CARIBBEAN EXAMINATIONS COUNCIL

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION

MAY/JUNE 2011

HUMAN AND SOCIAL BIOLOGY GENERAL PROFICIENCY EXAMINATION

GENERAL COMMENTS

The 2011 examination was the seventh June 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

Overall, candidate performance on this paper was good. Areas of difficulty were as follows:

- Osmosis
- Vital capacity
- Composition of lymph
- The pathway for nitrogenous compounds to exit the body
- Understanding the term 'allele'
- Similarity in the life cycles of the mosquito and housefly

Paper 02 – Structured Essays

Question 1

This question was only moderately done. Signs and symptoms of dengue, identification of a method of preventing the spread of dengue and plotting of the graph were done well. Many candidates were unable to name the types of mosquitoes that cause dengue and malaria. Part (b) (ii) gave information on tourist arrivals and the number of persons contracting the flu virus. Candidates were required to describe the trend in the population contracting the flu virus in Countries X and Y.

Many candidates were unable to correctly interpret the data presented in the table and the graph. They gave general responses such as 'increase' and 'decrease' without making any reference to a particular month or period. In several cases when the month or period was stated, it did not correspond with the figure stated or description given.

In Part (b) (iii), candidates were asked to describe the relationship between tourist arrivals and the spread of the flu virus. Very few candidates were able to establish the link. In many instances, they mainly restated the information shown in the table and graphs, for example, 'more tourists arrived in Country X than Country Y' or vice versa.

Recommendation to Teachers

Teachers should guide students in the use and interpretation of statistical data, for example, graphs, charts and tables.

Question 2

This question tested candidates' knowledge and understanding of nutrients, digestion and the digestive system. Performance was average.

Parts (a) (i) and (ii) were well done. Most candidates knew the vitamins and minerals that, when absent from the diet, could cause Peggy to feel weak and tired. The minerals mentioned were iron, calcium and phosphorus. In addition, most candidates knew that Vitamins B and C are water soluble vitamins.

Part (b) was poorly done. For Part (b) (i), candidates were required to state the function of the two parts of the digestive system which were labelled. Most candidates were unable to identify the function of the stomach and the small intestines, either because they could not identify the structures or they did not know the function.

Most candidates had difficulties with Part (b) (ii) which required them to describe protein digestion in the stomach and small intestine. They did not link the substrate to the correct product and the appropriate enzyme. Some candidates had the misconception that enzymes change into products.

Recommendations to Teachers

Students should practise drawing and labelling diagrams of the digestive system. Emphasis should be given to specific digestive activities occurring in each organ of the digestive system including enzymes, their substrates and products.

Question 3

This question tested candidates' knowledge of diffusion, osmosis, active transport, systemic and pulmonary circulation, as well as the lymphatic system.

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

Fairly good performance was seen in Part (a) (i) — recognizing the process as diffusion; Part (b) (i) — the definition of active transport; Part (b) (ii) — naming sites where active transport occurs and Part (c) (iii) — stating two functions of the lymphatic system.

For Part (b) (iii), candidates did not specify the type of membrane. 'Cell' membrane was the correct answer. Candidates found Parts (c) (i) and (c) (ii) very challenging. These questions asked candidates to suggest how problems with the pulmonary circulation and systemic circulation could account for difficulties in breathing after running long distances. Many of them described pulmonary and systemic circulation but did not relate it to the question. Some of them wrote about obesity, poor diet and atherosclerosis as answers to the question. Other candidates gave the answer for Part (c) (ii) in Part (c) (i).

Ideal answers for Part (c) (i) would have been that *the valves which regulate the flow of blood from the heart to the lungs and from the lungs into the heart may be faulty* ***or*** *there would be less blood going to the lungs to be oxygenated resulting in a decrease in blood flow to the lungs*. For Part (c) (ii), an ideal answer would have been that *if the muscles are weak then less blood would be pumped out of the heart and around the body, thus the body would not receive adequate nutrients*.

In Part (c) (iii), many candidates stated that the function of the lymphatic system was to get rid of waste. Correct answers should have included the following: *the lymphatic system transports fats from the small intestines to the circulatory system, it has an immune function, it removes or drains tissue fluid from tissues and returns it to blood, and it transports lymph*.

Recommendations to Teachers

The definition of osmosis must include *movement of water molecules from a high concentration of water to a low concentration of water*. Teachers should put greater emphasis on the use of knowledge to interpret novel situations. More practice questions in this area would be useful. For active transport, teachers should emphasize that active transport involves movement against a concentration gradient and energy is absolutely necessary. A practical approach could be used to teach this topic using easily available plant material like potatoes and cucumber.

Question 4

This question tested candidates' knowledge of respiratory structures, breathing, and aerobic and anaerobic respiration. Performance was average.

Most candidates were able to label some parts of the respiratory system and describe the mechanics of breathing. Parts (b) (ii), (iii) and (iv) were generally well done. These parts tested candidates' ability to explain why heart rate increases during a sprint; to account for pain that might be experienced by some athletes during a race and why an athlete might breathe through his mouth.

Part (b) (i) required candidates to state that *at the beginning of the race, the athlete respires aerobically to provide energy but that this switches to anaerobic respiration when the oxygen supply cannot keep up with the rate of use*. Candidates misinterpreted the question and simply stated the difference between aerobic and anaerobic respiration.

A good answer for Part (b) (v) should have included any of the multiple effects of cigarette smoke which could affect breathing, for example, *damage to the cilia due to nicotine, accumulation of mucus, emphysema or the reduction in oxygen absorption*. Most candidates simply stated that the lungs were damaged without giving any details of how.

Recommendations to Teachers

Teachers should include more practical activities to teach this topic, for example, examining the effect of exercise on breathing rate; using a tape measure to measure the changes in chest circumference during inhalation and exhalation; making use of practical laboratory exercises involving respiration.

Question 5

This question tested candidates' knowledge of the structures and functions of the reproductive systems, the birth process, the importance of family planning and the advantages and disadvantages of natural birth control methods. Candidate performance was moderate.

Candidates were generally able to describe the birth process and the benefits of family planning, Parts (b) and (c) (ii).

Parts (a) (i) and (ii) required candidates to label the oviduct, vagina, prostate gland and urethra on diagrams. Some candidates did this poorly, using arrows and lines which did not reach the specific structures and labelling lines which crossed each other.

Part (a) (iii) required candidates to state one major difference between the male and female reproductive systems concerning the passage of gametes and urine. In a number of cases, candidates presented the vagina as the passage for urine in females. They also described fertilization and how males urinated compared to how females urinated. An ideal answer would have been that *in males there is one passage for sperm and urine to exit the body, whereas in females there is one passage for eggs and another for urine*.

Part (c) (i) required candidates to suggest one natural method of birth control and to give one disadvantage of using this method. Candidates confused natural birth control with artificial birth control and sometimes even surgical methods. The rhythm and withdrawal methods were also confused with each other.

Recommendations to Teachers

Students need more practice in drawing and labelling diagrams of reproductive systems. Videos could be shown illustrating the birth process. 'You Tube' on the Internet as well as several health websites are possible sources of information. Suitable resource persons can be used to teach family planning.

Question 6

This question tested candidates' knowledge of environmental terms, waste disposal, pit latrines and cholera. It was moderately done. Part (a) (ii) which required candidates to identify ways of decreasing the volume of solid waste was well done. Candidates' knowledge of cholera was good. They were able to state how the disease is caused, the signs and symptoms of the disease and ways to avoid contracting it.

There were some misconceptions concerning environmental terms in Part (a) (i). Some candidates stated that biodegradable included materials that could not be broken down. Dumps were described as landfills. The latter is an area where solid waste may be sorted, compacted and buried.

It should be emphasized that a term cannot be used to define itself. A classic example was seen when candidates in defining the term 'pollutant' stated that 'a pollutant was something which polluted the environment'. They should have specified that *pollutants result from man's activities and cause harm to the environment*. Though most candidates were able to state that pit latrines when sited in the wrong location could cause the spread of some diseases, some candidates did not state how this could be avoided. They could have given a number of possible answers, for example, *pit latrines should be at least 3–6 feet deep; a concrete base should prevent vectors that spread disease; a lid would keep in the scent/odour and keep out flies; they should be built away from rivers and streams to prevent water from being contaminated*.

Recommendations to Teachers

Emphasis should be given to covering the material in Sections D and E of the syllabus. To achieve this objective, various types of projects could be given to students. Possible projects could include the creation of posters, pamphlets or flyers to educate the public about diseases. Health inspectors could be invited to talk to students about their jobs in preventing the spread of common diseases in their territories. Field trips to landfills and recycling plants could be undertaken. The topics could be dramatized by students in the form of jingles and skits. When there are International Days for some diseases or environmental issues, newspapers are usually very informative and students can be referred to them.