

CARIBBEAN EXAMINATIONS COUNCIL

**REPORT ON CANDIDATES' WORK IN THE
SECONDARY EDUCATION CERTIFICATE EXAMINATION
MAY/JUNE 2009**

HUMAN AND SOCIAL BIOLOGY

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HUMAN AND SOCIAL BIOLOGY
GENERAL PROFICIENCY EXAMINATION
MAY/JUNE 2009

The 2009 examination was the fifth June sitting of Human and Social Biology, offered at the General Proficiency level.

The format of the examination was the same as in previous years. Paper 01 consisted of 60 multiple-choice items. Paper 02 consisted of ten compulsory structured questions in Section A and four essay questions in Section B, of which candidates were required to answer any two.

General Comments

Candidate performance improved significantly over performance in 2008. Seventy-eight per cent of the candidates achieved acceptable grades, Grades I to III in 2009, as compared with 68 per cent in 2008.

This improved performance was due largely to improved performance in Paper 02. Performance on Paper 01 declined, from a mean of 62 per cent in 2008 to a mean of 56 per cent in 2009.

DETAILED COMMENTS

Paper 01

Candidate performance declined in 2009. Responses showed that candidates found difficulties with the following topics:

- Osmosis and diffusion
- Identifying a tendon of origin of the triceps
- Homeostasis
- Inheritance of characteristics – genetics
- Identifying an example of a degenerative disease – arthritis
- The specific nature of antibodies
- Polluting activities of human beings
- Biological filter method

Paper 02

Question 1

This question tested candidates' understanding of the carbon and nitrogen cycles as well as the part of the respiratory system responsible for gaseous exchange.

Candidates were unable to differentiate between the processes of nitrification and denitrification and the role of bacteria in these processes.

It is recommended that models be used when teaching these concepts. Role-playing activities can also be used with students acting the parts of the bacteria in the different processes.

Question 2

This question tested candidates' knowledge of the endocrine system in general and its association with diabetes mellitus in particular.

Some candidates unfortunately named the hormone associated with the glands instead of the glands themselves. They were also unable to say what makes a gland an exocrine or an endocrine one.

Part (ii) of this question was poorly done. Candidates were able to obtain only one of the three marks allocated to this part of the question. A common misconception was the use of glucagon and glycogen interchangeably.

It is recommended that

- (i) human models be used when teaching the location of these glands
- (ii) students be exposed to how glands themselves are formed so that they can clearly understand that ducts are associated with exocrine glands while endocrine glands are ductless.

Question 3

This question tested the candidates' knowledge of the importance of certain nutrients in the diet, as well as the importance of water in the human body.

Responses were satisfactory. Most candidates had a fair idea of what malnutrition is. However, the responses to the effects of anorexia nervosa were inaccurate. Some common misconceptions were that fear of obesity, shaky hands and tiredness were effects of anorexia nervosa. Another common misconception was that water is an energy source and provides nutrients.

Recommendations: Guest lecturers could be invited to the school to discuss these disorders. Students could also be given class projects to determine the functions of water, thus encouraging them to read more. The biological terms should be emphasized.

Question 4

This question tested candidates' knowledge of the methods of birth control, abortion, how the contraceptive pill functions to prevent pregnancy and the benefits of having few children in a family.

It was fairly well done. However, candidates had difficulties in differentiating between natural and artificial methods of birth control.

Some common misconceptions were that abortion, salt, Pepsi, Epsom salts, vaccines and hot Guinness can be used as artificial methods of birth control.

Candidates were unable to say how the pill prevents pregnancy. Some misconceptions were as follows:

- ATP is a hormone found in the pill.
- The pill prevents the sperm from developing.
- The pill blocks the ovary.
- The pill kills the sperm.
- The pill washes the sperm from the womb.

Recommendations: Personnel from the Family Planning Association could be invited to give lectures on methods of contraceptives and family planning.

Question 5

This question tested candidates' knowledge of diseases,

Performance was satisfactory.

Some common misconceptions were:

- Global warming destroys the ozone layer and causes skin cancer and a lack of oxygen.
- A pollutant is any material which affects the environment.

A good response would have been:

Pollution is the harming of the environment due to the activities of human beings.

Recommendations: Encourage students to participate in group discussions to promote a clear understanding of the concepts.

Invite resource persons to give lectures on global warming and its effects.

Use audio-visual aids to help to clarify misconceptions and emphasize key terms.

Question 8

This question addressed waste disposal, its effects on the environment and the difference between the terms 'biodegradable' and 'non-biodegradable'.

It was well done. However, some common misconceptions were:

- Non-biodegradable meant 'can be recycled'.
- Anything that is degradable is biodegradable.

Acceptable responses were:

Non-biodegradable means that something cannot be broken down or decayed.

Recommendations: Experts in areas of solid waste management could be invited to have discussions with students.

Video presentations and visits to landfills will provide students with concrete exposure to how solid waste is treated.

Question 9

This question tested the candidates' knowledge about bacteria, cholera and HIV/AIDS.

Overall performance on this question was satisfactory.

Part (b) of the question was very poorly done. Candidates showed that they were unaware about culturing bacteria and the concept of 'controls'.

Some common misconceptions about the methods of preventing the spread of HIV were:

- Isolation of HIV victims
- Usage of contraceptives.

A good answer should have been 'Practise safe sex/ Avoid contact with human blood/ body fluids'.

Recommendations: Simulations of experiments should be done so that students would observe how laboratory exercises should be conducted. This will also expose them to key concepts without having to actually conduct the experiment.

Video presentations on HIV and the development of AIDS should be shown, following which there should be class discussions.

Question 10

This question tested candidates' knowledge of locomotion and its importance, functions of the skeleton, cartilage, ligaments and tendons. The question was relatively well done.

Some common misconceptions were:

- Locomotion has to do with any movement and not necessarily movement from one place to another.
- Thin cartilage will cause bones to break.

A good response would have been:

- Locomotion is the ability to move from place to place.
- Worn, thin cartilage can
 - a) make walking difficult or make it harder for joint movement;
 - b) result in pain when the bones rub against each other.

Recommendations: Invite medical personnel to give lectures on the subject areas. Models should be used so that students have a clearer idea of the effects of worn, thin cartilage.

Question 11

This question tested the candidates' knowledge of genetics. Not many candidates attempted this optional question.

Parts (a) and (b) were fairly well done. Part (c) was well done while Part (d) was poorly done.

Some common misconceptions were:

- Mitosis/ meiosis can be used interchangeably with asexual/ sexual reproduction.
- Antibiotics, wrapping cuts tightly, applying pressure to wounds and using Vitamin K are all methods for treating hemophilia.

A good answer for method of treating hemophilia would be 'treating with clotting agents'.

Recommendations: Teachers must be very careful about not giving students misinformation.

Question 12

This question dealt with microorganism and sterilization methods, personal hygiene and its maintenance and the housefly and how it transmits disease.

This was the most popular question of the four optional questions and it was relatively well done. Parts (a) and (c) (i) presented some difficulties to the candidates.

Some common misconceptions were:

- Antibiotics and antibodies can be used interchangeably.
- Antibiotics can be used to treat viruses and other microorganisms.
- Fly detection is related to egg-laying.

Candidates were also unsure of the meaning of the term ‘sterilization’. A good answer would have been ‘the destruction of microorganisms present’.

Recommendations: Use audio-visuals so that students can clearly see how flies transmit microorganisms.

Use microscopes so that students can have a clearer vision of bacteria.

Prepare agar cultures for the visualization of the growth of bacteria.

Question 13

This question tested the candidates’ knowledge of large-scale water purification, lifestyle diseases and sexually transmitted infections.

Some common misconceptions were:

- Fluoride is added to drinking water to improve its taste/ to destroy bacteria.
- Lung cancer can be caused by alcohol consumption.

Most candidates wrote that chlorination is important for water purification. A good answer would have been that it is used to remove harmful bacteria.

Candidates were also confused about the signs/ symptoms of gonorrhoea and syphilis. Good answers for signs/ symptoms of gonorrhoea would have been blocked oviducts, discharge of pus from the penis, and arthritis, while those for syphilis would have been body rashes, red ulcers, and fatigue.

Recommendations: More emphasis should be placed on differentiating between the signs/ symptoms of various sexually transmitted infections.

Medical personnel should be invited to give lectures/ group discussions on the effects of alcohol, obesity and sexually transmitted infections.

Question 14

This question tested the candidates’ knowledge of the heart, blood vessels, atherosclerosis, vasodilation and vasoconstriction.

This was not a very popular question but it was relatively well done.

Candidates were unable to tell the difference between the right and left sides of the heart and could not correctly spell the names of the vessels. Explaining how the heart functions as a double pump also posed a problem.

Regarding differences between arteries and veins, candidates focused on the fact that arteries carry oxygenated blood while veins carry deoxygenated blood only. A good answer to this part of the question could have been: 'larger lumen in veins/ smaller lumen in arteries; or veins may have valves/ valves are not present in arteries'.

Recommendations: Use DVDs/ human models as teaching aids.

Emphasis should be placed on correct spelling of terms and anatomical structures.