency that leads to a lower red cell count-not *anaemia* - which is the state of a low red cell count.

(e) A possible danger of a high red cell count is that there is more chance of the blood clotting or clumping. Few candidates saw this point.

Question 7

(a) The differences shown in the blood flow between **C** and **D** included: in **D** the arteriole was dilated; the shunt was constricted; the venule was wider; the capillaries carried more blood. However, *the capillaries are dilated* was not accepted.

(b) Two other muscle-induced effects in the skin apart from vasoconstriction are shivering and erection of the hairs or *goosebumps.*

Section B

Question 8

(a) Oxygenated blood flows via the pulmonary vein into the left atrium. When the atrium contracts blood flows through the bicuspid valve into the relaxed left ventricle. When full the ventricle contracts, forcing blood through the semi-lunar valves into the aorta. Each of the valves prevents the backflow of blood, by closing, when the pressure of blood is greater on one side of the valve than the other. There were some 13 marking points here for 8 marks and many candidates scored maximum points. A substantial number, however, described both oxygenated and deoxygenated flows through the heart and so wasted a lot of time.

(b) The arteries passing from the aorta into the heart muscle are the coronary arteries-not the *carotid or the pulmonary arteries.*

(c) The effect of blocking these by deposits of fat will be to reduce flow to the heart *muscle*, thus depriving it of oxygen or glucose. Hence its contractions will become weaker, so less blood will be pumped to the rest of the body. Many candidates registered there would be reduced flow to the body without explaining the role of the heart muscle and their coronary arteries and so scored poorly here.

Three ways of reducing the build-up of fat in these arteries or its effects include: stop smoking; reduce alcohol intake; reduce animal fat/cholesterol in the diet, reduce stress and take regular exercise. This section was generally well-answered.

Question 9

In spite of the familiarity of the topic examined by this question, relatively few answers scored well h… many answers were imprecise or not directly related to the question.

(a) Three structural features showing the adult mosquito to be an insect were: wings, *three* pairs … legs and body divided into head, thorax and abdomen. Having a segmented body, antennae or legs are not specifically insect characteristics, being present in several classes of Arthropods.

(b) Not all mosquitoes carry malaria since, only adults are vectors. Of adults only females are implicated since only they bite and suck blood - the males feed on plant fluids. Some species carry other diseases, not malaria. Not all species bite man - the Anopheles being the main carrier. Of these, only those females which have previously bitten an infected man will carry the parasite. Three points were required here with many scoring 2 or 3.

(c) Methods to attack each stage of the life-cycle expected were:

egg; drain swamps, speed flow in drains, empty tins, add fish etc.

larva; introduce fish/Gambusia, add kerosene. Add Bacillus Thuringiensis, insecticides.

pupa; fish, kerosene, insecticides.

adult; insecticide, catch males, sterilize and release.

While knowledge was generally good in this section, many failed to use a different method for each stage as requested, or did not identify which stage they were talking about.

(d) The fever occurs since the parasite is reproducing inside the red blood cells; causing them to burst every two or three days; releasing toxins which affect the body thermostat. This section was often poorly answered with incorrect cells identified and little mention of the toxins or the effect on the brain.

(e) Two reasons for the increase are: the parasite is becoming resistant to the drugs used; the drugs are too expensive for prophylaxis in malarial areas and the mosquito is becoming resistant to commonly used insecticides. Few candidates appeared to be aware of these problems or be able to suggest the dangers of increased travel to malarial areas or of mosquitoes being carried to other areas in aeroplanes.

Question 10

EITHER

(a)(i) When focusing on a near object the ciliary muscle contracts, slackening the suspensory ligaments. The lens becomes 'fatter' - shortens focal length and the cornea bulges, each producing more refraction. The incident rays now converge on the *fovea*.

(ii) The vitreous humour maintains the shape of the eyeball, pushing out the wall when the ciliary muscle relaxes. This pulls the suspensory ligaments which, in turn, pull the lens flatter. Hence refraction is reduced so that distant objects are now focused. The vitreous humour is also transparent to allow the rays to pass through.

There were the usual confusions between the ciliary and iris muscles in part **(a)** but it was in **(ii)** that most candidates struggled to find an answer. The function of the vitreous humour is not well understood.

(b) Since blue is recessive, each blue-eyed parent must be bb. Marks were awarded for a simple diagram showing the two parents' genotypes, those of the four gametes and the possible offspring - here all bb. A Punnett square was ideal for this.

If each brown-eyed parent is heterozygous (Bb), then one in four of the offspring will be blue-eyed. Again a simple diagram sufficed to score the marks. Many candidates knew this but scored only four, not six, by failing to show the parents involved in their diagrams, or if they showed the parents, they omitted the gametes. Nevertheless, this was usually well-answered.

OR

(a) Tetanus is caused by a bacterium. Antiseptics are used to clean the wound by killing the there. Antiseptics are for external use only. Antibiotics can be taken internally, by tab injection. Antibodies also work inside the body, being made by lymphocytes in response to antigens. They may be given in a serum to reduce the symptoms or induced by a vaccine beforehand. Antitoxins, also made by lymphocytes, neutralise the toxins released by the tetanus bacilli inside the body.

Most answers lacked detail or failed to apply to the tetanus infection and there was much confusion between the various categories described above.

(b) A serum has a more rapid effect than a vaccine, which takes time to build up the necessary antibodies; so the serum can be given to a patient to treat the disease. Unlike the serum, the vaccine's effect is long-lasting and it can be given beforehand to prevent the disease.

Once again there was much confusion between the terms serum and vaccine. Where these terms were understood, detail was usually lacking.