

**C A R I B B E A N   E X A M I N A T I O N S   C O U N C I L**

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

**MAY/JUNE 2014**

**HUMAN AND SOCIAL BIOLOGY  
GENERAL PROFICIENCY EXAMINATION**

## GENERAL COMMENTS

The 2014 examination was the tenth June sitting of Human and Social Biology offered at the General Proficiency level. E-marking was done in this subject area for the first time. While there were many challenges, marking was completed in a timely manner.

There was no change to the format of the examination. Paper 01 consisted of 60 multiple-choice items and Paper 02 six compulsory questions, four of which are structured (Section A) and two of which are structured 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 benefitted 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 would always involve the analysis of data.

## DETAILED COMMENTS

### Paper 01 – Multiple Choice

Candidate performance on Paper 01 was consistent with performance in previous years. The following areas proved challenging for some candidates:

- Formula for Body Mass Index
- Full complement of deciduous teeth in infants
- Substances transported by the blood
- The position of the main lymph glands facilitating draining of lymph from major parts of the body
- Identifying the phenotype, not genotype, from a genetic cross
- Gases that do not contribute to acid rain, for example, carbon monoxide
- Water entering the atmosphere by respiration, transpiration and precipitation

### Paper 02 – Structured Essay

#### Question 1

SPECIFIC OBJECTIVES: D.8, 10

This data analysis question tested candidates' knowledge of HIV/AIDS: the ways in which it is transmitted; the associated signs and symptoms; the cell that is specifically targeted and destroyed by the virus; and why though transmitted via unprotected sex, it is not referred to as a venereal disease. Candidates were also required to construct a bar graph of the incidence of HIV/AIDS versus related deaths within various countries and do a comparative study. Suitable responses on the effects of a high incidence of AIDS on the countries were also required.

#### **General Performance of Candidates**

This question was fairly well done.

#### **Specific Areas of Good Performance**

- Most candidates were able to state at least one way in which HIV can be transmitted within a population and were relatively knowledgeable regarding the symptoms of AIDS. However, there are still many misconceptions relating to the spread of HIV. Several candidates said that it can be spread by kissing, mosquito bites and via toilet seats. Popular responses such as, weakness, weak immune system, lack of appetite, diarrhoea, sores and rashes were given. Major misconceptions were

tiredness, lack of energy, vomiting, hair loss and hair becoming pretty. Most candidates correctly stated that it is the T-lymphocyte that is specifically targeted and destroyed by the HIV.

- Part (d) required candidates to state which countries had the highest and lowest number of deaths due to AIDS and to suggest one reason why Cuba had less deaths than the Bahamas. This was well done. Candidates were successful in getting at least one mark by relating the lower deaths in Cuba to their advanced health services, health care, available medication, national awareness of the disease and their healthy life style. They were also able to state reasonable effects that a high incidence of AIDS would have on the mentioned countries.

### **Specific Areas of Poor Performance**

- Candidates continue to give vague responses for signs/symptoms of AIDS. For example, instead of stating “*extreme fatigue*”, they stated “fatigue”.
- Very few candidates stated that both AIDS and venereal diseases are spread via sexual contact. They did not bear in mind that though AIDS is spread by sexual contact, it is also spread by other means.
- Candidates are still unable to correctly plot a graph and often omit the legends.

### **Recommendations to Teachers**

- Commendations to teachers. Most candidates have a good working knowledge on this topic.
- More emphasis should be placed, however, on the review of terms such as venereal diseases, which are commonly used but students who are not absolutely clear as to its meaning.
- When reviewing signs and symptoms of diseases, special attention should be given to specific information relating to individual diseases, especially since many signs and symptoms are common to different diseases.
- Short video-clips involving the spread/symptoms of AIDS and the use of visual aids will serve to reinforce how HIV/AIDS is spread as well as its symptoms. Research via the Internet or other sources is a viable method for reinforcing and internalizing information. Students can also be challenged to engage in research and produce brochures on this subject, as well as write skits in order to disseminate the information.
- The skill of drawing bar/line graphs needs to be taught; this includes determining scales, plotting of points and labelling of axes. An interdisciplinary approach can also be used (Mathematics/Human and Social Biology).

### Question 2

SPECIFIC OBJECTIVES: A. 2, 4, 1

This question tested candidates’ knowledge of plant organelles and their functions; similarities and differences between viruses and plant cells; recognition and classification of different cell types; and characteristics of living organisms.

### **General Performance of Candidates**

This question was moderately well done.

### **Specific Areas of Good Performance**

- Part (c) (ii) – Most candidates were able to correctly state that the cells were differentiated.
- Part (d) – Most candidates were able to name at least two characteristics of living things that were illustrated by the children who were playing in the park.

### Specific Areas of Poor Performance

- Part (a) (i) – Most candidates stated that the nucleus was the cytoplasm and the endoplasmic reticulum was starch granules. They were also confused about the function of the mitochondria and chloroplast, stating the function of the mitochondria was the function of the chloroplast and vice versa.
- Part (b) – Most candidates were unaware of the features of a virus and repeatedly stated that the nucleus is a common feature of both a virus and a typical plant cell.
- Part (e) required candidates to explain why whether a flame is a living organism because it moves, grows and reproduces by spark. Most candidates were able to state that flames are not living but were unable to substantiate their response. A good answer would have been that flames do not exhibit all of the characteristics of living things, neither do they possess cells.

### RECOMMENDATIONS TO TEACHERS

- Emphasis should be placed on the identification of the organelles within the cell.
- Emphasis should also be placed on identifying organelles based on shape and appearance.
- Teachers should use a number of teaching strategies like drawing, making models and viewing cells under the microscope.
- Teachers MUST spend more time on the first part of the syllabus – Section A, that is, the structures and functions of parts of the cell, PARTICULARLY the plant cell.
- Students should be taught how to draw and label diagrams.
- Differences between breathing and respiration should be emphasized.
- Emphasis should be placed on the differences between living and non-living things.

### Question 3

SPECIFIC OBJECTIVES: B1.20 – 24; B1.14; D.2

This question tested candidates' knowledge of the organs of the digestive system and their functions; the food groups which are digested by the enzymes in pancreatic juice; deficiency-related diseases; conditions under which enzymes are functional; and the importance of chewing one's food properly.

### General Performance of Candidates

This question was relatively well done.

### Specific Areas of Good Performance

- Parts (a), (b) (i) and (ii), and (c) (i) and (ii) were well done. The most popular response for the function of the liver was that it produces bile.
- Good responses for deficiency-related diseases were:
  - Carbohydrates – *Marasmus*
  - Fats – *Fat soluble deficiency*
  - Proteins – *Kwashiorkor*
  - Vegetables and Fruits – *Vitamin deficiency*

### Specific Areas of Poor Performance

- Part (c) (ii) required candidates to determine in which of three tests digestion would not occur. Many candidates correctly stated that digestion would not have occurred within the test tube which had starch plus boiled amylase but they were unable to adequately explain why digestion did not occur.
- Part (d) (i) required candidates to explain why chewing food briefly is bad for the digestion of food. A good response was:

*The teeth mechanically break down food into smaller pieces which exposes more food to the digestive juices. This facilitates the start of digestion of starches in the mouth. Insufficient chewing results in increased effort by the small intestines in order to digest the food.*

### **Recommendations to Teachers**

- Visual aids with respect to the anatomy of the digestive systems should be utilized. Emphasis should be placed on linking structure with function since very few candidates stated a function of the liver other than bile production.
- Students should engage in practical activities in order to demonstrate the effects of pH and temperature on enzymes
- Students should be encouraged to practise answering questions especially those related to analyzing graphical data.
- Emphasis should be placed on both mechanical and chemical digestion.

### **Question 4**

SPECIFIC OBJECTIVES: C.1 – 4; C.6; B.7.3

This question tested candidates' knowledge on mitosis, genetic diseases, meiosis and the menstrual cycle.

### **General Performance of candidates**

This question was poorly done.

### **Specific Areas of Good Performance**

- Parts (a), (b) and (c) were fairly well done.
- Part (a) required candidates to state the chromosome number that cells possess at the end of meiosis. Most candidates gave a correct response.
- Part (b) required candidates to name the type of cells in which meiosis occurs and two differences between mitosis and meiosis. Candidates were able to state the differences but were confused as to which difference applied to which type of cell division.
- Part (c) was well done. Most candidates were able to state that Down syndrome occurs if the zygote receives an extra chromosome.

### **Specific Areas of Poor Performance**

- Part (d) (ii) required candidates to use a diagram to respond to questions such as “during which period does menstruation occur and what occurs within the ovary as the wall of the uterus starts to thicken”. In spite of the fact that the diagram was an excellent stimulus and guide to correct responses, candidates did not maximize the opportunities given.
- Part (d) (iv) required candidates to state the pituitary hormone that controls ovulation and on which day does ovulation occur. Most candidates should have stated that luteinizing hormone controls ovulation but instead stated that follicle-stimulation hormone was responsible for ovulation. Most knew that ovulation occurs on Day 14 of the menstrual cycle.

### **Recommendations to Teachers**

- The role of hormones especially as they relate to the menstrual cycle should be emphasized.
- The responses from candidates indicated that the topics of cell division and the menstrual cycle were covered. However, there continues to be many misconceptions/misinformation related to these topics. It would be useful to have class discussions about misconceptions as they relate to these topics.
- Audiovisual aids should be used to teach cell division and the menstrual cycle.
- The use of jargon should be avoided.
- Students should be encouraged to read the stem of the questions.

### Question 5

SPECIFIC OBJECTIVES: D.11, 12, 14

This question tested candidates' knowledge of dengue, leptospirosis and gastroenteritis.

#### **General Performance of Candidates**

This question was fairly well done.

#### **Specific Areas of Good Performance**

- Parts (a) (i), (b) (i) and (ii) were fairly well done.
- Candidates were able to state the vector for dengue as well as its symptoms.
- Part (b) required candidates to explain why vomiting and diarrhoea would occur in a neighborhood when garbage collectors go on strike. Most candidates gave appropriate responses such as, *the buildup of garbage being responsible for an increase in the populations of rats and flies which transmit pathogens when they come into contact with household food, resulting in vomiting and diarrhoea.*
- Part (b) (ii) required candidates to suggest three measures that could be taken by the community to prevent the spread of gastroenteritis and leptospirosis. Most candidates were able to give a partially good response to this question, stating that *food should be covered, vectors should be exterminated and garbage could be recycled, buried or burnt.*

#### **Specific Areas of Poor Performance**

Part (a) (ii) required candidates to explain how a mosquito spreads dengue. They were confused as to how dengue is spread. A good response as to how dengue is spread is as follows:

*A mosquito bites an infected person and picks up the pathogen. When the mosquito bites another person it transmits the pathogen to him/her.*

#### **Recommendations to Teachers**

- Teachers need to emphasize the difference between vectors and pathogens in relation to dengue and how it spreads from person to person.
- Personnel from the Vectors and Control Division of the Ministry of Health could be invited to give lectures on various diseases and their methods of control.
- Emphasis should be placed on the correct use of biological terms/expressions.
- Correct spelling of terms should be encouraged.

### Question 6

SPECIFIC OBJECTIVES: E. 1, 2, 3, 10, 7, 6

This question tested candidates' knowledge on water pollution, eutrophication and testing for bacteria.

#### **General Performance of Candidates**

This question was fairly well done.

#### **Specific Areas of Good Performance**

Part (a) (i) was well done. Most candidates were able to define pollution and state an example of a water pollutant. Most, however, were unable to link the pollution to human activity.

### **Specific Areas of Poor Performance**

- Part (a) (ii) required candidates to describe the process of eutrophication. Most candidates confused it with methods of water purification/pollution. A good response was:

*Excessive amounts of minerals, particularly nitrates and phosphates enter waterways causing rapid and abundant growth and algae. Algae deplete the water of oxygen resulting in the death of organisms.*

- Part (b) (i) required candidates to explain why members within a community became ill after eating vegetables from flooded areas and to suggest two measures that could have been taken to prevent illness. Candidates stated that the water infected the vegetables thus infecting the members of the community. A good answer was:

*Flood waters contain industrial and agricultural chemicals, sewage and other pollutants which contaminate crops. Eating these contaminated foods when uncooked causes illness, as a result of pathogens. Preventative measures that could be taken to avoid illness should include washing vegetables thoroughly under running water, using frozen or canned vegetables and/or avoiding the use of vegetables from the flooded area.*

- Part (b) (ii) required candidates to describe how water can be tested for bacteria. Most candidates were not familiar with the use of agar plate when testing for bacteria and most were unable to clearly state the steps involved in testing for bacteria. While candidates mentioned that boiling and using chlorine could be used to sterilize water, they failed to add that the water should first be filtered.

### **Recommendations to Teachers**

- Candidates should be encouraged to study the causes of pollution through the use of brochures and posters. They should also thoroughly understand the role that humans play in the pollution process.
- Testing for bacteria continues to pose a problem. Testing for the presence of bacteria should be done as a laboratory exercise.
- All aspects of the syllabus should be covered thoroughly.