

CARIBBEAN EXAMINATIONS COUNCIL

**REPORT ON CANDIDATES' WORK IN THE
SECONDARY EDUCATION CERTIFICATE EXAMINATION**

JANUARY 2012

**HUMAN AND SOCIAL BIOLOGY
GENERAL PROFICIENCY EXAMINATION**

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GENERAL COMMENTS

The 2012 examination was the seventh January sitting of Human and Social Biology, offered at the General Proficiency level.

The format of the examination was different from that of previous years. There was no change to Paper 01 which consisted of 60 multiple-choice items. However, Paper 02 now consists of six compulsory questions, four of which are structured (Section A) and two of which are essay questions (Section B). Each question is worth 15 marks. Teachers should note the following:

- The four structured questions are longer and a single question attempts to integrate several areas of the syllabus.
- The questions in this paper assume that students would have benefited from the opportunities of learning provided by field trips.
- There has been little change to the essay components.
- Teachers should be mindful that Question 1 in Paper 02 will always involve the analysis of data.

DETAILED COMMENTS

Paper 01 – Multiple Choice

Candidate performance was average. The areas that presented difficulties were:

- Osmosis
- Food tests
- The structure of mature red blood cells
- The function of a motor neurone
- Identifying endocrine glands
- Methods of controlling tuberculosis
- Impact of organic fertilizers on a river

Paper 02 – Structured Essay

Question 1

This question tested candidates' knowledge of the water cycle, agricultural activities that may cause water pollution and waterborne diseases. The data analysis section of the question dealt with the relationship between pollutants and percentage increase of cancers. There was also a diagram of an experiment about bacterial growth being conducted.

This question was relatively well done. Most candidates were familiar with the water cycle and waterborne diseases. However, they were unsure about agricultural activities and focused on pollution to rivers instead. Most candidates thought that the Petri dish from the experiment would break but did not mention the likely effect on the individual conducting the experiment.

The construction of the histogram for the data analysis section of the question was well done by most candidates. However, linking the data between the graph and the questions asked posed a problem for the majority.

Recommendations to Teachers

Teachers should guide students in the use and interpretation of statistical data, for example, graphs, charts and tables. More attention should also be given to practical activities as well as cause and effect.

Question 2

This question tested candidates' knowledge and understanding of the cardiovascular system, and involved labelling the parts of the heart, differentiating between arteries and veins, relating the functioning of the heart to that of a pump and problems associated with weak heart muscles.

This question was poorly done. While most candidates were able to correctly label the diagram of the heart and were aware of the differences between arteries and veins, they discussed the effects of hypertension on the individual rather than on the left side of the heart.

Some common misconceptions included confusing the bicuspid for the tricuspid valve, and using the term 'aorta' interchangeably with 'atrium'.

Recommendations to Teachers

Students should practise drawing and labelling diagrams of the cardiovascular system. Emphasis should be given to the proper functioning of the heart, how blood flows through the heart and the pressure differences associated with the right side versus the left side of the heart and the associated reasons. Health professionals could also be invited to give presentations on the effects of hypertension on the individual as well as on the heart itself.

Question 3

This question tested candidates' knowledge of the advantages and disadvantages of sexual and asexual reproduction, examples of asexual reproduction, the relationship between oestrogen and ovulation, the role of the lining of the uterus in pregnancy and the hormone which causes the lining of the uterus to thicken. Candidates were also asked to respond to ways in which a new contraceptive, that was specifically designed to target the lining of the uterus, would prevent pregnancy.

This question was poorly done. Most candidates were only able to score between 1 and 3 marks out of the possible 15 marks.

Most candidates viewed sexual reproduction as sexual intercourse/family planning and thus gave advantages and disadvantages relating to humans and family life. Regarding asexual reproduction, they associated it with same-sex relationships, artificial insemination or the absence of sexual intercourse in order for offspring production.

While most candidates were aware of the relationship between oestrogen and ovulation, they simply did not know the effects that hormones have on the lining of the uterus.

Ideal answers for (b) (iv) would have been that *the new drug could directly prevent the lining of the uterus from becoming thick, therefore making implantation improbable or the new drug could have caused the progesterone levels to remain low, and therefore the lining would not have developed.*

Recommendations to Teachers

Teachers need to stress the differences between types of reproduction and the difference between reproduction and intercourse (copulation). Models should be used to highlight the structure and associated function of the parts of the reproductive system. The meanings of terms, for example, *describe, suggest, define*, should be taught and emphasized.

Question 4

This question tested candidates' knowledge of homeostasis, excretion, the functions of the renal tubule, and the path of carbon dioxide from the time it is produced by the cells in the body to the time it reaches the air sacs in the lungs.

Candidate performance was poor. Most candidates scored between 0 and 6 out of a possible 15 marks.

Most candidates were unable to define the term *homeostasis*. They referred to it as having to do with temperature only. Some common misconceptions were: 'Homo' referred to sexuality; Homeostasis versus heterozygous; Homeostasis dealt with functions of hormones; Excretion could be equated with ejaculation or erection; Excretion meant getting rid of faecal matter.

Regarding the path of carbon dioxide from its production to its excretion, this was explained in the reverse, that is, the path of inspired air from the nasal passage to the lungs.

An ideal answer should have been as follows:

When carbon dioxide is produced, it is transported in the blood within veins until it enters the heart. The carbon dioxide is then transported in the blood via the pulmonary artery to the lungs, passes through the bronchial tree until it enters the capillaries surrounding the air sacs in the lungs.

Recommendations to Teachers

Teachers should include more practical activities to teach this topic. Structure and function need to be linked. The phases of urine production need to be clearly taught.

Question 5

This question tested candidates' knowledge of the definition of health, categories of diseases and treatment and immunity.

The performance on this question was poor. Candidates were unable to give a comprehensive definition of health and were unaware of the categories of diseases. It was pleasing to note that they were very familiar with asthma, its triggers and forms of treatment.

Candidates were also knowledgeable about the necessity of vaccinations but were unable to describe types of immunity. Part (c) presented the most difficulty. Some common misconceptions were as follows: the mother passes her immunity as a disease to the child and this disease is cured by the vaccination; vaccinations are injections containing antibodies.

A model answer to this question would have been:

Natural passive immunity: this type of immunity involves antibodies being produced by the mother which are then passed onto the developing foetus.

Recommendations to Teachers

Teachers should ensure that students know the meaning of the following terms: *antigen, antibodies, vaccination, immunity* and the context in which these terms are used.

When studying the systems of the body, the diseases associated with these systems should also be discussed concurrently.

Question 6

This question tested candidates' knowledge of functions of the skeleton other than movement, joints and movements associated with joints, the interactions between muscles, bones and tendons, and the functions of synovial fluid.

Performance on this question was poor. Few candidates were able to state the functions of the skeleton and were familiar with different types of joints and their associated movements. Candidates mentioned face joints, back joints and double joints. They were also confused about the difference between ligaments and tendons and thought that tendons were actual blood vessels which carried nutrients.

A good response to Part b (i) would have been:

The radius is one of two long bones of the lower arm. Lifting the lower arm involves contraction of the biceps muscle. The lower end of the biceps is joined to the radius by tendons. Since the tendons are severed, the radius (the arm) would not be pulled up when the biceps contract and Tdoosy would not be able to lift anything.

Recommendations to Teachers

When teaching the skeletal system, students should be encouraged to draw and label diagrams on this system. There are also excellent presentations on YouTube which clearly illustrate the interaction between muscles, bones and tendons. More visual aids should be utilized when teaching these systems so as to ensure that students thoroughly understand what is being taught.