

**CARIBBEAN EXAMINATIONS COUNCIL**

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

**MAY/JUNE 2013**

**HUMAN AND SOCIAL BIOLOGY  
GENERAL PROFICIENCY EXAMINATION**

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## GENERAL COMMENTS

The 2013 examination was the ninth June sitting of Human and Social Biology offered at the General Proficiency level.

The format of the examination was different from that preceding 2011. 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 (Part A) and two of which are essay questions (Part 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 candidates 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 declined this year when compared with the June sittings of 2011 and 2012. Candidates had difficulties with questions that assessed knowledge of the following topics:

- The organ responsible for neutralizing hydrochloric acid
- Foods that prevent constipation
- Function of the ileum
- Interpreting a graph showing vital capacity
- Component of cigarette smoke that reduces the oxygen-carrying capacity of the blood
- Blood clotting sequence
- Cranial reflex action
- Changes in the eye to facilitate accommodation
- Genetics
- Signs of dengue fever
- Ideal soil type on which to construct a pit latrine

### Paper 02 – Structured Essay Questions

#### Question 1

SPECIFIC OBJECTIVES: D8, 23, 10

This data analysis question tested candidates' knowledge of HIV/AIDS: the meaning of the acronym, the ways in which it is spread and symptoms related to it. Candidates were also required to construct a bar graph of the incidence of HIV/AIDS — related deaths within various age groups and do a comparative study knowledge of the socio-economic effects of deaths within the 25–44 age groups was 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 spread 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 wrote that it could be spread by kissing, mosquito bites and via toilet seats. Popular responses such as weakness, weak immune system, lack of appetite, diarrhoea, sores, rashes were given. Major misconceptions were tiredness, lack of energy, hair loss and hair becoming pretty.

Part (b) (ii) required candidates to compare the number of deaths in the various age groups. They were expected to describe the initial increase in number of deaths, followed by consecutive decreases and most were able to respond correctly.

## **Specific areas of poor performance**

Few candidates were able to state the meaning of the acronyms 'HIV' and 'AIDS'. For HIV, many candidates left out "deficiency" in human immunodeficiency virus. Regarding AIDS, many candidates were unable to state that it stood for acquired immunodeficiency syndrome.

Part (b) (i) — candidates were required to draw a bar graph of the data presented. The scale on the y-axis was a major problem and some candidates did not label the axis. A few candidates drew line graphs instead of bar graphs.

Part (b) (iii) – Candidates were asked to suggest three socio-economic effects that deaths within the 25–44 age group would have on a country. Most candidates identified at least one relevant socio-economic effect. Poor responses to this question included: stress, increased space for burials, juvenile delinquency, an increase in crime and criminals.

## **Recommendations to teachers**

- The meanings of acronyms need to be taught and reinforced. Both words and meanings must be taught together. The correct spelling of the words could be reinforced through games and spelling competitions.
- Short video-clips involving the spread and 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 pamphlets on this subject as well as engage in role-play and produce skits in order to disseminate the information.
- The skill of drawing bar and line graphs needs to be taught; this includes determining scales, plotting of points and labelling of axes. An interdisciplinary approach can also be used (involving the teachers of Mathematics and Human and Social Biology respectively).
- Candidates need to be taught how to compare and contrast effectively. This can be done using concrete examples at first and then moving into abstract examples. Teachers need to ensure that candidates have a clear understanding of the meaning of the word 'socio-economic'. There are many topics in Human and Social Biology for which this term is used. In this particular question it related to AIDS - related deaths. The use of word games can greatly enhance reinforcement.

## Question 2

SPECIFIC OBJECTIVES: A1; A2, 4; B7.2

This question tested candidates' knowledge of the following: structural differences between plant and animal cells; being able to identify a specialized cell and explain how its structure was suited to its function; characteristics of living organisms, other than respiration and feeding; being able to explain why the characteristics of respiration and feeding could not be applied to a car.

### **General performance of candidates**

This question was moderately well done.

### **Specific areas of good performance**

Part (a) – Most candidates were able to state at least one way in which the structure of a plant cell differs from that of an animal cell. Most were able to identify the sperm cell in Part (b) (i) and list three characteristics of living organisms in Part (c) (i).

Part (b) (ii) – Most candidates were able to state one adaptation of a sperm cell relating to its function and this was that it had a tail enabling it to swim towards the egg. Other responses which would have been acceptable included: mitochondria in the middle piece to provide energy; the head contains enzymes that dissolve membranes of the egg to facilitate fertilization, or the head contains genetic material to be passed on to offspring.

### **Specific areas of poor performance**

Candidates found Part (c) (ii) challenging as it required them to explain why respiration and feeding are characteristics that cannot be applied to a car. Candidates were awarded marks if they defined the terms respiration and feeding. Responses of appropriate comparisons could have included: plants use glucose for respiration whereas cars use gasoline for energy; respiration occurs in cells in plants whereas cars do not have cells; respiration in plants requires enzymes. Regarding feeding, candidates could have stated that plants make their own food whereas cars need to be given fuel; plants use glucose to make other molecules; cars do not manufacture anything.

### **Recommendations to teachers**

- 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: B1.14, B1.20, B1.21, B1.24, D.6

This question tested candidates' knowledge of enzymes, types of teeth and diabetes.

#### **General performance of candidates**

This question was poorly done.

#### **Specific areas of good performance**

Parts (a) (iii) and (c) (ii) were well done. Most candidates knew which teeth are responsible for mechanical digestion. For the management of diabetes, other than by the use of medication, the candidates' responses, most of which related to diet and exercise, varied widely.

#### **Specific areas of poor performance**

Parts (a), (b) and (c) (i) were badly done.

Part (a) (i) asked to name two digestive enzymes and state one function of each enzyme named. Most candidates believed that the enzyme was saliva, hydrochloric acid or a hormone. Some were uncertain about the names of enzymes and their specific substrates as was commonly seen in responses like "the enzyme maltose breaks down maltase", "the enzyme fructose digests fructose" and "the enzyme salivary amylase digests starch into carbohydrates and glucose". Good responses would have been "The enzyme salivary begins the digestion of starch", and "Rennin breaks down milk proteins".

Part 3 (a) (ii) asked candidates to name the type of digestion for which the teeth are responsible. Many candidates explained the process of digestion instead of stating the type of digestion. This was evident in the responses given such as chewing, grinding and mastication, rather than mechanical digestion.

In Part (b) (i) required candidates to determine from the graph the temperature and pH at which amylase would best function. Candidates stated ranges outside those on the graph, indicating that many candidates attempted the questions without referring to the graphs.

Part 3 (b) (ii): candidates' misconceptions were that temperatures greater than 55 °C "killed, fried, dried, inactivated, degenerated or slowed down the enzyme".

Part (c) (i) required candidates to explain the role of the pancreas in the development of diabetes. Emphasis was placed on poor eating habits being the cause of diabetes rather than referring to the malfunction of the pancreas/insufficient insulin production.

#### **Recommendations to teachers**

- Visual aids with respect to the anatomy of the endocrine and the digestive systems should be utilized. Emphasis must be placed on the dual roles (exocrine and endocrine) of the pancreas.
- Emphasis should be placed on the differences between hormones and enzymes.
- Students should be encouraged to practise answering questions, especially those related to analyzing graphical data.

#### Question 4

SPECIFIC OBJECTIVES: C1, 2, 3, 4; B7.3

This question tested candidates' knowledge of mitosis, meiosis and the menstrual cycle.

#### **General performance of candidates**

This question was poorly done.

#### **Specific areas of good performance**

Parts (a) (i), (ii) and (c) (i) were well done. Parts (a) (i) and (ii) required candidates to state the type of cell division which results in identical offspring and the diploid number of chromosomes in human cells respectively. Most were able to respond correctly.

#### **Specific areas of poor performance**

Part (b) (i) required candidates to state that *crossing over* was the event where small parts of DNA are exchanged between homologous chromosomes. Candidates were unaware of this concept. Poor responses included the naming of various phases of cell division or descriptions of the event without naming it. For Part (b) (ii) it was expected that candidates would say that parents are the source of homologous chromosomes and that its importance is that variation is the result.

Part (c) required candidates to analyse a graph to describe changes in the menstrual cycle. For (c) (i) most candidates were able to describe changes occurring in the menstrual cycle from day 0 to 5, but were unable to describe the changes between days 6 and 14. It was expected that they would describe changes in the uterine lining or development of the egg. Candidates could also have described changes in the hormone levels.

Part (c) (ii) required candidates to describe the changes that take place with progesterone levels after ovulation if pregnancy occurs and if pregnancy does not occur. Too many candidates disregarded the instruction at the top of the Part relating to progesterone levels.

Part (d) required candidates to outline how follicle-stimulating hormone (FSH) controls the production of oestrogen. The expected response was that as FSH levels rise, oestrogen levels rise.

#### **Recommendations to teachers**

- The roles 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 reproduction were covered however, there continues to be many misconceptions and misinformation related to these topics. It would be useful to have class discussions about misconceptions as they relates to reproduction.
- Audiovisual aids should be used for cell division and the menstrual cycle.
- The use of colloquialism should be avoided.
- Students should be encouraged to practise reading questions carefully before planning and writing their responses.

### Question 5

SPECIFIC OBJECTIVES: D7, 14

This question tested candidates' knowledge of leptospirosis and gastroenteritis.

#### **General performance of candidates**

This question was poorly done.

#### **Specific areas of good performance**

Candidates were able to state the vector for leptospirosis as well as the signs and symptoms for both leptospirosis and gastroenteritis. Good responses such as "urine" and "faeces" were given for the source of pathogens for leptospirosis.

#### **Specific areas of poor performance**

Part (a) required candidates to name the vector for leptospirosis. Many were unable to state that the vector for gastroenteritis was the housefly.

Gastroenteritis was believed to be indigestion and as a result candidates gave remedies for indigestion.

Part 5 (b) required candidates to discuss ways to prevent pathogens from entering the body. Most gave better responses for leptospirosis than gastroenteritis. The use of rat traps or poison was expected for the control of rats and insecticides for the control of flies.

#### **Recommendations to teachers**

- Teachers need to emphasize the difference between vectors and pathogens.
- Personnel from the Vectors and Control Division of the Ministry of Health (or the corresponding local authority) 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 and expressions.
- Teachers should insist on the correct spelling of technical terms related to the subject.

### Question 6

SPECIFIC OBJECTIVES: E1, 2, 6, 7

This question tested candidates' knowledge of water pollution, small-scale water purification and testing for bacteria.

#### **General performance of candidates**

This question was relatively well done.

#### **Specific areas of good performance**

Parts 6 (a) (i) and (ii) were well done. Most candidates were able to define pollution; state an example of a pollutant which could not be seen or touched and describe methods used to purify water on a small scale.

Part (a) (iii) required candidates to list pollutants of water after a hurricane. While most were able to do so, some candidates were not able to state the source of the pollutants.

### **Specific areas of poor performance**

Part (b) 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. Some candidates were able to describe the test; however, most made no mention of a control.

### **Recommendations to teachers**

- All aspects of the syllabus should be covered thoroughly.
- Testing for the presence of bacteria can be done as a laboratory exercise.