



CARIBBEAN EXAMINATIONS COUNCIL

Human and Social Biology



CSEC[®] PAST PAPERS

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CSEC® Human and Social Biology Past Papers

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CARIBBEAN EXAMINATIONS COUNCIL**SECONDARY EDUCATION CERTIFICATE
EXAMINATION****HUMAN AND SOCIAL BIOLOGY****Paper 02 – General Proficiency***2 hours***READ THE FOLLOWING DIRECTIONS CAREFULLY**

- 1.** This paper consists of **FOURTEEN** questions in **TWO** sections.
- 2.** **SECTION A** consists of **TEN** questions. Answer **ALL TEN** questions. Write your answer in the space provided in this answer booklet. Each question is worth **10** marks.
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DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

SECTION A

Answer ALL questions in this section.

1. The movement of ions and other materials across membranes is extremely important in biological systems. Materials can normally be moved by osmosis, simple diffusion and active transport.

(a) Complete the following statement:

In simple diffusion, the higher the _____, the _____ the rate of movement. (2 marks)

(b) (i) Briefly explain the term 'active transport'.

(2 marks)

(ii) Give an example of active transport.

(1 mark)

(c) Define the term 'osmosis'.

(2 marks)

(d) Complete the following statements:

When a peeled potato is placed in distilled water it will _____ as a result of osmosis. (1 mark)

If some salt is added to the water the potato will _____ (1 mark)

(e) A drop of ink is placed in a glass of pure, clear water, and after a while all the water turns blue. This spread is as a result of _____ (1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

2. Figure 1 shows a section through the head of a femur.

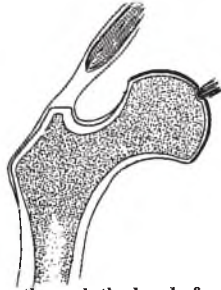


Figure 1. Section through the head of a femur

- (a) (i) By means of a line and a label, show on the diagram EACH of the following parts:
- a) Cartilage
 - b) Cancellous (spongy) bone
 - c) Compact bone
 - d) Fatty marrow
- (4 marks)**
- (ii) Describe the function of EACH of the parts labelled in (a) (i) above.

Cartilage:

Cancellous bone:

Compact bone:

Fatty marrow:

(4 marks)

- (b) Give TWO reasons for the elasticity of cartilage.

(2 marks)

Total 10 marks

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3. Figure 2 represents a horizontal section through the eye.

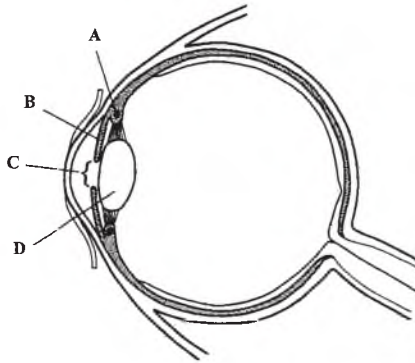


Figure 2. Horizontal section through the eye

(a) Name the parts labelled A, B, C and D.

A: _____

B: _____

C: _____

D: _____

(4 marks)

(b) Name the part of the eye which decreases in size when a bright light is shone into the eye.

(1 mark)

(c) Explain why objects in dim light are seen more clearly from the corner of the eye.

(1 mark)

(d) Explain how the eye is nourished.

(2 marks)

GO ON TO THE NEXT PAGE

(e) Describe how images are formed on the retina.

(2 marks)

Total 10 marks

4. Figure 3 shows drawings of blood cells.

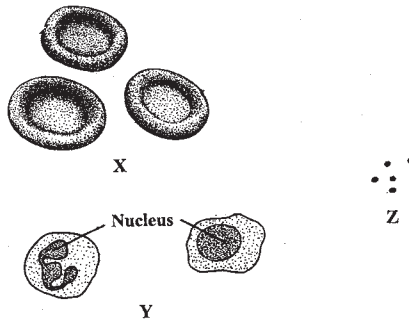


Figure 3. Blood cells

(a) Identify the blood cells, X, Y and Z in Figure 3.

X: _____

Y: _____

Z: _____

(3 marks)

- (b) Describe oxygen transport in the red blood cell.

(3 marks)

- (c) (i) What is the liquid part of the blood called?

(1 mark)

- (ii) Distinguish between the part named in (c) (i) and serum.

(1 mark)

- (d) Distinguish between the functions of the blood and the circulation of the blood.

(2 marks)

Total 10 marks

5. (a) Glucose \rightarrow lactic acid \rightarrow carbon dioxide and water

With reference to the above equation, identify EACH of the following processes:

(i) Anaerobic respiration:

_____ (1 mark)

(ii) Aerobic respiration:

_____ (1 mark)

(b) Explain EACH of the following processes:

(i) Anaerobic respiration

_____ (3 marks)

(ii) Aerobic respiration

_____ (3 marks)

(c) Explain the concept of oxygen debt.

_____ (2 marks)

Total 10 marks

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6. Figure 4 shows parts of the alimentary canal.

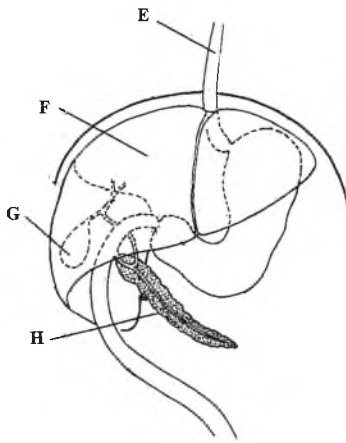


Figure 4. Parts of the alimentary canal

(a) Name EACH of the parts labelled E, F and G.

E: _____

F: _____

G: _____

(3 marks)

(b) (i) Name the substance that is stored in G.

_____ (1 mark)

(ii) State TWO functions of the substance named in (b) (i).

(2 marks)

- (c) Name TWO enzymes produced by the part labelled H in Figure 4, and the substrate on which EACH of these enzymes act.

Name of enzyme: _____

Substrate: _____

Name of enzyme: _____

Substrate: _____

(4 marks)

Total 10 marks

7. (a) Choose the word from the brackets at the end of the statement, to complete the statement correctly.

The rhythm method is an example of a/an _____ method of birth control, while contraceptive pills are an example of a/an _____ method of birth control. (artificial, natural, surgical) (2 marks)

- (b) What is meant by the 'safe period' in reproduction?

(1 mark)

- (c) Which days of the menstrual cycle are considered NOT safe?

(1 mark)

- (d) Explain TWO ways in which contraceptive pills prevent pregnancy.

(2 marks)

GO ON TO THE NEXT PAGE

- (e) In pregnancy, explain how the structure of the placenta is related to its function.

(4 marks)

Total 10 marks

8. (a) Briefly describe DNA and explain its function.

(3 marks)

- (b) Explain what is meant by EACH of the following terms:

- (i) Homozygous

(1 mark)

- (ii) Dominance

(1 mark)

- (c) (i) With the aid of a diagram, determine the inheritance of eye-colour for a homozygous male with brown eyes mating with a homozygous female with blue eyes. Brown eye-colour is dominant over blue eye-colour.

(3 marks)

- (ii) What is the phenotype of the F1 generation in (c) (i)?

_____ (1 mark)

- (iii) What proportion of the F1 generation will be homozygous recessive?

_____ (1 mark)

Total 10 marks

9. (a) Drug abuse is a common societal problem. Name THREE drugs which are commonly abused.

_____ (3 marks)

- (b) (i) What is the effective ingredient in alcoholic drinks?

_____ (1 mark)

- (ii) Describe ONE social impact of alcohol abuse on the family.

_____ (1 mark)

GO ON TO THE NEXT PAGE

- (c) Explain how alcohol acts on the human body.

(5 marks)

Total 10 marks

10. (a) One of the problems created by modern man is the greenhouse effect.

- (i) What causes the greenhouse effect?

(2 marks)

- (ii) What is the initial consequence of the greenhouse effect?

(2 marks)

- (iii) State ONE health consequence of the thinning of the ozone layer.

(1 mark)

- (b) (i) Name TWO sources of atmospheric (air) pollution.

(2 marks)

- (ii) Which THREE dilute acids are produced by water in the atmosphere combining with the pollutants named in (b) (i)?

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

SECTION B

Answer ANY TWO questions in this section.

11. (a) Define the term 'hormone'. (2 marks)
- (b) Describe the role of hormones in the regulation of the menstrual cycle. (9 marks)
- (c) Which is faster, nervous control or hormonal action? Explain your answer. (9 marks)

Total 20 marks

12. Figure 5 shows a simplified drawing of a human heart.

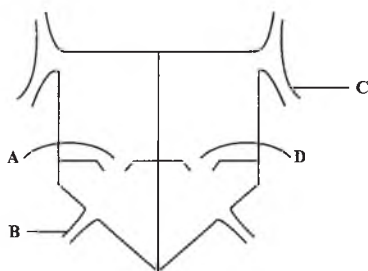


Figure 5. Simplified drawing of a human heart

- (a) Copy Figure 5 on your answer page. On your drawing:
- (i) Label EACH of the structures, A, B, C and D in Figure 5. (4 marks)
- (ii) Shade the part of the heart which is associated with oxygenated blood. (1 mark)
- (iii) Label the atria and ventricles. (2 marks)
- (b) Compare the relative thickness of the walls of the atria and ventricles. (3 marks)
- (c) Describe the role played by the different parts of the heart in the circulation of blood. (10 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

13. (a) With the aid of diagrams, describe cell division by the process of mitosis. (15 marks)
- (b) State TWO main differences between mitosis and meiosis. (2 marks)
- (c) Explain how gender is determined in humans. (3 marks)

Total 20 marks

14. (a) Define the term 'obesity'. (2 marks)
- (b) State FOUR main causes of obesity. (4 marks)
- (c) Explain how hypertension can become a complication of obesity. (4 marks)
- (d) Explain what is meant by lifestyle changes, and discuss how lifestyle changes can be used in treating obesity. (10 marks)

Total 20 marks

END OF TEST

TEST CODE **01253020**

FORM TP 2006012

JANUARY 2006

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

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING DIRECTIONS CAREFULLY

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01253020/F/ JANUARY 2006

SECTION A

Answer ALL questions in this section.

1. Figure 1 shows a drawing of a typical animal cell.

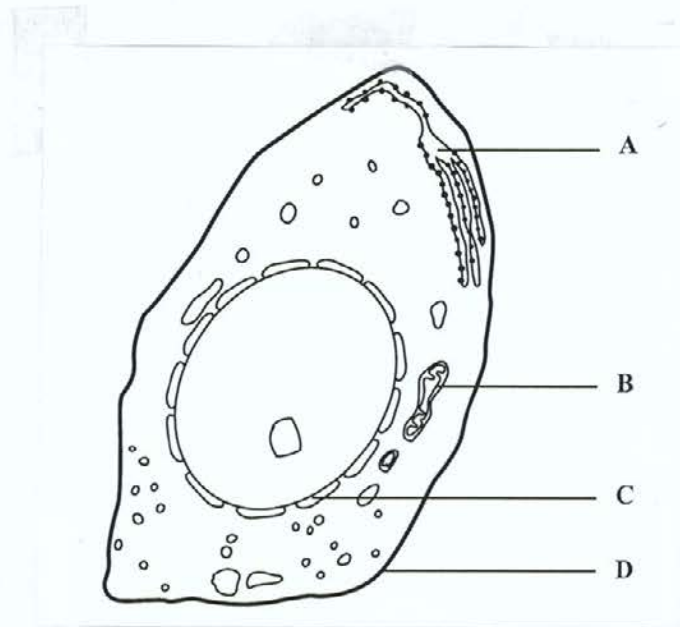


Figure 1. A typical animal cell

- (a) Name EACH of the FOUR structures labelled as A, B, C and D in Figure 1.

A: _____

B: _____

C: _____

D: _____

(4 marks)

- (b) Name ONE type of cell which does not possess a nucleus.

_____ (1 mark)

- (c) (i) Name the compound which is found in the outer layer of plant cells but NOT in animal cells.

_____ (1 mark)

- (ii) State the function of the compound named in (c)(i).

_____ (1 mark)

GO ON TO THE NEXT PAGE

- (d) (i) Identify the TWO main chemical constituents of the chromosome.

_____ (1 mark)

- (ii) Outline the role of the chromosomes in the nucleus.

_____ (2 marks)

Total 10 marks

2. (a) When Dujon is bowling during a cricket game he uses a number of muscles in his body.

- (i) Name TWO muscles which flex his arm.

_____ (2 marks)

- (ii) Describe the role of EACH of the muscles named in (a)(i) above, in the bowling movement of the arm.

_____ (6 marks)

- (b) Explain how locomotion is achieved in man.

_____ (2 marks)

Total 10 marks

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3. Maintaining normal blood sugar levels is important for the proper functioning of our cells and for ensuring our optimum energy requirements.

Figure 2 shows a schematic diagram of some of the major organs and processes associated with maintaining normal blood sugar.

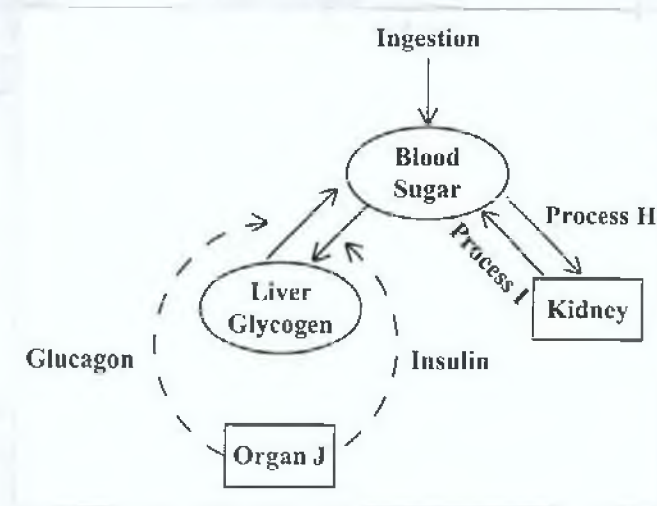


Figure 2. Schematic diagram

- (a) Name Organ J, which detects changes in blood glucose level.

_____ (1 mark)

- (b) (i) Insulin and glucagon are examples of what type of substances?

_____ (1 mark)

- (ii) Explain how the blood levels of the following substances change with blood sugar concentrations.

Insulin:

Glucagon:

(4 marks)

GO ON TO THE NEXT PAGE

(c) Identify EACH of the following processes occurring in the kidney:

(i) Process H, in which sugar leaves the blood

_____ (1 mark)

(ii) Process I, in which sugar re-enters the blood

_____ (1 mark)

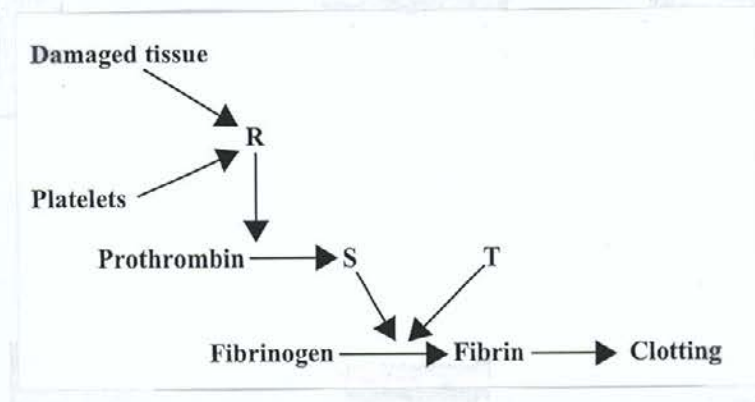
(d) Explain why insulin is given as an injection.

(2 marks)

Total 10 marks

4. When our skin is cut a blood clot forms to prevent the entry of bacteria, as well as to stop further bleeding.

The following schematic diagram is representative of the blood clotting mechanism:



- (a) Name R, S and T.

R: _____

S: _____

T: _____

(3 marks)

- (b) Which organ in the body is responsible for prothrombin production?

(1 mark)

- (c) Which vitamin is necessary for prothrombin formation?

(1 mark)

- (d) Suzie gets a cut on her finger. Explain how a blood clot functions in the healing process.

(4 marks)

GO ON TO THE NEXT PAGE

- (e) Explain why haemophiliacs are liable to lose disproportionate quantities of blood from even minor wounds.

(1 mark)

Total 10 marks

5. (a) Breathing is necessary for gaseous exchange in human beings. Define the term 'tidal air'.

(1 mark)

- (b) Navita observes her father's chest rising and falling while he is sleeping. Explain these breathing movements in terms of

- (i) inspiration

(3 marks)

- (ii) expiration.

(3 marks)

- (c) Describe TWO effects of cigarette smoking on the respiratory tract.

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

6. Figure 3 shows a vertical section through an incisor.

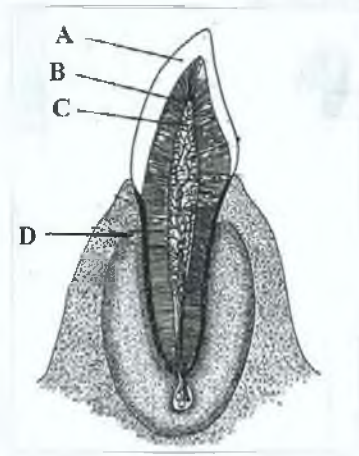


Figure 3. Vertical section through an incisor

(a) Name EACH of the parts labelled:

- A: _____
- B: _____
- C: _____
- D: _____

(4 marks)

(b) How many incisors in the upper jaw are present in EACH of the following sets?

- (i) The milk set: _____ (1 mark)
- (ii) The permanent set: _____ (1 mark)

(c) How many canine teeth are present on the lower jaw in EACH of the following sets?

- (i) The milk set: _____ (1 mark)
- (ii) The permanent set: _____ (1 mark)

(d) Jamie flosses his teeth very often.

Explain to Jamie how flossing the teeth helps to prevent cavities or tooth decay.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

7. (a) What is meant by EACH of the following terms?

(i) Sexual reproduction

_____ (1 mark)

(ii) Asexual reproduction

_____ (1 mark)

(b) Identify ONE way in which the characteristics of the offspring are influenced by EACH of the following methods of reproduction:

(i) Sexual reproduction

_____ (1 mark)

(ii) Asexual reproduction

_____ (1 mark)

(c) When the male is sexually aroused the penis becomes erect. Account for this phenomenon.

_____ (1 mark)

(d) (i) What is the name of the process by which the male releases semen?

_____ (1 mark)

(ii) Explain how the process named in (d)(i) improves the probability of a pregnancy occurring.

_____ (2 marks)

(e) State TWO characteristics of semen which enhance the possibility of fertilization.

_____ (2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

8. (a) What is meant by EACH of the following terms?

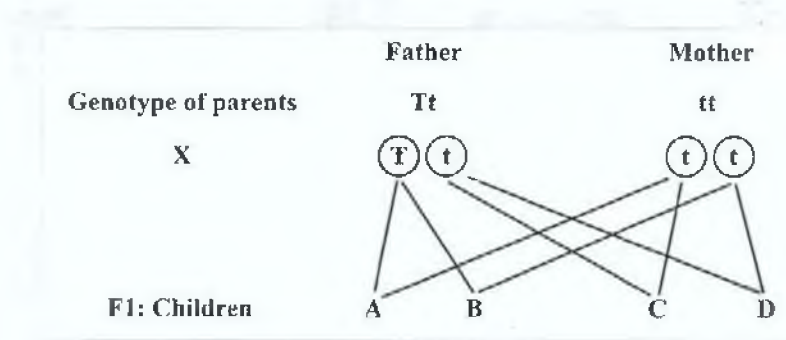
(i) Genotype

(2 marks)

(ii) Phenotype

(2 marks)

(b) The diagram below shows inheritance of height in a family. The allele for tallness is represented by T (dominant) and the allele for shortness is represented by t (recessive).



(i) Identify the term designated X.

(1 mark)

(ii) Which of the offspring would be

a) homozygous recessive?

(2 marks)

b) homozygous dominant?

(1 mark)

(iii) Which of the offspring have the same genotype as the father?

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

9. Poor nutrition contributes to both obesity and marasmus.

(a) Identify TWO factors, other than poor nutrition, which contribute to obesity.

(2 marks)

(b) What aspect of poor nutrition causes marasmus?

(1 mark)

(c) What is the cause of scurvy?

(1 mark)

(d) Name ONE disease caused by the lack of Vitamin A.

(1 mark)

(e) Identify TWO sources for EACH of the following:

(i) Vitamin A:

(2 marks)

(ii) Vitamin B:

(2 marks)

(f) Obesity is now known to contribute to a number of diseases. Name ONE such disease.

(1 mark)

Total 10 marks

10. (a) Good quality water is vital to life but man's activities are putting the water under threat. Explain TWO activities of industrial plants which affect our water resources.

(2 marks)

- (b) Excluding garbage disposal, what is the main way in which households contribute directly to water pollution?

(1 mark)

- (c) In non-urban areas faeces disposal creates a potential problem.

- (i) State ONE insect and ONE other type of animal that may transfer pathogens from faeces to man.

Insect: _____

Animal: _____

(2 marks)

- (ii) Identify ONE disease that may result from the action of EACH of the vectors named in (c)(i).

Insect: _____

Animal: _____

(2 marks)

- (d) Martin wants to construct a pit latrine at the back of his house.

- (i) What TWO factors must he consider when constructing the pit latrine?

(2 marks)

- (ii) Advise Martin why he should not add disinfectants to the pit latrine.

(1 mark)

Total 10 marks

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SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of this booklet.

11. (a) Define the term 'nitrogen fixation'. (2 marks)
- (b) Using an illustrated diagram, show how nitrogenous compounds absorbed by plants are eventually incorporated in the muscles of a herbivore. (9 marks)
- (c) (i) What is the carbon cycle? (1 mark)
- (ii) Describe THREE ways in which carbon dioxide is added to the atmosphere. (8 marks)

Total 20 marks

12. During a Human and Social Biology class, a teacher explains that respiration provides energy for the body. She says that respiration is similar to combustion, with glucose serving as the fuel. The teacher also explains that if the energy produced is not required immediately, it is stored as a high-energy chemical.
- (a) Draw a labelled diagram of the respiratory tract, showing the trachea, bronchus, bronchioles, air sacs, the lungs and the approximate position of the heart. (6 marks)
- (b) Give the name of the high-energy chemical used to store energy. (1 mark)
- (c) (i) Using the chemical formula for glucose, write a balanced chemical equation to illustrate the teacher's point about combustion. (3 marks)
- (ii) State TWO similarities and TWO differences between respiration and combustion. (4 marks)
- (d) Briefly explain the role of haemoglobin in the exchange of gases during respiration. Your answer should not exceed eight lines. (6 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

13. Acquired immune deficiency syndrome (AIDS) has become one of the biggest health challenges to modern man. Write an essay entitled 'AIDS'. Your answer should include:

- The cause and progress of the disease
- Methods of spread
- Associated social implications

Total 20 marks

14. (a) Define the terms 'pollution' and 'pollutants'. **(2 marks)**

(b) Give THREE examples of atmospheric pollutants. **(3 marks)**

(c) Explain the treatment procedure that should be carried out on river water to make it safe for human consumption. **(10 marks)**

(d) Discuss the role of micro-organisms in the treatment of sewage. **(5 marks)**

Total 20 marks

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SECTION A

Answer ALL questions in this section.

1. **Figure 1** shows a drawing of an animal cell.

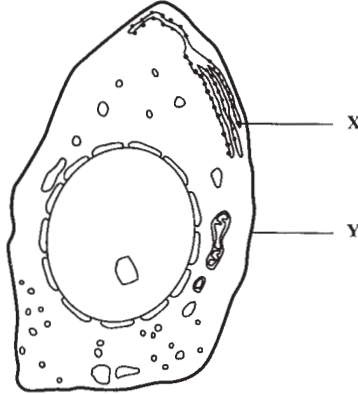


Figure 1. Drawing of an animal cell

- (a) Name the structures labelled X and Y.

X: _____

Y: _____
(2 marks)

- (b) State the function of EACH of the following:

- (i) The structure labelled Y in Figure 1.

(1 mark)

- (ii) The mitochondria

(1 mark)

- (c) Describe TWO differences between the characteristics of plants and animals.

(4 marks)

- (d) Explain how fungi obtain their food.

(2 marks)

Total 10 marks

2. (a) Complete EACH of the following sentences by choosing the correct answer from the words in brackets at the end of the sentence.

(i) The nervous system consists of two parts: the _____ nervous system and the _____ nervous system. (central, automatic, autonomic) (2 marks)

(ii) The sympathetic nervous system and the _____ nervous system are parts of the autonomic nervous system. (systematic, parasympathetic) (1 mark)

(iii) The nerves of the sympathetic nervous system originate in the _____. (brain, spinal cord) (1 mark)

(iv) The function of the sympathetic nervous system is to initiate _____ action. (emergency, involuntary) (1 mark)

(v) One bodily change that occurs when the sympathetic nervous system is stimulated is _____. (dilation of blood vessels, constriction of pupils) (1 mark)

(b) Neurosis is a form of mental illness.

(i) Under what circumstances does this disease originate? (1 mark)

(ii) Identify THREE characteristics exhibited by persons suffering from neurosis.

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

3. (a) Describe the pacemaker of the heart.

(2 marks)

- (b) Describe the sequence of events associated with the proper functioning of the pacemaker.

(4 marks)

- (c) Describe the events occurring in the heart during a heart attack.

(4 marks)

Total 10 marks

4. (a) State THREE characteristics of enzymes.

(3 marks)

- (b) Using your knowledge of enzymes, explain EACH of the following:

- (i) Milk that has been boiled and then covered keeps longer than fresh milk.

(3 marks)

- (ii) Raw meat keeps longer in a refrigerator than in open air.

(2 marks)

- (iii) Fish that has been dried quickly in the sun keeps longer than wet fish.

(2 marks)

Total 10 marks

5. (a) (i) Define the term 'heat'.

_____ (1 mark)

(ii) Name ONE quantity that must be known in order to determine the amount of heat associated with a body.

_____ (1 mark)

(iii) Name the process by which man generates heat under normal circumstances.

_____ (1 mark)

(b) State the normal temperature of human beings.

_____ (1 mark)

(c) Describe how your body attempts to maintain a constant temperature when you are

(i) in an extremely cold air-conditioned room

_____ (2 marks)

(ii) outdoors on a very hot day.

_____ (4 marks)

Total 10 marks

6. (a) Your older sister is about to become a mother. Explain to her the changes that occur in the uterus and cervix just before and during the birth of the baby.

(5 marks)

- (b) (i) Define the term 'spontaneous abortion'.

(2 marks)

- (ii) Name ONE form of treatment that could be given to women prone to spontaneous abortion.

(1 mark)

- (c) Give TWO reasons accepted in some Caribbean countries to justify induced abortion.

(2 marks)

Total 10 marks

7. (a) What are chromosomes?

(2 marks)

- (b) Using an example, explain the term 'dominance' as it applies to heredity.

(2 marks)

- (c) A tall couple produces a dwarf offspring. With the aid of a diagram, explain to the husband how it is possible for him and his wife to have dwarf children.

(6 marks)

Total 10 marks

8. (a) (i) Explain the term 'immunity' as it relates to diseases.

(1 mark)

- (ii) Using examples, explain TWO natural methods by which immunity is acquired.

(3 marks)

- (b) Baby Dalip was vaccinated at six months of age. Explain the process by which the vaccines work.

(6 marks)

Total 10 marks

9. (a) (i) Differentiate between the signs and symptoms of a disease.

Signs:

(2 marks)

Symptoms:

(2 marks)

- (ii) Using the common cold, give ONE example of a sign and ONE example of a symptom.

Example of a sign:

Example of a symptom:

(2 marks)

- (b) (i) What occurs in the respiratory system when a stimulus triggers an asthmatic attack?

(2 marks)

- (ii) Give TWO examples of stimuli which may trigger an asthmatic attack.

(2 marks)

Total 10 marks

10. (a) Describe how water can be tested for bacteria.

(2 marks)

- (b) Describe THREE ways in which human activities adversely affect our water supplies.

(3 marks)

- (c) Using specific examples, explain why contaminated water is harmful to human health.

(5 marks)

Total 10 marks

SECTION B

Answer ANY TWO questions.

Write your answer on the pages provided at the end of this booklet.

11. (a) Two students are having a discussion on the playing field. They conclude that if the sun were to be blocked out, not only would plants not be able to make food, but also the atmosphere would become depleted of oxygen.

With the aid of an equation, show why the conclusions of the students are accurate.

(5 marks)

- (b) Define EACH of the following terms:

(i) Herbivore **(2 marks)**

(ii) Carnivore **(2 marks)**

(iii) Omnivore **(1 mark)**

- (c) (i) Construct a food chain with FOUR trophic levels. **(2 marks)**

(ii) From your food chain identify ONE carnivore. **(1 mark)**

(iii) Construct a pyramid of energy and using the cow as an example, account for the change of available energy at different parts of the food chain. **(7 marks)**

Total 20 marks

12. The following questions refer to digestion in the human body.

- (a) Identify the site of

(i) pepsin production **(1 mark)**

(ii) fat digestion. **(1 mark)**

- (b) Name TWO enzymes involved in carbohydrate digestion and ONE enzyme involved in fat digestion. **(3 marks)**

- (c) Many schools in the Caribbean serve fish as a source of protein.

(i) Describe the digestion of protein. **(9 marks)**

(ii) How does the structure of the villi assist with the utilization of the digested fish? **(6 marks)**

Total 20 marks

GO ON TO THE NEXT PAGE

13. Figure 2 below shows a developing foetus in utero.

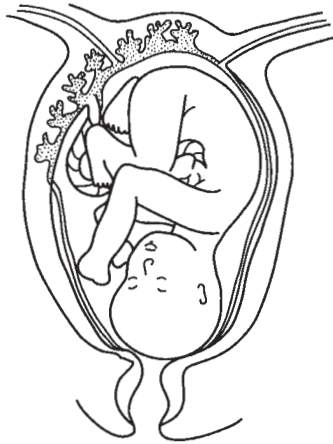


Figure 2. Developing foetus

- (a) Label EACH of the following parts on the diagram in Figure 2.
- (i) Umbilical cord (1 mark)
 - (ii) Placenta (1 mark)
 - (iii) Amniotic fluid (1 mark)
 - (iv) Foetus (1 mark)
 - (v) Cervix (1 mark)
- (b) Explain the effects of sexually transmitted diseases on the
- (i) pregnant mother (3 marks)
 - (ii) foetus. (3 marks)
- (c) State THREE ways in which HIV/AIDS is transmitted. (3 marks)
- (d) Explain why females are more prone to urinary tract infections than males. (2 marks)
- (e) Explain the process of male circumcision and its significance in the hygiene of the genitalia. (4 marks)

Total 20 marks

14. Figure 3 shows sections through two pit latrines, K and L.

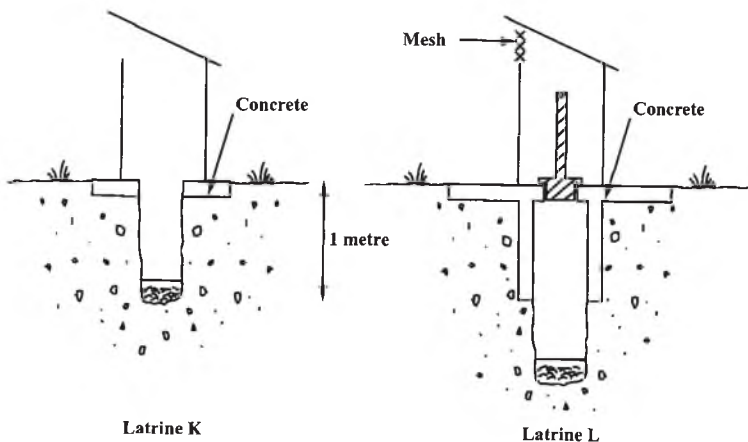


Figure 3. Section through two pit latrines

- (a) Label EACH of the following parts of Latrine L in Figure 3 using the letters A, B, C, D and E.
- (i) A – cover
 - (ii) B – squatting plates
 - (iii) C – concrete base
 - (iv) D – pit
 - (v) E – concrete lining (5 marks)
- (b) Which pit latrine, K or L, provides the better way of disposing of faeces and urine? Give reasons for your answer. (6 marks)
- (c) Explain why the location of the pit latrine is important. (4 marks)
- (d) Give reasons why disinfectants should or should not be used in pit latrines. (5 marks)

Total 20 marks

END OF TEST

TEST CODE **01253020**

FORM TP 2007012

JANUARY 2007

CARIBBEAN EXAMINATIONS COUNCIL

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING DIRECTIONS CAREFULLY

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2. **SECTION A** consists of **TEN** questions. Answer **ALL TEN** questions. Write your answer in the space provided in this answer booklet. Each question is worth **10 marks**.
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SECTION A

Answer ALL questions in this section.

1. (a) (i) Write a balanced chemical equation to summarise the process of photosynthesis.

(3 marks)

- (ii) Briefly explain how photosynthesis occurs. Your answer should include the location and stages of the process and the organelles involved.

(5 marks)

- (b) Construct a food chain for man. Begin with cabbage.

(2 marks)

Total 10 marks

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2. Figure 1 below shows a diagram of the upper arm.

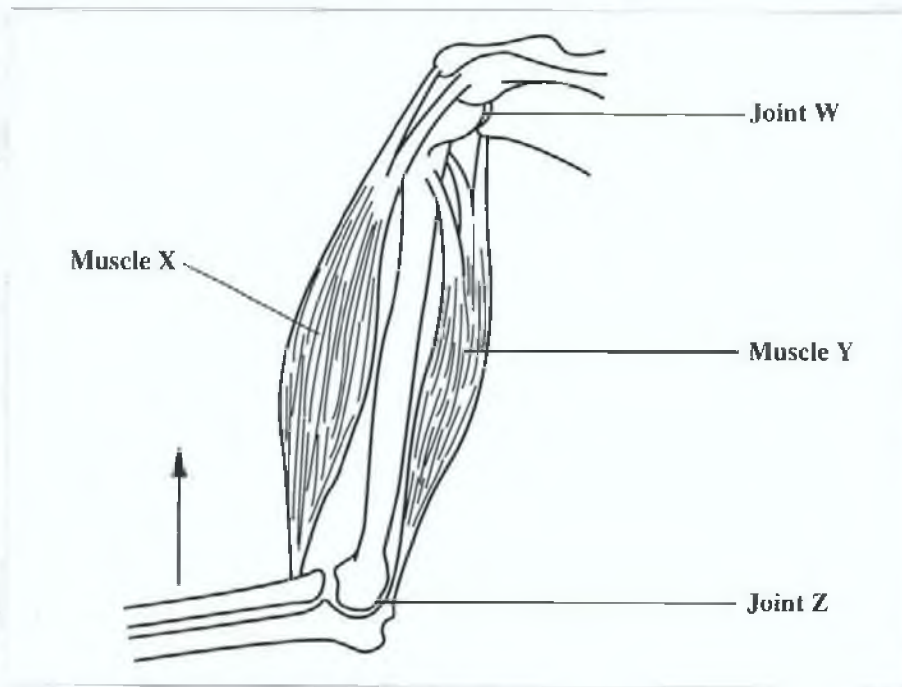


Figure 1: Diagram of the upper arm

(a) Name the two muscles labelled X and Y.

X: _____

Y: _____

(2 marks)

(b) Explain what happens to Muscles X and Y to raise the bones of the lower arm.

(4 marks)

(c) What types of joints are labelled **W** and **Z** in Figure 1?

W: _____

Z: _____

(2 marks)

(d) Explain how the joints **W** and **Z** differ.

(2 marks)

Total 10 marks

3. (a) Figure 2 is a simplified diagram of parts of the nervous system.

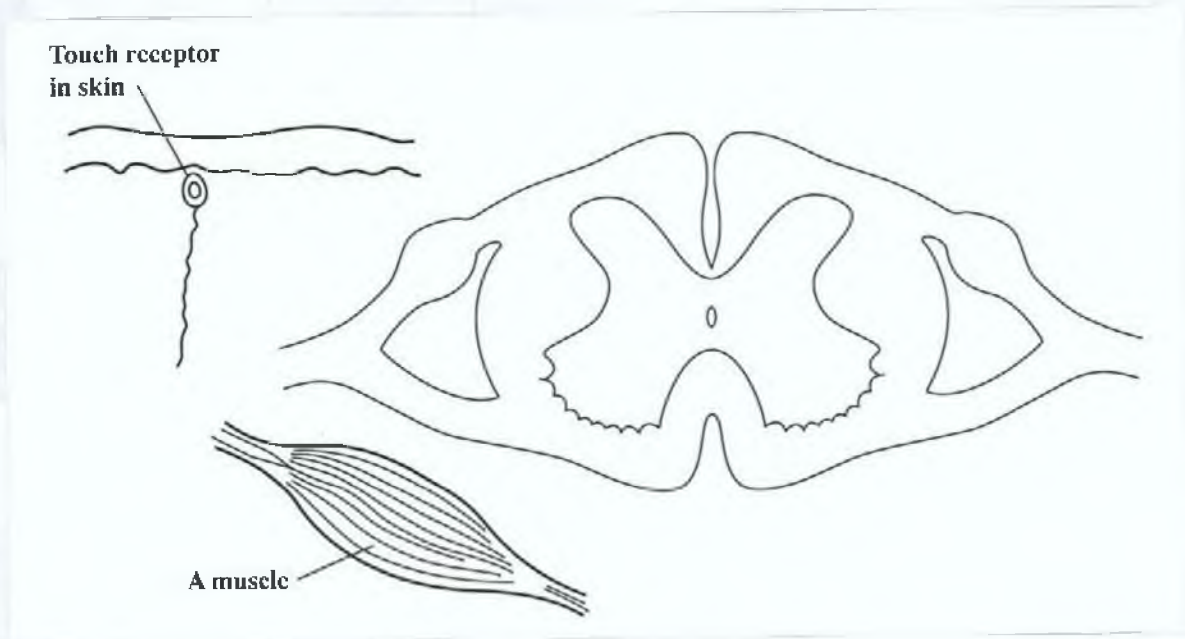


Figure 2: Diagram of parts of the nervous system

(i) On Figure 2, draw the **THREE** neurones which make up the simple spinal reflex arc. (3 marks)

(ii) Label the motor neurone as **M**. (1 mark)

- (b) (i) Why is it considered dangerous to try one dose of heroin?

(1 mark)

- (ii) Why does a person taking heroin steadily increase the quantity taken?

(1 mark)

- (c) Excessive use of alcohol is dangerous to the body. Explain how TWO named regions of the body are affected by alcohol consumption.

(4 marks)

Total 10 marks

4. Figure 3 is a sketch of the human body showing two glands.

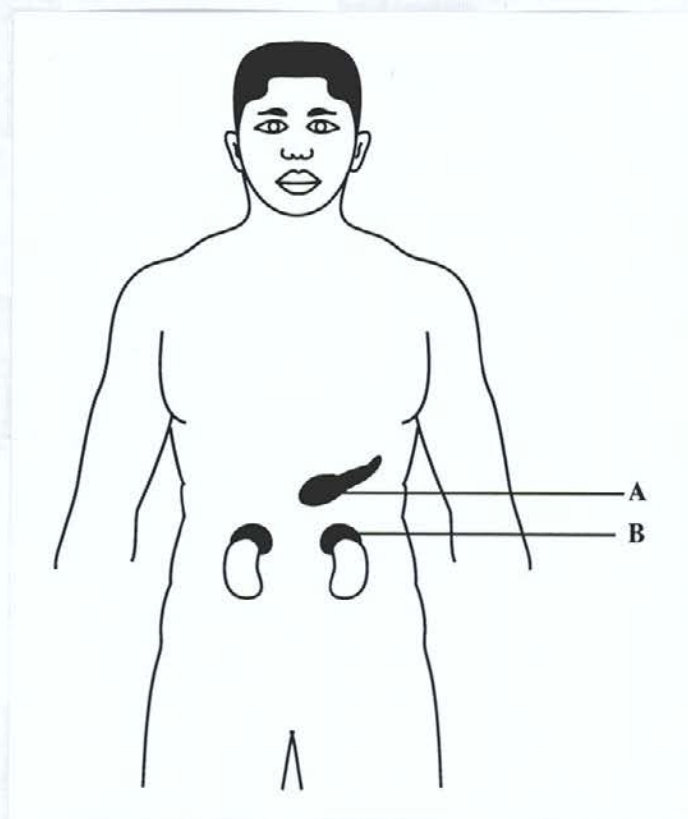


Figure 3: Sketch of the human body

(a) Name one hormone associated with EACH of the glands labelled in Figure 3.

A: _____

B: _____

(2 marks)

(b) Some hormones are slow-acting, while others act very rapidly. Name ONE hormone that acts rapidly and ONE that acts over a period of hours.

Rapid: _____

Slow acting: _____

(2 marks)

(c) (i) Give the name and location of the gland responsible for the production of thyroxin.

Name: _____

Location: _____

(2 marks)

(ii) Describe TWO effects of thyroxin on the human body when present at

a) normal levels

b) abnormal levels.

(4 marks)

Total 10 marks

5. (a) Complete Table 1 below to show what happens during inspiration.

TABLE 1

Structure	Function / Action
Diaphragm muscles	(i)
Diaphragm	Flattens / moves down
External intercostal muscle	(ii)
Rib cage	Moves upward and outward
Thorax (volume)	(iii)
Thorax (pressure)	(iv)

(4 marks)

(b) Explain why it is more difficult to breathe at high altitudes.

(2 marks)

GO ON TO THE NEXT PAGE

(c) Which muscles contract to force air out of the thorax during deep breathing?

_____ (1 mark)

(d) Briefly describe the control of breathing rate by the nervous system.

(3 marks)

Total 10 marks

6. Figure 4 shows the external structure of the heart.

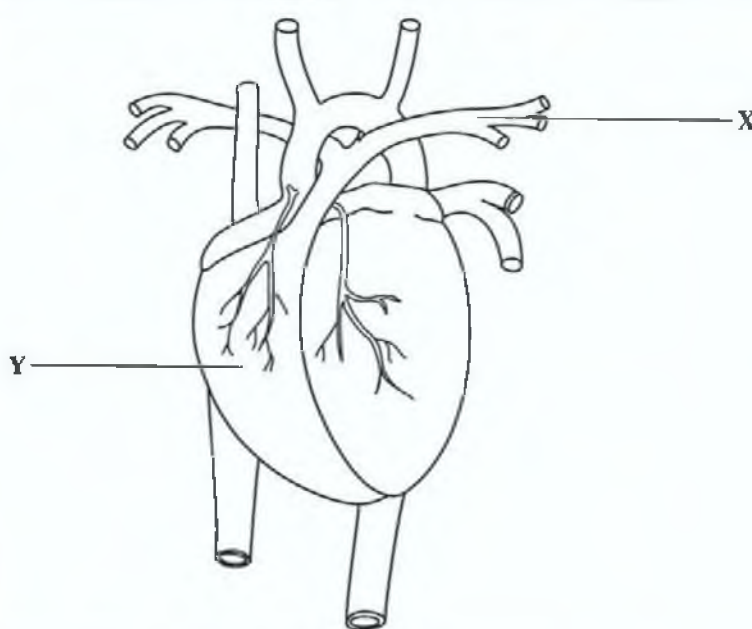


Figure 4: External structure of the heart

(a) Name the structures labelled X and Y in Figure 4.

X: _____

Y: _____

(2 marks)

(b) Explain how the structure of the left ventricle assists with its function.

(2 marks)

(c) Relate the structure of the arteries and veins to their respective functions.

(6 marks)

Total 10 marks

7. Figure 5 represents a section through a mammalian kidney.

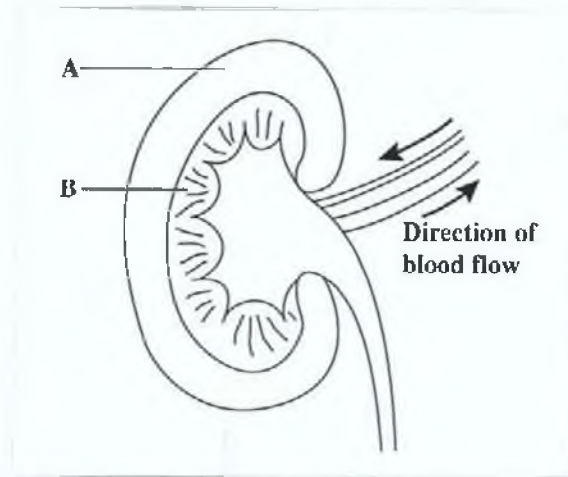


Figure 5: Section through a mammalian kidney

(a) Name the parts labelled **A** and **B** in Figure 5.

A: _____

B: _____

(2 marks)

(b) Describe the functions of the medulla and ureter.

Medulla: _____

Ureter: _____

(6 marks)

- (c) Explain why death occurs within ten days of kidney failure.

(2 marks)

Total 10 marks

8. (a) What is meant by EACH of the following genetic terms?

- (i) Sex-linked genes

(1 mark)

- (ii) Heterozygous

(1 mark)

- (iii) Genotype

(1 mark)

- (b) Why is colour blindness much more common in males than in females?

(2 marks)

- (c) By means of a genetic diagram, show the genotype and phenotype of the possible offspring produced by a father with normal vision and a mother who is heterozygous for colour vision.

(5 marks)

Total 10 marks

9. (a) (i) State TWO symptoms of dengue fever and explain how the disease is spread.

Symptoms: _____

Method of spread: _____

(3 marks)

10. (a) Explain TWO ways in which EACH of the following affects water resources.

(i) Heavy industry

(2 marks)

(ii) Agricultural activity

(2 marks)

(b) State ONE benefit of EACH of the following processes in the purification of water.

(i) Exposure to ultraviolet light

(1 mark)

(ii) Fluoridation

(1 mark)

(iii) Chlorination

(1 mark)

GO ON TO THE NEXT PAGE

- (c) Aerification is an important step in water purification. Describe the process of aerification and give TWO benefits of the process.

(3 marks)

Total 10 marks

SECTION B

Answer ANY TWO questions.

Write your answer on the pages at the end of this booklet.

11. (a) State TWO uses of nitrogen in living organisms. (2 marks)
- (b) Figure 6 shows a part of the nitrogen cycle.

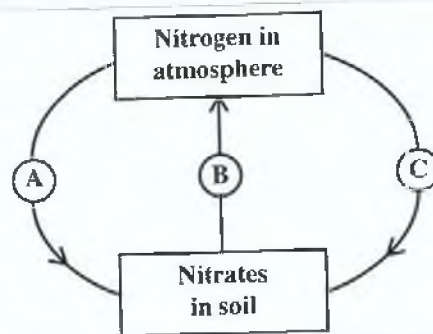


Figure 6: Part of the nitrogen cycle

- (i) Identify the factors labelled A, B and C. (3 marks)
- (ii) Use the nitrogen cycle to explain why it would be unwise for man to destroy all bacteria on earth. (15 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

12. (a) State THREE uses of water in the human body. (3 marks)
- (b) Write, in correct sequence, the structures through which water passes on the way from the mouth to the circulation of the blood. (5 marks)
- (c) Explain why prolonged diarrhoea can be dangerous. (4 marks)
- (d) (i) Draw a diagram of a section through a villus. On the diagram label FOUR of the following parts:
- a) Blood vessels
 - b) Lymph vessels
 - c) Epithelial cells
 - d) Lacteal
 - e) Blood capillaries
- (ii) State TWO functions of the epithelial cells of the villus. (2 marks)

Total 20 marks

13. (a) (i) Define the term 'diabetes mellitus'. (2 marks)
- (ii) State THREE symptoms of diabetes mellitus. (3 marks)
- (b) Differentiate between Type I and Type II diabetes mellitus. (5 marks)
- (c) Explain how Type II diabetes mellitus can be brought on by obesity. (5 marks)
- (d) Suggest how TWO named forms of therapy, OTHER THAN drugs, can be used to manage diabetes mellitus. (5 marks)

Total 20 marks

14. (a) (i) Name THREE materials that are commonly recycled. (3 marks)
- (ii) For ONE of the materials named in (a) (i) above, explain how the recycling process reduces pollution, OTHER THAN by direct reduction. (2 marks)
- (b) As a Health Inspector, you visit a remote village not serviced by running water or a garbage collection system. There is garbage all over the village. What advice would you give the villagers about the proper handling and disposal of refuse? (15 marks)

Total 20 marks

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CARIBBEAN EXAMINATIONS COUNCIL**SECONDARY EDUCATION CERTIFICATE
EXAMINATION****HUMAN AND SOCIAL BIOLOGY****Paper 02 – General Proficiency***2 hours***READ THE FOLLOWING DIRECTIONS CAREFULLY**

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SECTION A

Answer ALL questions in this section.

1. (a) (i) Explain the principles of a food chain.

(2 marks)

- (ii) Account for the variation of available energy in a food chain.

(3 marks)

- (b) Give an example of an aquatic food chain.

(2 marks)

- (c) A pesticide gets into the food chain below. Which animal would have the highest accumulation of the pesticide? Explain your answer.

Chicken → fox → lion

Animal:

Reason:

(3 marks)

Total 10 marks

2. Figure 1 below shows the structure of a long bone.

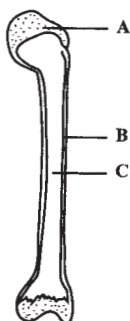


Figure 1. Structure of a long bone

- (a) Identify EACH of the parts labelled A to C in Figure 1.

A: _____

B: _____

C: _____

(3 marks)

- (b) State FOUR functions of the skeleton.

(4 marks)

- (c) State whether bone is dead or living tissue.
Explain your answer.

(3 marks)

Total 10 marks

4. (a) Explain the concept of gaseous exchange in humans.

(2 marks)

- (b) (i) What kind of reaction is responsible for the liberation of carbon dioxide in red blood cells?

(1 mark)

- (ii) In what form is most of the carbon dioxide transported in the blood?

(1 mark)

- (c) (i) Give TWO examples of events which may cause the arrest (stoppage) of breathing movements.

(2 marks)

- (ii) For any ONE example named in (c) (i) above, explain how breathing can be re-started.

(4 marks)

Total 10 marks

5. (a) (i) Name THREE fat-soluble vitamins.

(3 marks)

- (ii) Trevor has ingested a meal rich in fat-soluble vitamins.
Explain how the fat-soluble vitamins are absorbed from the alimentary tract into the circulatory system.

(2 marks)

- (b) Explain why less Vitamin C is lost when vegetables are plunged into boiling water.

(2 marks)

- (c) Jenny is suffering from a deficiency of Vitamin C. What may be some of her symptoms?

(3 marks)

Total 10 marks

6. (a) (i) Define the term 'excretion' .

(2 marks)

- (ii) Name TWO excretory organs, OTHER THAN the kidneys.

(2 marks)

- (b) (i) The kidneys regulate blood composition in three ways. One way is by removing excess water. Identify TWO OTHER ways.

(2 marks)

- (ii) How do the kidneys assist in maintaining blood pH?

(1 mark)

- (c) Brian sweats profusely during a cricket game. Explain how the sweat reaches the surface of the skin.

(3 marks)

Total 10 marks

7. (a) Mr Garcia decides to seek help because he abuses alcohol.

(i) Why does Mr Garcia frequently forget where he left his keys?

(1 mark)

(ii) Why does Mr Garcia have very shaky hands?

(2 marks)

(iii) Name ONE symptom, OTHER THAN those mentioned in (i) and (ii) above, likely to be experienced by Mr Garcia.

(1 mark)

(iv) What condition is Mr Garcia likely to have?

(1 mark)

(v) Explain why Mr Garcia may NOT be considered a safe driver.

(3 marks)

(b) What advice would you give to an expectant mother regarding alcohol?

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

8. (a) Figure 2 below represents a sewage treatment plant. Explain what occurs at EACH of the points labelled A, B and C.

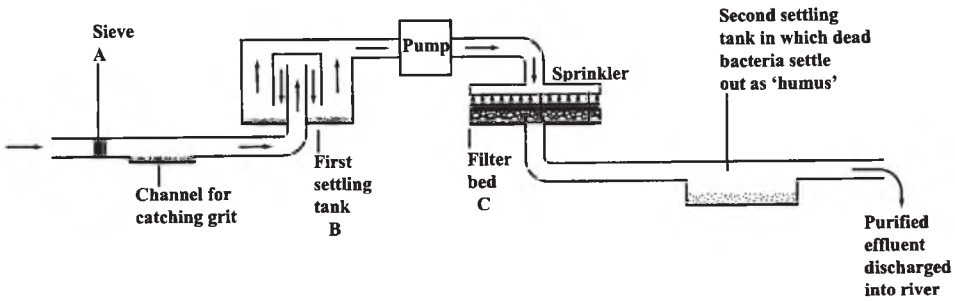


Figure 2. Sewage treatment plant

A: _____

B: _____

C: _____

(4 marks)

- (b) (i) Explain what is a disinfectant.

(1 mark)

- (ii) The Public Health Authorities want to spray a landfill with a disinfectant. Explain why this is NOT advisable.

(3 marks)

(c) In recent years, plastics have been creating a major problem for landfills.

(i) Describe the problem of plastics in landfills.

(1 mark)

(ii) How is the problem described in (c)(i) above being addressed?

(1 mark)

Total 10 marks

9. After severe flooding in a country, there is an outbreak of cholera.

(a) What is meant by the word 'carrier' as it relates to cholera?

(2 marks)

(b) Describe how carriers, flood and disease outbreaks are linked.

(4 marks)

(c) (i) The Health Authorities suspect that Sushma has contracted cholera.
What treatment should be administered to her, even before she visits the doctor?

(1 mark)

(ii) Why is this treatment necessary?

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

10. (a) Compare the structure and function of veins and arteries.

Structure

Veins:

Arteries:

(2 marks)

Function

Veins:

Arteries:

(2 marks)

- (b) How does the structure of the right chambers of the heart (the atrium and ventricle) relate to the functions of the right chambers?

Atrium

Structure:

Function:

(3 marks)

Ventricle

Structure:

Function:

(3 marks)

Total 10 marks

SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of this booklet.

11. (a) State ONE characteristic of living things which is common to both plants and animals and ONE characteristic which is NOT common to both plants and animals. (2 marks)
- (b) (i) Describe the structure of a plant cell. (3 marks)
- (ii) Explain the importance of EACH of the following processes to the growth of the plant:
- a) Diffusion
- b) Osmosis
- c) Active transport (14 marks)
- (iii) What feature of the structure of a leaf makes it suitable for diffusion to occur? (1 mark)

Total 20 marks

12. Guydath notices that most of his classmates can sit at their desks and read easily from the chalkboard or from their books. His teacher, Miss Angela, has to hold her book at arms' length in order to read it.

- (a) (i) Explain how the human eye makes adjustments to see near and distant objects. (5 marks)
- (ii) What is the name of the process explained in (a)(i) above? (1 mark)
- (b) Explain why the near point of vision of most of the students is shorter than the near point of vision of Miss Angela. (3 marks)
- (c) Guydath sees objects that are distant but not those that are near.
- (i) What are the causes of long-sightedness? (2 marks)
- (ii) How does the eye respond to light rays to manifest long-sightedness, and how can Guydath's problem be corrected? (4 marks)
- (d) What is astigmatism and how can it be corrected? (5 marks)

Total 20 marks

13. (a) (i) What is Acquired Immune Deficiency Syndrome (AIDS)? (1 mark)
- (ii) Name the virus that causes AIDS. (1 mark)
- (iii) List THREE ways in which the AIDS virus may be spread. (3 marks)
- (b) As a health educator you are addressing a church youth group.
- (i) Describe how the virus which causes AIDS enters the body. (3 marks)
- (ii) Explain how full-blown AIDS develops from the time the virus enters the blood. (9 marks)
- (c) Give THREE reasons why Caribbean people must be concerned about the AIDS epidemic. (3 marks)

Total 20 marks

14. (a) Name TWO ways of purifying water in the home. (2 marks)
- (b) (i) List THREE activities of man which negatively affect water supplies. (3 marks)
- (ii) For EACH activity listed in (b) (i) above, write ONE paragraph to explain how it affects water supplies. (15 marks)

Total 20 marks

END OF TEST

TEST CODE **01253020**

FORM TP 2008012

JANUARY 2008

CARIBBEAN EXAMINATIONS COUNCIL

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

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01253020/JANUARY/F 2008

NOTHING HAS BEEN OMITTED

SECTION A

Answer ALL questions in this section.

1. (a) Name THREE characteristics of living organisms.

(3 marks)

- (b) (i) A rose plant accidentally sticks Mary in her arm and she pulls away her arm. Does the muscle in Mary's arm contract or relax?

(1 mark)

- (ii) Suggest TWO features of the **muscle** in Mary's arm which allow her to respond by pulling away her arm.

(2 marks)

- (iii) Mary's muscle needs energy for movement of the arm. Describe the process which produces this energy.

(3 marks)

- (iv) Is the process described in (iii) above aerobic or anaerobic respiration?

(1 mark)

Total 10 marks

2. (a) (i) Explain what is meant by 'fertilisation' as it relates to reproduction.

(2 marks)

(ii) Does fertilisation occur during asexual reproduction or sexual reproduction?

(1 mark)

(b) (i) Mrs. Khan is pregnant. Describe how the foetus she is carrying obtains food and oxygen through the placenta.

(4 marks)

(ii) Give TWO reasons why it is essential that the foetal circulatory system is never directly connected to the mother's blood vessels.

(2 marks)

(c) Give ONE example of parental care following birth.

(1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

3. (a) (i) What is the liquid part of blood called?

_____ (1 mark)

(ii) Name the oxygen-carrying pigment of human blood.

_____ (1 mark)

(iii) Name the type of blood cells which assists the body in fighting infections.

_____ (1 mark)

(b) Thomas is involved in a vehicular accident and one of his blood vessels is cut open.

(i) Explain how his body functions to prevent him bleeding to death.

_____ (4 marks)

(ii) Explain how his body prevents his wounds from becoming infected.

_____ (3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

4. Ms. Moneyless makes sure her children are never hungry by feeding them a lot of boiled white rice and sugar water. When they become constipated she takes them to the Health Centre, where she learns that her children are malnourished, they have rickets and are suffering from night blindness.

(a) What is meant by the term 'malnutrition'?

(1 mark)

(b) (i) Why would the children be constipated?

(1 mark)

(ii) Name ONE food which the children can eat to prevent constipation.

(1 mark)

(c) (i) Which vitamin is deficient in the children's diet to cause EACH of the following diseases:

a) Rickets

b) Night blindness

(2 marks)

(ii) For EACH of the diseases in (c) (i), name ONE food which Ms. Moneyless should have given to her children to prevent the disease.

a) Rickets

b) Night blindness

(2 marks)

(d) Suggest THREE nutrients, OTHER THAN carbohydrates and vitamins, required to balance the children's diet.

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

5. The World Health Organization has suggested that it is possible to eradicate mosquito-borne diseases if all communities follow strict guidelines.

(a) Complete Figure 1 to show the correct stages in the life cycle of the mosquito.

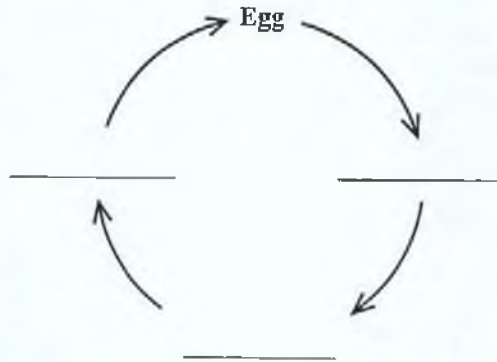


Figure 1. Incomplete life cycle of the mosquito

(3 marks)

(b) You have to inform your community about the *Aedes aegypti* mosquito.

(i) Describe how the mosquito transmits the dengue fever virus to human beings.

(2 marks)

(ii) Outline TWO activities which the community can carry out on the environment, to prevent the spread of mosquito-borne diseases, and explain how these activities will be effective in preventing the diseases.

Activity: _____

Explanation: _____

Activity: _____

Explanation: _____

(4 marks)

(iii) Suggest ONE activity, OTHER THAN the two in (b) (ii), which your mother can carry out in the home to prevent the spread of dengue fever.

(1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

6. (a) Nisha tells her brother, Niall, that the amount of water on earth remains constant, with the assistance of plants, and that the water cycle illustrates how this is so. Figure 2 represents the water cycle.

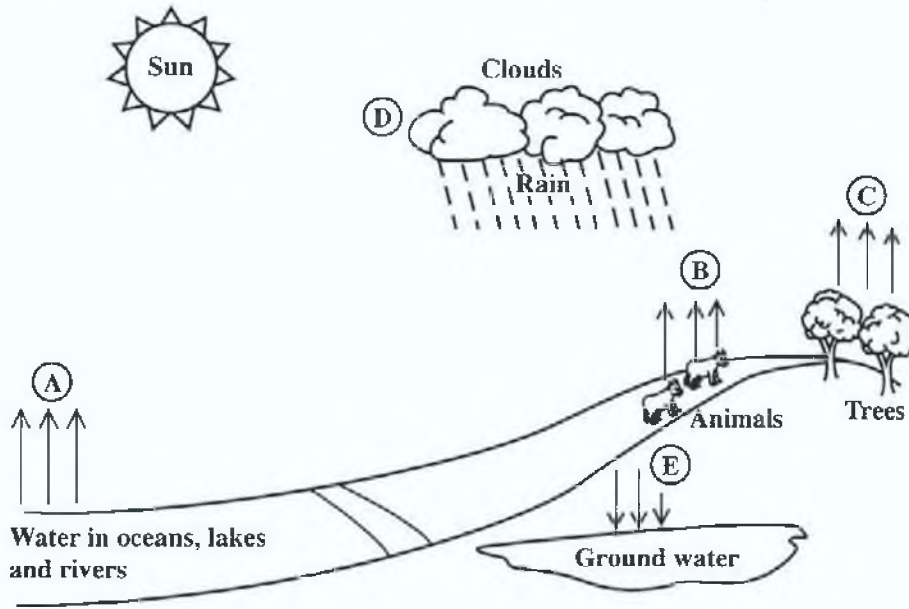


Figure 2. The water cycle

Identify the processes labelled A, B, C, D and E in Figure 2.

A: _____

B: _____

C: _____

D: _____

E: _____

(5 marks)

GO ON TO THE NEXT PAGE

(b) Ground water must be purified before it is safe for drinking.

(i) Name TWO methods used in the home for purifying water.

(2 marks)

(ii) What is the function of screening in water treatment plants?

(1 mark)

(c) Niall has a sample of water which he thinks has bacteria. How can he demonstrate the presence of bacteria in the water?

(2 marks)

Total 10 marks

7. (a) Define EACH of the following terms:

(i) Mitosis

_____ (1 mark)

(ii) Meiosis

_____ (1 mark)

(iii) Genetic inheritance

_____ (1 mark)

(b) Figure 3 shows four steps in the process of mitosis. These steps are NOT in the correct order.

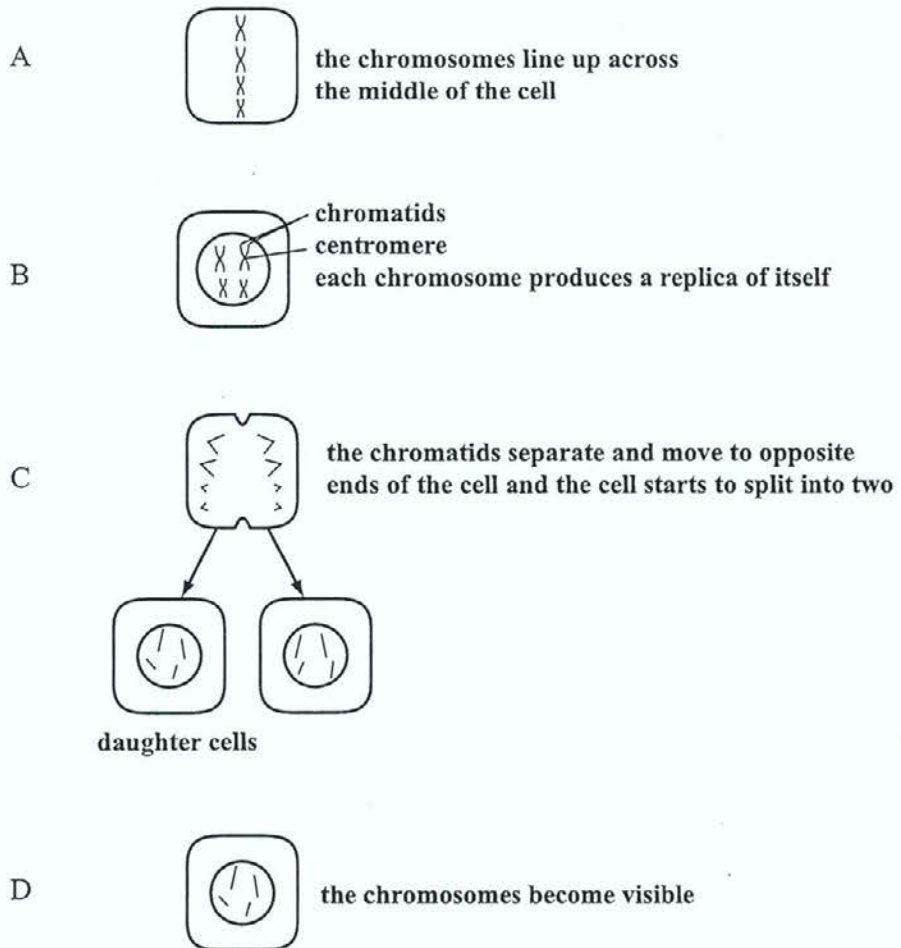
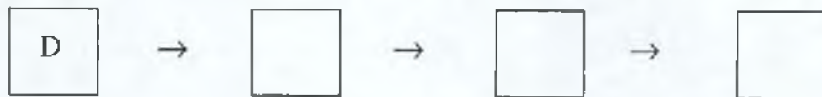


Figure 3. Steps in the process of mitosis

GO ON TO THE NEXT PAGE

Complete the sequence of the steps in the process of mitosis by writing the correct letter in the boxes below.



(2 marks)

- (c) (i) Suggest TWO reasons why it is important to have cells subdivide by mitosis.

(2 marks)

- (ii) Give TWO examples of the process of mitosis in the human body.

(2 marks)

- (iii) Suggest ONE way in which the process of mitosis could be used in the medical field.

(1 mark)

Total 10 marks

8. (a) (i) State TWO functions of bones in the human body.

(2 marks)

(ii) What is the function of cartilage in the human body?

(1 mark)

(b) (i) The lungs are the organs responsible for gaseous exchange.

Complete the statement below by writing the correct answer from the list in brackets.

Oxygen from the air moves into our lungs by the process of

. (diffusion, osmosis, active transport)
(1 mark)

(ii) Oxygen enters the blood by the same process as in (b) (i) above. Describe how this process causes oxygen to move into the blood.

(2 marks)

(iii) Plants also need oxygen to function.

Explain the process by which oxygen is produced by green plants.

(4 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

9. (a) (i) What is meant by the term 'pollutant'?

(1 mark)

(ii) State TWO causes of water pollution.

(2 marks)

(b) Carbon monoxide is an atmospheric pollutant produced by the incomplete combustion of fuel in motor vehicles.

(i) Name ONE OTHER process or activity which produces carbon monoxide.

(1 mark)

(ii) The driver of an old car has fumes (carbon monoxide) entering the vehicle. Explain the effect of carbon monoxide on the human system.

(2 marks)

(iii) Suggest TWO ways in which a community can reduce the risk of carbon monoxide poisoning.

(2 marks)

(c) Until recently, **carbon dioxide** levels remained constant in the atmosphere.

Suggest TWO human activities which cause an increase of **carbon dioxide** in the atmosphere.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

10. (a) (i) Name the organism which causes AIDS.

(1 mark)

(ii) State TWO ways by which the disease is spread.

(2 marks)

(iii) Suggest TWO ways in which a person diagnosed with AIDS can treat or manage the disease.

(2 marks)

(b) People suffering from AIDS are at greater risk of contracting infectious diseases like tuberculosis.
Suggest why this is so.

(1 mark)

(c) Caribbean governments are concerned about the impact of AIDS on society.
Outline TWO social and TWO economic impacts of AIDS.
Social:
(i) _____

(ii) _____

Economic:
(i) _____

(ii) _____

(4 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of this booklet.

11. (a) Define the term 'homeostasis' and state why homeostasis is important for human beings. (2 marks)
- (b) What is meant by 'homeothermy' and which organ is mainly responsible for it? (3 marks)
- (c) Suggest FIVE problems associated with a lack of control of blood glucose in the human body. (5 marks)
- (d) Once a day Mr. Stephens eats a meal rich in carbohydrates. Explain how his body regulates his blood sugar levels. (10 marks)

Total 20 marks

12. (a) (i) At which point of a food chain, the beginning, middle or end, is there the MOST energy? (1 mark)
- (ii) At which point of a food chain does photosynthesis occur? (1 mark)
- (iii) Arrange the following components of a food chain in correct sequence:
Big fish, water weed, small fish, tadpole (3 marks)
- (b) In an effort to make it easier for tourists to view coral reefs and exotic fish, one Caribbean island decided to get rid of the seaweed from the sea bed. At first, small levels of weedicide were injected into the seaweeds but some people in the population suffered from weedicide poisoning.
- (i) Explain what might have caused the appearance of the weedicide in some people in the population by discussing the concentration levels of weedicide in EACH element of the food chain. (6 marks)
- (ii) It was then decided to have divers pull up the seaweeds. Gradually, all the sea life around the island disappeared and the coral reefs died.
- Explain how the removal of the seaweeds led to the disappearance of the sea life and the death of the coral reefs around the island. (6 marks)
- (c) Rivers provide recreation for us, and for tourists also.
- Explain how growing crops near a river can cause the 'death' of the river. (3 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

13. (a) Define the term 'sterilization' as it relates to preventing diseases. (1 mark)
- (b) (i) Explain how heat is used in the canning of tuna to ensure that it stays for long periods without spoilage. (3 marks)
- (ii) Name ONE method, OTHER THAN canning, which employs high temperature for food preservation. (1 mark)
- (c) Mrs. Grazette has been taking antibiotics for the common cold, without her doctor's knowledge.
- (i) Define the term 'antibiotic' as used in the pharmaceutical industry. (2 marks)
- (ii) Give ONE example of an antibiotic. (1 mark)
- (iii) Explain how antibiotic treatments can adversely affect the microorganism population in the intestine. (4 marks)
- (iv) Why should antibiotic treatment be regulated by a physician (doctor)? (4 marks)
- (d) Another common disease in the Caribbean is leptospirosis. You have to create a poster to inform your community about the disease.

What information should be written on the poster about EACH of the following?

- (i) The causative organism
- (ii) The vector
- (iii) Transmission of the disease (4 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

14. (a) Figure 4 shows a labelled diagram of a molar tooth.

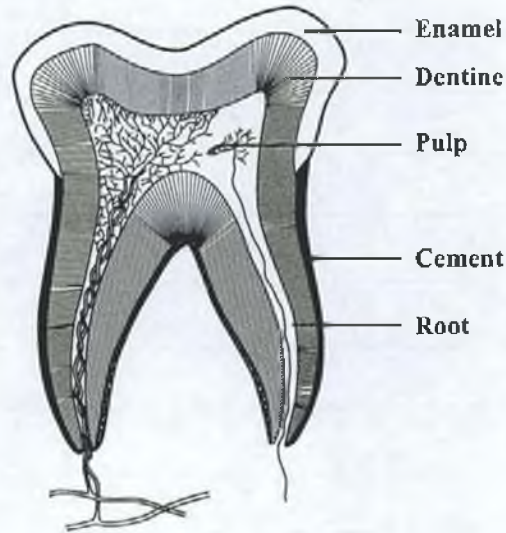


Figure 4. A molar tooth

- (i) State the function of EACH of the labelled parts. (5 marks)
- (ii) Your friend, Peter, says that he has a toothache caused by a 'cavity' in one of his teeth.
- Explain to Peter how bacteria may have caused his tooth to develop a cavity. (7 marks)
- (iii) Suggest TWO practices which Peter should follow to prevent cavities in his other teeth, and explain why these practices would be effective. (4 marks)
- (b) Granny is missing her canine and molar teeth. Explain how this affects her ability to eat food. (4 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

CARIBBEAN EXAMINATIONS COUNCIL**SECONDARY EDUCATION CERTIFICATE
EXAMINATION****HUMAN AND SOCIAL BIOLOGY****Paper 02 – General Proficiency***2 hours***READ THE FOLLOWING DIRECTIONS CAREFULLY**

1. This paper consists of **FOURTEEN** questions in **TWO** sections.
2. **SECTION A** consists of **TEN** questions. Answer **ALL TEN** questions. Write your answer in the space provided in this answer booklet. Each question is worth **10 marks**.
3. **SECTION B** consists of **FOUR** questions. Answer **ONLY TWO** questions. Write your answer on the pages provided at the end of this booklet. Each question is worth **20 marks**.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

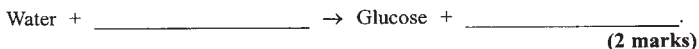
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SECTION A

Answer ALL questions in this section.

1. (a) Photosynthesis is the process by which plants manufacture their food.

(i) Complete the word equation below for photosynthesis.



(ii) One condition necessary for photosynthesis is the presence of chlorophyll.

Name ONE OTHER condition necessary for photosynthesis.

(1 mark)

(b) Students in a class are asked to carry out the following experiment to investigate photosynthesis:

- Attach a strip of foil to the upper and lower surfaces of a leaf of a potted plant, as shown in Figure 1.
- Put the plant in a sunny place.
- After a few days detach the leaf and test it for starch.

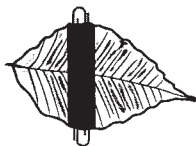


Figure 1. Leaf used in experiment

(i) List the steps involved in testing the leaf for the presence of starch.

(4 marks)

GO ON TO THE NEXT PAGE

- (ii) What would you expect the results of the experiment on page 2 to be? Explain your answer.

Results: _____

Explanation: _____

_____ (3 marks)

Total 10 marks

2. (a) Complete Table 1 below by writing the correct word from the list provided in brackets. Each word may be used once, more than once or not at all. An example has been done for you.

(similar, large, small, present, absent)

TABLE 1. COMPONENTS OF PLANT AND ANIMAL CELLS

Cell component	Plant	Animal
Chloroplast	present	absent
Glycogen		
Cell wall		
Vacuole		

(3 marks)

- (b) Students in a class are discussing plant and animal cells. Rehanna argues that the cell wall and cell membrane are different. To assist Rehanna, you are asked to describe the structure and function of both the cell wall and cell membrane.

Cell wall

Structure: _____

Function: _____

GO ON TO THE NEXT PAGE

Cell membrane

Structure: _____

Function: _____

_____ (4 marks)

- (c) Complete the following paragraph by writing the correct answer from the list provided at the end of the paragraph.

Some cells in the human body require more energy than others. Most _____ require more energy. This energy is provided by the _____ which are present in _____ quantities in cells using a lot of energy.

(nervous cells, epithelial cells, muscle cells, ribosomes, mitochondria, chloroplasts, greater, smaller)

(3 marks)

Total 10 marks

3. Most of our actions are controlled by the central nervous system.

- (a) State what is a 'reflex action'.

_____ (1 mark)

- (b) State TWO differences between a reflex action and a voluntary action?

_____ (2 marks)

GO ON TO THE NEXT PAGE

(c) Describe the actions of the nervous system to produce EACH of the following responses.

- (i) Kim injures her leg in a vehicular accident. When the doctor hits her below the knee with his rubber hammer, her knee jerks.

(4 marks)

- (ii) Brian claps his hands near your face and you blink.

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

4. The lymphatic system acts as a circulatory system which deals specifically with infections.

(a) (i) What is 'lymph'?

(1 mark)

(ii) Describe how lymph is formed.

(2 marks)

(b) Tonsils form part of the lymphatic system. Maya had her healthy tonsils removed.

(i) Suggest ONE possible effect that this may have on her health.

(1 mark)

(ii) Give ONE reason for your answer in (b) (i) above.

(2 marks)

(c) The tricuspid valve is located between the right atrium and right ventricle of the heart. A young man with a weak tricuspid valve tires easily.

(i) Describe the function of a normal tricuspid valve.

(1 mark)

GO ON TO THE NEXT PAGE

- (ii) How does the structure of the tricuspid valve assist the valve to function properly?

(1 mark)

- (iii) Suggest how a weak tricuspid valve may cause the young man to tire easily.

(2 marks)

Total 10 marks

5. (a) Respiration is the process whereby living cells produce energy.

- (i) Complete the word equation below for aerobic respiration.

Glucose + _____ → _____ + water + energy.
(2 marks)

- (ii) What is anaerobic respiration?

(1 mark)

GO ON TO THE NEXT PAGE

(b) Use your knowledge of how the respiratory system works to explain why EACH of the following persons may have difficulty in breathing:

(i) A chronic smoker

(4 marks)

(ii) An asthmatic person

(3 marks)

Total 10 marks

6. Organs like the skin and kidneys play an important role in homeostasis.

(a) Define the term 'homeostasis'.

(1 mark)

GO ON TO THE NEXT PAGE

- (b) Control of carbon dioxide in the blood is a negative feedback mechanism. Explain how the body controls carbon dioxide levels in the blood through this mechanism.

(2 marks)

- (c) Marathon races are becoming very popular in some Caribbean countries. During the race an athlete tends to drink a lot of water.

- (i) Explain how the athlete's body uses water to control body temperature.

(4 marks)

- (ii) Why do the kidneys produce less urine, even though the athlete drinks more water?

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

7. (a) Figure 2 shows the reproductive tract of the human female. Identify the parts labelled X and Y.

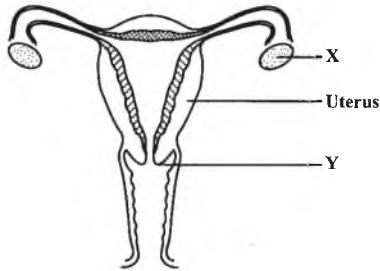


Figure 2. Reproductive tract of the human female

X: _____

Y: _____

(2 marks)

- (b) Name ONE birth control method used by males.

(1 mark)

- (c) During a class discussion, students tell their teacher that a female cannot become pregnant on the first occasion she has sexual intercourse. The teacher informs the students that they are incorrect.

- (i) Starting from the point of ejaculation, outline the process of fertilization.

(5 marks)

GO ON TO THE NEXT PAGE

- (ii) Write ONE statement which will explain the teacher's claim that a female can become pregnant on the first occasion she has sexual intercourse.

(2 marks)

Total 10 marks

8. (a) Complete EACH of the following sentences by writing the correct word from the list provided in brackets.

(reproduction, growth, replace, reproduce, inherited, genetic)

- (i) New cells are needed by the body for _____ and to _____ worn out cells.

- (ii) The new cells must have the same _____ information as the original cells. (3 marks)

- (b) Anita notices that she has no dimples but her sister, Sunita, has dimples.

Using **D** to represent the dominant gene for dimples, and **d** to represent the recessive gene for no dimples, deduce the genotype for Anita and Sunita.

Genotype of Parents:

Gametes:

Genotype of F_1 :

Genotype of Anita: _____

Genotype of Sunita: _____

(4 marks)

GO ON TO THE NEXT PAGE

- (c) Would the genes determining the presence or absence of dimples also determine the sex (gender) of an individual? Give ONE reason for your answer.

Answer: _____

Reason: _____

(3 marks)

Total 10 marks

9. (a) There has been an increase in the number of persons suffering from tuberculosis, and this, it is believed, is related to the AIDS epidemic.

- (i) State TWO methods for limiting the spread of AIDS and ONE method for limiting the spread of tuberculosis.

AIDS:

Tuberculosis:

(3 marks)

- (ii) Suggest ONE way in which tuberculosis is related to AIDS.

(3 marks)

GO ON TO THE NEXT PAGE

- (b) Your village is infested with mosquitoes. Using your knowledge of the life cycle of the mosquito, outline to the villagers TWO methods they should use to decrease the number of *Aedes aegypti* mosquitoes, and explain how these methods would reduce the mosquito population.

Method: _____

Explanation: _____

Method: _____

Explanation: _____

(4 marks)

Total 10 marks

10. As the human population increases, waste disposal becomes more important in maintaining a healthy environment.

- (a) Define EACH of the following terms:

- (i) Sewage

(2 marks)

- (ii) Biodegradable

(1 mark)

GO ON TO THE NEXT PAGE

- (b) Many hotels are built close to the ocean and some of them have faulty sewage treatment plants. Explain how the dumping of sewage into the ocean affects the oxygen content of the water, and the food chain.

Oxygen content: _____

Food chain: _____

(6 marks)

- (c) Give ONE reason why large quantities of disinfectants should NOT be added to sewage treatment plants.

(1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

SECTION B

Answer ANY TWO questions.

Write your answer on the pages provided at the end of this booklet.

11. (a) List TWO factors that affect the rate of breathing. **(2 marks)**
- (b) The air we breathe in contains 20% oxygen and only 0.04% carbon dioxide. The air we breathe out contains 16% oxygen and 4% carbon dioxide.

Explain what happens in the lungs to bring about this change in levels of oxygen and carbon dioxide. Your answer should include:

- the function of breathing
- the role of the blood in the lungs
- the structure and function of the lungs. **(10 marks)**

- (c) Your mother awakes one morning with a high fever, severe headaches and sore throat. She is diagnosed as having the flu.

- (i) What is the causative organism of the flu?
- (ii) State TWO OTHER symptoms your mom may experience.
- (iii) Advise your mother on THREE things she should do to relieve the symptoms of the flu.
- (iv) Should you drink from the same glass as your mom? Give ONE reason for your answer. **(8 marks)**

Total 20 marks

12. (a) Digestion is the process whereby food is broken down into smaller substances.
- (i) State ONE function of EACH of the following in the stomach:
 - a) Hydrochloric acid
 - b) Pepsin
 - c) Renin
 - (ii) In which organ of the body is bile produced and what is the function of bile in digestion? **(5 marks)**

GO ON TO THE NEXT PAGE

- (b) Your friend complains that she has not had a bowel movement for a few days. You suspect that she is constipated. Explain to your friend:
- Why faeces are said to be egested and NOT excreted
 - What occurs in the colon to cause constipation
 - THREE effects of constipation
 - THREE ways to ease constipation

(15 marks)

Total 20 marks

13. (a) Students in a class are asked to carry out an experiment on two solutions to test for the presence of a food nutrient as shown in Figure 3. They add 2 cm³ of Benedict's solution to each test tube and then boil the mixture.

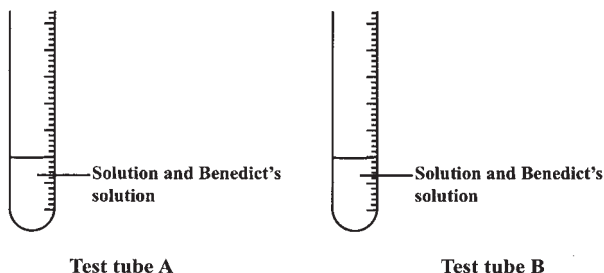


Figure 3. Food test

- Which food nutrient is being tested in the above experiment?
- Test tube B gives a positive result. What colour will be observed in Test tube B?
- Test tube A gives a negative result. What colour will be observed in Test tube A?

(3 marks)

- (b) Your middle-aged aunt, who is in excellent health, becomes concerned after hearing about the dangers of very high or very low blood sugar levels.

Explain to her how a healthy body maintains its blood sugar levels

- after a meal rich in carbohydrates is eaten
- several hours after the meal.

(12 marks)

GO ON TO THE NEXT PAGE

- (c) (i) What is 'diabetes mellitus'?
- (ii) State TWO symptoms of diabetes mellitus **and** suggest TWO ways in which the disease may be managed. **(5 marks)**

Total 20 marks

14. The supply of clean drinking water to large populations is becoming increasingly difficult and expensive.

- (a) (i) State TWO ways in which water could be purified at home.
- (ii) State THREE ways in which agricultural and industrial activities pollute water. **(5 marks)**
- (b) (i) Flood waters are usually contaminated with faeces. Explain how contaminated flood waters may be dangerous to your health. Your answer should include the causative organism and symptoms for
- ONE named disease caused by **drinking** contaminated water
 - ONE named disease caused by parasites.
- (ii) For EACH disease named in (b) (i) above, explain the treatment that may be administered to an infected person. **(12 marks)**
- (c) Large amounts of forest have been destroyed worldwide. Describe THREE ways in which deforestation impacts on the water cycle. **(3 marks)**

Total 20 marks

END OF TEST

CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE
EXAMINATION

SPECIMEN
MULTIPLE CHOICE QUESTIONS
FOR

HUMAN AND SOCIAL BIOLOGY

READ THE FOLLOWING DIRECTIONS CAREFULLY

Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.

Sample Item

Abnormally high blood pressure is called

- (A) hypotension
- (B) distension
- (C) hypertension
- (D) hyperglycaemia

Sample Answer



The best answer to this item is “hypertension”, so answer space (C) has been shaded.

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1. All living organisms carry out certain activities which make them different from inanimate objects.
- Which one of the following lists shows three activities of all living organisms?
- (A) Movement, decay, synthesis
(B) Respiration, nutrition, preservation
(C) Exercise, irritability, metabolism
(D) Reproduction, excretion, growth
2. Which nutrients are classified as the macronutrients?
- (A) Proteins, minerals, vitamins
(B) Carbohydrates, fats, proteins
(C) Vitamins, fibre, water
(D) Iron, Codliver-Oil, milk
3. The function of the lymphatic system in the human body is to
- (A) carry the tissue fluid out of the body
(B) bring nutrients back to the body
(C) remove excess fluid and foreign material from the tissue spaces
(D) remove poisonous substances and other waste materials from the blood
4. Mouth to mouth resuscitation should be administered only when the casualty
- (A) is unconscious
(B) is unable to speak
(C) has shallow breathing
(D) is unable to breathe
5. Which of the following are functions of cartilage:
- I. form a barrier between bones
II. lengthen the space between bones
III. reduce friction between bones
IV. prevent shock between bones
- (A) I and II only
(B) I and IV only
(C) II and III only
(D) III and IV only
6. Which of the following are functions of the skin?
- I. Produces hair
II. Excretes sweat
III. Protects from injury
IV. Produces body temperature
- (A) I and II only
(B) I and IV only
(C) II and III only
(D) III and IV only
7. When a voluntary action occurs all of the following take place EXCEPT
- (A) a stimulus originates in the cerebrum
(B) an efferent nerve impulse is transmitted down the white matter of the spinal cord
(C) the impulse is sent via sensory nerves to the spinal cord
(D) impulse is taken via the motor neurone to the effector muscle
8. Fertilization occurs when
- (A) semen is expelled into the vagina
(B) the sperms enter the oviduct
(C) the sperm fuses with the ovum
(D) implantation occurs

9. Which of the following symptoms occur during an asthmatic attack?
- (A) Shortness of breath, wheezing, bronchospasms
 - (B) Wheezing, coughing, vomiting
 - (C) Shock, coughing, shortness of breath
 - (D) Chest pains, bronchospasms, partial expiration

10. Which of the following vectors causes dengue haemorrhagic fever?
- (A) Anopheles mosquito
 - (B) Bats
 - (C) Rats
 - (D) Aedes agypti mosquito

11. Which of the following shows the correct path for sperms to exit the body?
- (a) Testis → epididymis → vas deferens → urethra
 - (b) Epididymis → testis → vas deferens → urethra
 - (c) Vas deferens → epididymis → testis → urethra
 - (d) Vas deferens → testis → epididymis → urethra

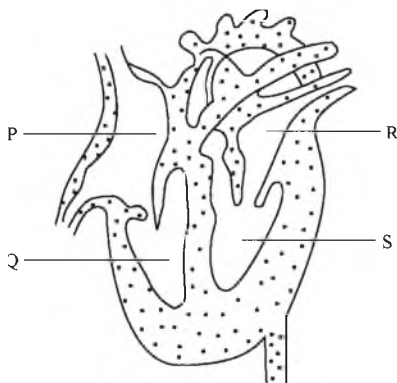
Item 12 - 14 refer to the following information.

The group below consists of four lettered headings followed by three numbered phrases. For each numbered phrase, select one heading which is most closely related to it. Each heading may be used once, more than once or not at all.

- (A) Nucleus
 - (B) Ribosome
 - (C) Mitochondrion
 - (D) Cell membrane
12. Makes proteins for the cell
13. Controls the passage of materials into the cell
14. Controls the activities of the cell

15. The function of the bile is to
- (A) convert fats into fatty acids and glycerol
 - (B) emulsify fats
 - (C) digest proteins
 - (D) neutralise the contents of the stomach

Item 16 refers to the following diagram which shows a section through the heart.



16. Which chamber of the heart is the first to receive oxygenated blood?
- (A) P
 - (B) Q
 - (C) R
 - (D) S
17. Which of the following statements are true of aerobic respiration?
- I. Produces a large amount of energy
 - II. Carbon dioxide is always produced
 - III. Produces lactic acid
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II, and III

GO ON TO THE NEXT PAGE

18. Which is NOT a function of the human skeleton?
- (A) Protects the spinal cord
 - (B) Produces blood cells
 - (C) Produces vitamin D
 - (D) Assists in breathing

Item 19 refers to the information in the table below. Which row in the table correctly matches the disease with the causative agent?

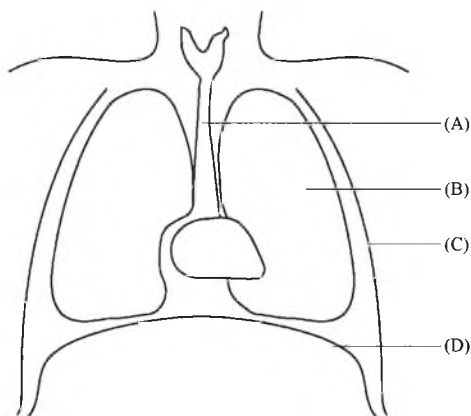
	Gonorrhoea	AIDS	Syphilis	Herpes
(A)	Virus	Bacterium	Virus	Bacterium
(B)	Bacterium	Virus	Bacterium	Virus
(C)	Virus	Virus	Bacterium	Bacterium
(D)	Bacterium	Bacterium	Virus	Virus

20. Which of the following actions occurs when a person feels cold?
- (A) Blood vessels constrict
 - (B) Blood vessels dilate
 - (C) Hairs on the skin lie flat
 - (D) Blood vessels move closer to the skin

21. Which of the following best describes what happens during exhalation?

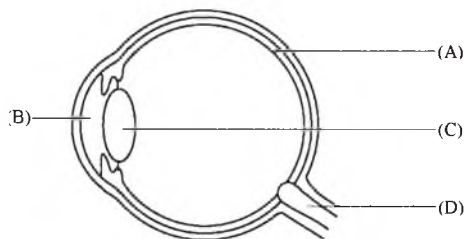
	Ribcage	Diaphragm
(A)	moves up	flattens
(B)	moves down	curves upward
(C)	moves down and in	curves upward
(D)	moves up and out	does not move

Items 22 – 24 refer to the diagram below. Match the parts of the thorax with the numbered phrases below. Each part may be used once, more than once or not at all.



22. Contains air sacs or alveoli
23. A muscular organ that moves to change the volume of the thorax
24. Is a pathway for air to enter the lungs
25. Andrea leaves a brightly lit area and ventures into a dark closet. Which of the following changes occur in the eye?
- (A) Radial muscles of the iris contract and the pupils become larger
- (B) Circular muscles of the iris contract and the pupils increase in size
- (C) Pupils decrease in size because the radial muscles in the iris relax
- (D) Pupils decrease in size due to the contraction of the circular muscles of the iris

Items 26 – 28 refer to the diagram below. Match the parts of the eye with the numbered phrases below. Each part may be used once, more than once, or not at all.



26. Contains cells called rods and cones.
27. Changes thickness to facilitate production of images
28. Transmits impulses to the brain
29. Which of the following tasks is or are performed by the kidneys?
- I. Elimination of toxins
- II. Getting rid of all metabolic waste
- III. Maintaining blood composition
- (A) I only
- (B) III only
- (C) I and III only
- (D) I and II only
30. A food chain shows the
- (A) feeding relationships between animals
- (B) location of organisms in an ecosystem
- (C) feeding relationships among living organisms
- (D) dependence of animals on each other
31. The energy to drive a food chain comes from
- (A) the plant
- (B) carbon dioxide
- (C) chlorophyll
- (D) the sun

GO ON TO THE NEXT PAGE

32. Which of the following processes occur during meiosis?
- I. Two cell divisions
 - II. Production of four diploid cells
 - III. Movement of chromosomes
 - IV. Creation of spindle
- (A) I, II, and IV only
(B) II, III, and IV only
(C) I, III and IV only
(D) II and III only
33. Which of the following must be done when preparing food?
- I. Sanitize all surfaces
 - II. Use disposable paper towels instead of dish cloths and tea towels
 - III. Avoid handling the food too much
 - IV. Wash hands only when visibly dirty
- (A) I, II and IV only
(B) I, II and III only
(C) II, III, and IV only
(D) I and II only
34. Anthony is vaccinated against a disease on Monday and the antibody concentration increases rapidly. However, there is a gradual decrease in antibody concentration over the next few days. What type of immunity does Anthony experience?
- (A) Active
(B) Naturally acquired
(C) Active artificial
(D) Passive artificial
35. The blood vessel that takes blood from the heart to the lungs is called the
- (A) pulmonary vein
(B) aorta
(C) vena cava
(D) pulmonary artery
36. Which teeth are used for cutting pieces of food?
- (A) Incisors
(B) Canines
(C) Premolars
(D) Molars

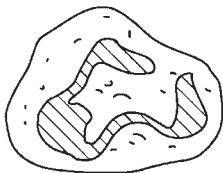
Item 37 refers to the following diagrams which show structures found in the blood.

37. Which structure is phagocytic in nature?

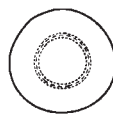
(A)



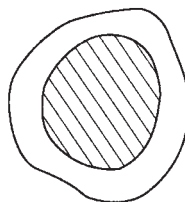
(C)



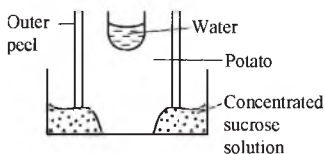
(B)



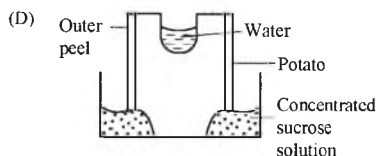
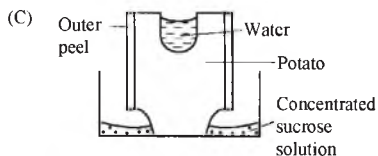
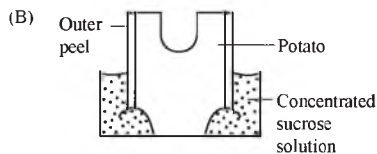
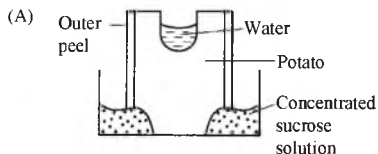
(D)



The diagram below which shows an experiment used to investigate the process of osmosis in potato tissue.



38. Which diagram shows the results after twenty-four hours?



39. Table 1 shows the approximate percentages of three gases in inspired air. Which column in Table 2 shows the approximate composition of expired air?

TABLE 1

	Inspired Air
Co ₂	0.03
N ₂	79
O ₂	21

TABLE 2

	(A)	(B)	(C)	(D)
Carbon dioxide	0.03	10	5	15
Nitrogen	60	86	79	79
Oxygen	40	4	16	6

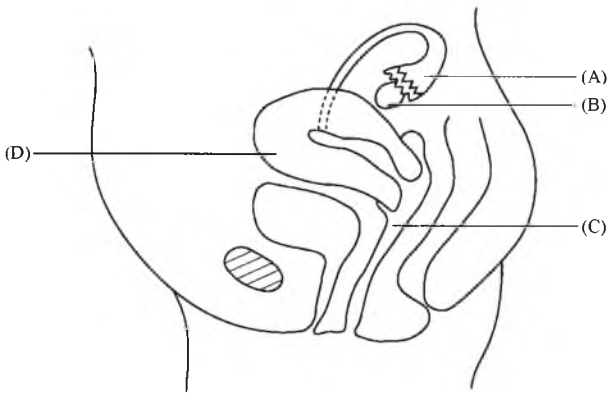
40. Which structure of the brain is responsible for the regulation of water content in the blood?

- (A) Pituitary gland
- (B) Hypothalamus
- (C) Cerebrum
- (D) Cerebellum

GO ON TO THE NEXT PAGE

41. Which is the correct path of travel for an impulse from the receptor to the effector in a reflex action?
- (A) Dendron - motor neurone - intermediate neurone - sensory neurone - axon
 - (B) Axon - motor neurone - intermediate neurone - sensory neurone - dendron
 - (C) Axon - sensory neurone - intermediate neurone - motor neurone - axon
 - (D) Dendron - sensory neurone - intermediate neurone - motor neurone - axon

Item 42 - 44 refer to the following diagram of the female reproductive system. Match the lettered parts to the numbered phrases below. Each part may be used once, more than once, or not at all.



- 42. Produces the female gametes
- 43. Where fertilization occurs
- 44. Facilitates the development of the foetus

45. Obesity may be caused by all of the following EXCEPT
- (A) protein
 - (B) roughage
 - (C) carbohydrate
 - (D) milk
46. Which sequence best represents a simple carbon cycle?
- (A) Carbon dioxide → man → bacteria → soya beans → carbon dioxide
 - (B) Carbon dioxide → bacteria → earthworms → green plants → carbon dioxide
 - (C) Carbon dioxide → grass → sheep → man → carbon dioxide
 - (D) Carbon dioxide → bacteria → soya beans → man → carbon dioxide
47. The function of nitrifying bacteria is to convert
- (A) nitrates to protein
 - (B) nitrogen gas to nitrates
 - (C) nitrites to nitrates
 - (D) nitrogen gas to urea
48. An enzyme shows optimum activity at pH 2.5. In which part of the alimentary canal will this enzyme be most active?
- (A) Duodenum
 - (B) Ileum
 - (C) Mouth
 - (D) Stomach
49. Zena cuts her finger while peeling an orange. Which of the following components of the blood will assist in reducing bleeding?
- (A) White blood cells
 - (B) Blood platelets
 - (C) Red blood cells
 - (D) Haemoglobin
50. Tar is a component of cigarette smoke. What is the MOST LIKELY effect of tar in the body of a cigarette smoker?
- (A) A reduction of oxygen going to the blood
 - (B) An increase in the absorption of oxygen
 - (C) An reduction of carbon monoxide in the blood
 - (D) An increase in the amount of carbon dioxide leaving the blood
51. Which of the following diseases may be described as chronic?
- (A) Typhoid
 - (B) Diabetes
 - (C) Cholera
 - (D) Dengue
52. Which of the following items BEST represent materials which can be recycled?
- (A) Plastics, tin cans, fabric
 - (B) Plastics, glass bottles, discarded food
 - (C) Tin cans, plastics, paper
 - (D) Paper, discarded food, tin cans
53. The trachea is lined with hair-like structures called
- (A) villi
 - (B) cells
 - (C) cilia
 - (D) flagella
54. Which of the following is a definitive sign of malnutrition?
- (A) Albinism
 - (B) Dwarfism
 - (C) Overweight
 - (D) Shiny hair

55. Which of the following results in coronary artery disease?
- (A) Cirrhosis
 - (B) Atherosclerosis
 - (C) Arthritis
 - (D) Phagocytosis
56. What are the two main types of the respiration?
- (A) Aerobic and anaerobic
 - (B) Cellular and non-cellular
 - (C) Lung and heart
 - (D) Mitosis and meiosis
57. Which ion initiates muscle contraction?
- (A) Magnesium
 - (B) Sodium
 - (C) Potassium
 - (D) Calcium
58. Which of the following substances lowers blood sugar?
- (A) Glucagon
 - (B) Glycogen
 - (C) Insulin
 - (D) Adrenalin
59. The long process of a nerve cell which conducts impulses towards a cell body is called
- (A) dendron
 - (B) axon
 - (C) dendrites
 - (D) ganglia
60. Which of the following is an example of a congenital defect?
- (A) birth mark
 - (B) Down's syndrome
 - (C) big head
 - (D) nightblindness

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE
EXAMINATION

HUMAN AND SOCIAL BIOLOGY

SPECIMEN PAPER 2008

Item No.	Key
1	D
2	B
3	C
4	D
5	D
6	C
7	A
8	C
9	A
10	D
11	A
12	B
13	D
14	A
15	B
16	C
17	A
18	C
19	B
20	A
21	C
22	B
23	D
24	A
25	A
26	A
27	C
28	D
29	C
30	C

Item No.	Key
31	D
32	C
33	B
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35	D
36	A
37	C
38	B
39	C
40	B
41	C
42	B
43	A
44	D
45	B
46	C
47	C
48	D
49	B
50	A
51	B
52	C
53	C
54	C
55	B
56	A
57	D
58	C
59	A
60	B

TEST CODE **01253020**

FORM TP 2009010

JANUARY 2009

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

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

- 1.** This paper consists of **FOURTEEN** questions in **TWO** sections.
- 2.** **SECTION A** consists of **TEN** questions. Answer **ALL TEN** questions. Write your answer in the space provided in this answer booklet. Each question is worth **10 marks**.
- 3.** **SECTION B** consists of **FOUR** questions. Answer **ONLY TWO** questions. Write your answer on the pages provided at the end of this booklet. Each question is worth **20 marks**.

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01253020/JANUARY 2009

SECTION A

Answer ALL questions in this section.

1. Conservationists are concerned about the extinction of whales, dolphins and sharks.

(a) Develop a food chain of FOUR organisms, ONE of which MUST include the dolphin OR shark.

(3 marks)

(b) Use your knowledge of food chains to explain how a permanent ban on the fishing of whales, dolphins and sharks would affect the ecosystem.

(4 marks)

(c) Define EACH of the following terms:

(i) Carnivore

(ii) Herbivore

(iii) Omnivore

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

2. (a) A student sets up an experiment, as shown in Figure 1, to demonstrate the process of osmosis.

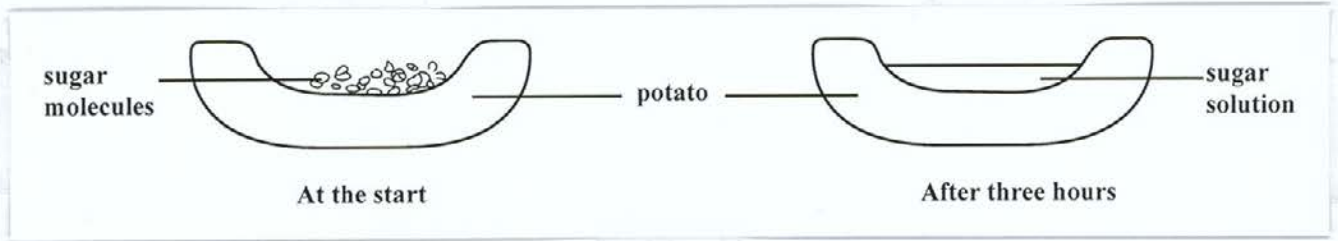


Figure 1. Experiment to demonstrate osmosis

- (i) Complete the statement below by writing the correct word or words chosen from the list provided in brackets.

(solute, sugar molecules, water molecules, sugar solution)

Osmosis involves the movement of _____

from a region of high concentration to a region of low concentration of

_____.

(2 marks)

- (ii) Give ONE example of the process of osmosis occurring in the human body.

(1 mark)

- (b) During his visit to the medical doctor, Mr Douglas learns that he has sugar in his urine.

- (i) Is it normal for a healthy person to have sugar in his or her urine?

(1 mark)

- (ii) Ultrafiltration forces water, salts and glucose into the Bowman's capsule. Describe the process of ultrafiltration in the tubules of the kidneys.

(2 marks)

- (iii) Name the process by which glucose is reabsorbed into the blood in the tubules of the kidneys.

(1 mark)

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- (iv) Name ONE common disease which Mr Douglas may have, based on his urine test.

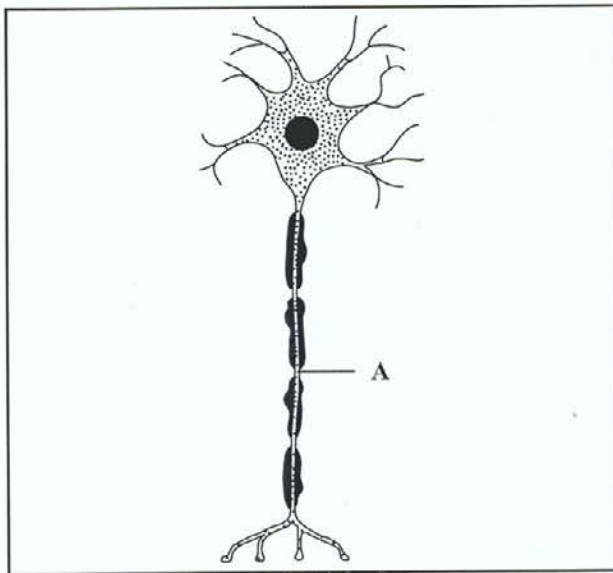
_____ (1 mark)

- (v) Suggest TWO measures which the doctor may recommend to Mr Douglas to treat the disease named in (iv) above.

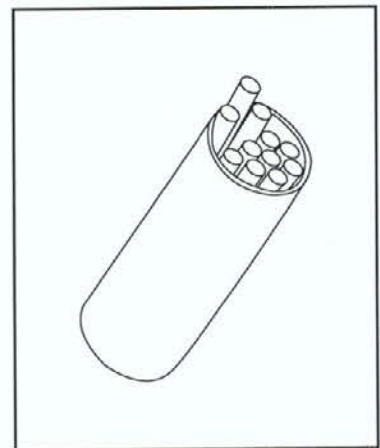
_____ (2 marks)

Total 10 marks

3. (a) Figure 2 shows drawings of a nerve and a neurone found in the nervous system of humans.



Structure I



Structure II

Figure 2. Parts of the nervous system in humans

- (i) Identify Structure I and Structure II in Figure 2.

I: _____

II: _____

- (ii) What is the name of the part labelled A in Structure I in Figure 2?

A: _____

(3 marks)

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(b) A new sweetener is found to interfere with the neurotransmitters (chemicals) released at synapses in the nervous system.

(i) What feature of a synapse makes neurotransmitters (chemicals) necessary?

(2 marks)

(ii) How do neurotransmitters function at synapses?

(2 marks)

(iii) Why would persons taking the new sweetener experience difficulty responding to stimuli?

(1 mark)

(iv) What may be the effect if the sweetener causes spontaneous release of neurotransmitters at synapses?

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

4. (a) Complete the following sentences by writing the correct word or words chosen from the list provided in brackets.

(blood, glucose, fats, oxygen, lymphocytes, waste products)

Food molecules, such as, _____ and substances such as, _____ are carried to the cells where they are needed.

The blood also collects and carries away _____ from the cells. (3 marks)

- (b) Mrs Eaton's blood vessels, supplying blood to the heart muscle itself, have become clogged with fatty substances.

Use your knowledge of the heart and circulatory system to answer the following questions.

- (i) Identify a medical condition that Mrs Eaton is **LIKELY** to suffer and **ONE** symptom of this condition.

Condition:

Symptom:

(2 marks)

- (ii) Explain how the clogged blood vessels will affect the heart and hence the body.

Effect on the heart:

Effect on the body:

(5 marks)

Total 10 marks

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5. (a) Figure 3 shows the detailed structure of part of a lung and its blood supply.

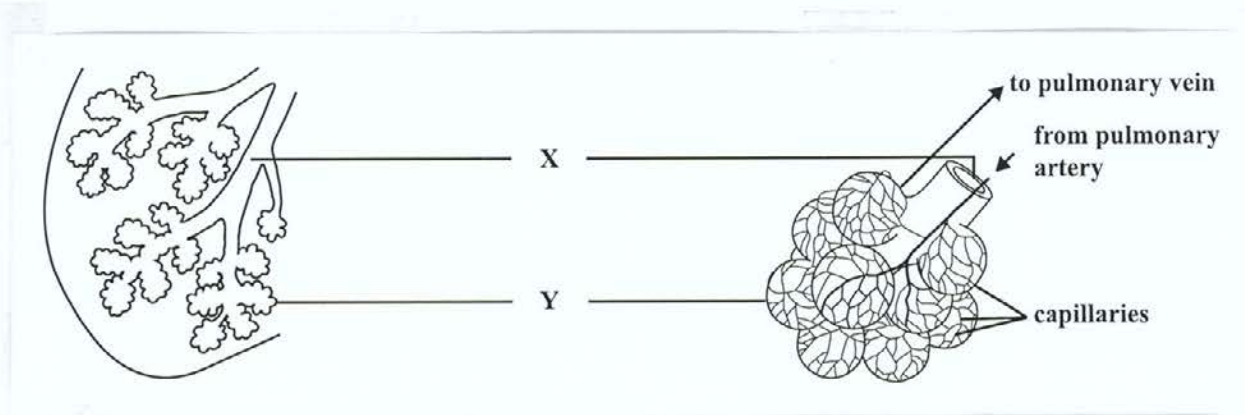


Figure 3. Detailed structure of part of a lung

Name the parts labelled X and Y in Figure 3.

- (i) X:

- (ii) Y:

(2 marks)

- (b) Define the term 'vital capacity'.

(1 mark)

- (c) During a sprint race both aerobic and anaerobic respiration occur in an athlete's body.
- (i) Explain the processes of aerobic and anaerobic respiration taking place during the sprint race.

Aerobic respiration:

Anaerobic respiration:

(5 marks)

- (ii) Explain why anaerobic respiration occurs **after** aerobic respiration in the athlete's body.

(2 marks)

Total 10 marks

6. (a) (i) Name ONE water-soluble vitamin and ONE fat-soluble vitamin.
Water-soluble:

Fat-soluble:

(2 marks)
- (ii) Which vitamin, when deficient, causes night blindness?

(1 mark)
- (b) For years Mr Henry has been having too much carbohydrate in his diet, and no physical exercise. This has affected his health.
- (i) What is the end-product of carbohydrate digestion?

(1 mark)
- (ii) Excess carbohydrate leads to excess end-product for Mr Henry. State what happens to the excess end-product of carbohydrate digestion.

(2 marks)
- (iii) Suggest ONE possible disease which may have resulted from Mr Henry's diet of excess carbohydrate, and no physical exercise.

(1 mark)
- (c) Explain how too little calcium in the diet over a prolonged period of time affects the body.

(3 marks)

Total 10 marks

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7. (a) Define the term 'homoeostasis', giving ONE example relating to the human body.

Homoeostasis:

Example :

(3 marks)

- (b) Figure 4 shows blood glucose levels over a two-hour period after breakfast.

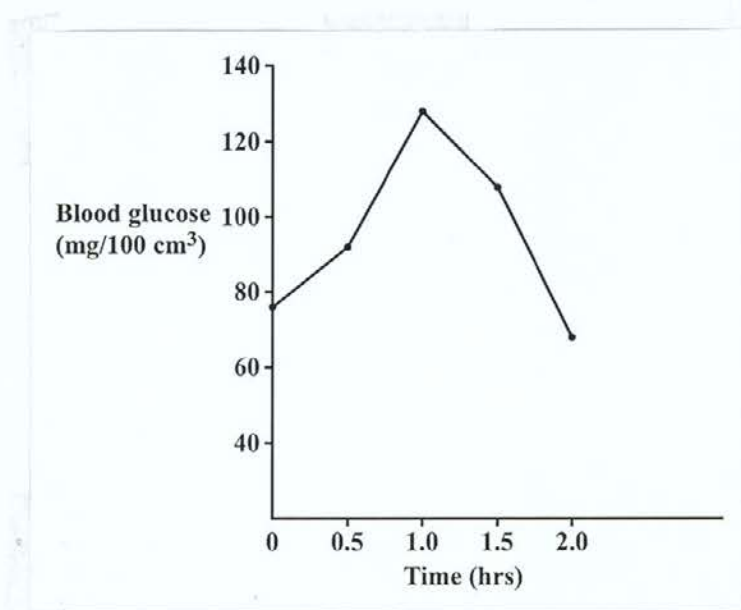


Figure 4. Blood glucose levels after breakfast

- (i) Describe the shape of the graph in Figure 4, in terms of blood glucose levels and time after breakfast.

(3 marks)

- (ii) Name the hormone responsible for the fall in glucose levels in Figure 4, and explain how this hormone causes the fall in blood glucose levels.

Hormone:

Explanation:

(4 marks)

Total 10 marks

8. (a) Complete the statement below by writing the correct word chosen from the list provided in brackets.

(ribosome, DNA, RNA, chromosome, cytoplasm, nucleus)

A gene consists of part of a _____ molecule arranged on a _____ in the _____.

(3 marks)

- (b) Your friend, Marc, completed Table 1 below to show the differences between mitosis and meiosis. Some of his information is **incorrect**.

TABLE 1: DIFFERENCES BETWEEN MITOSIS AND MEIOSIS

Mitosis	Meiosis
1. Two cell divisions.	One cell division.
2. Occurs in normal body cells.	Occurs in the formation of gametes.
3. Nuclei have genes mixed by crossing over.	Nuclei have identical genes.
4. Provides variation.	Produces clones.
5. Ensures the haploid number of chromosomes.	Ensures the diploid number of chromosomes.

Complete Table 2 below to show FIVE CORRECT differences between mitosis and meiosis.

TABLE 2: DIFFERENCES BETWEEN MITOSIS AND MEIOSIS

Mitosis	Meiosis

(5 marks)

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- (c) Brown eyes are dominant to blue eyes. Mr and Mrs Browne have three children with brown eyes and one child with blue eyes. Both Mr and Mrs Browne have brown eyes. What is the genotype for eye colour for Mr and Mrs Browne, and the genotype of their children? Show your working.

Mr and Mrs Browne :

Gametes :

F₁ :

(2 marks)

Total 10 marks

9. (a) (i) Define the term 'vector'.

(2 marks)

- (ii) Which vector is responsible for the spread of dengue fever in the Caribbean?

(1 mark)

- (b) You are preparing a poster for dengue fever awareness in your community. Using your knowledge of the disease, what information would you include with respect to EACH of the following?

- (i) The organism which causes the disease

(1 mark)

- (ii) The form of the disease in which there is bleeding

(1 mark)

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10. (a) What are the TWO MAIN constituents of sewage?

_____ (2 marks)

(b) On a visit to a sewage treatment plant you observe that at the end of the treatment, dirty waste water is collected but clear water is discharged into a nearby river.

Explain the processes which transform the dirty water into clean water.

_____ (5 marks)

(c) (i) Smoke and high concentrations of sulphur dioxide cause a reducing smog. Photochemical smogs are caused by sunlight reacting with pollutants from car exhausts.

Name ONE source of the sulphur dioxide.

_____ (1 mark)

(ii) Suggest ONE way in which EACH of the following affects human beings.

Reducing smog:

Photochemical smog:

_____ (2 marks)

Total 10 marks

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SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of this booklet.

11. (a) State ONE function of EACH of the following parts of the reproductive system:
- (i) Testis
 - (ii) Urethra
 - (iii) Oviduct
 - (iv) Ovary
 - (v) Vas deferens (5 marks)
- (b) Birth control methods are being promoted in underdeveloped countries as a means of controlling population growth. Discuss FOUR advantages and FOUR disadvantages of controlling population growth. (8 marks)
- (c) Use your knowledge of the menstrual cycle and fertilisation to explain EACH of the following.
- (i) Menstruating females can become pregnant during only a few days each month.
 - (ii) Females taking the pill do NOT normally become pregnant.
 - (iii) Very young females and very old females CANNOT normally become pregnant. (7 marks)

Total 20 marks

12. (a) (i) State TWO functions of bones and ONE function of cartilage. (3 marks)
- (ii) Name the type of joints found at the
- a) shoulder
 - b) knee. (2 marks)
- (b) In a degenerative disease which affects elderly people, the cartilage in the knee is lost. Predict how the loss of knee cartilage would affect the function of the knee. (3 marks)
- (c) A cricketer, who injured his biceps, cannot bend his arm.
- Use your knowledge of bones, tendons and muscles to explain why he cannot bend his arm. (9 marks)
- (d) Explain why a broken shoulder bone would affect movement of the lower arm. (3 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

13. (a) Name the organism which causes leptospirosis. (1 mark)
- (b) Identify the animal vector which commonly carries leptospirosis in the Caribbean. (1 mark)
- (c) Give THREE mild symptoms of leptospirosis. (3 marks)
- (d) Hurricane Gilbert caused floods in Jamaica, resulting in an increase in leptospirosis.
- (i) Suggest how the floods may have caused an increase in the incidence of leptospirosis. (10 marks)
- (ii) What treatment is given to a person with leptospirosis? (1 mark)
- (iii) Advise your community on FOUR ways to reduce the incidence of leptospirosis. (4 marks)

Total 20 marks

14. (a) Explain what is meant by EACH of the following terms as it applies to solid waste:
- Reuse
 - Recycle
 - Reduce
 - Biodegradable
 - Non-biodegradable (5 marks)
- (b) In some countries, garbage is dumped in an area set aside for solid waste. A lot of smoke and bad smells arise from this area or 'dump'.
- (i) What is the cause of the bad smell? (2 marks)
- (ii) Suggest FIVE kinds of materials that make up the garbage in such an area. (5 marks)
- (iii) Explain how this garbage area can be harmful to health. (6 marks)
- (iv) Why is a landfill safer than a dump? (2 marks)

Total 20 marks

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**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

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DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

SECTION A

Answer ALL questions in this section.

1. Living things use materials from the environment. Some of these materials are cycled in nature and returned to the environment.

(a) Carbon is one element which is cycled in nature. Figure 1 shows a part of the carbon cycle.

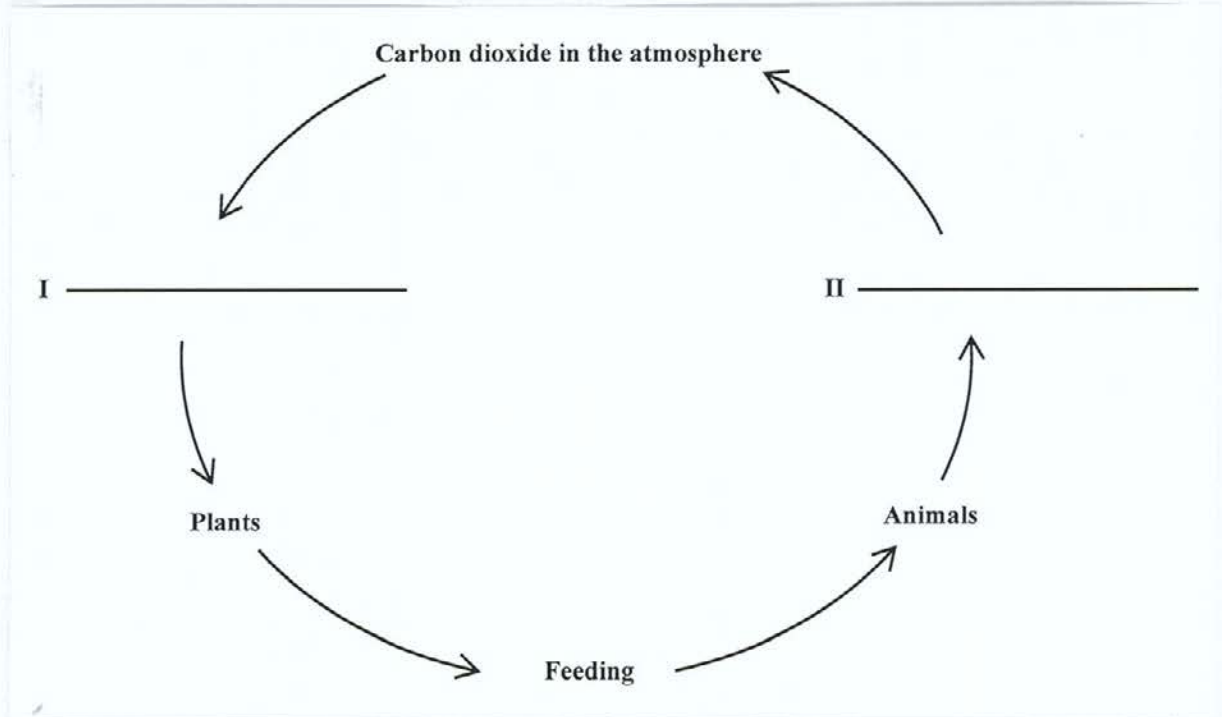


Figure 1. Part of the carbon cycle

(i) From the list given in brackets below, identify the processes at I and II in Figure 1. Write your answers in the spaces provided in Figure 1.

(respiration, digestion, osmosis, photosynthesis).

(2 marks)

(ii) The lungs are responsible for removing carbon dioxide from the body. Which structure in the lungs is responsible for gaseous exchange?

(1 mark)

(b) Nitrogen is another element which is cycled in nature. Plants use nitrogen in the form of nitrates.

(i) Explain the role of nitrifying bacteria in making nitrates available to plants.

(3 marks)

(ii) Explain how nitrates in the soil are returned to the atmosphere as nitrogen gas.

(2 marks)

(c) Decomposers, like bacteria and fungi, feed on dead organisms and waste droppings from animals, and release nutrients into the soil.

One way human beings can utilize decomposers is in the production of biogas.

Suggest TWO OTHER ways in which human beings can utilize decomposers to benefit their daily lives.

(2 marks)

Total 10 marks

2. (a) Figure 2 shows an outline of part of the human body.

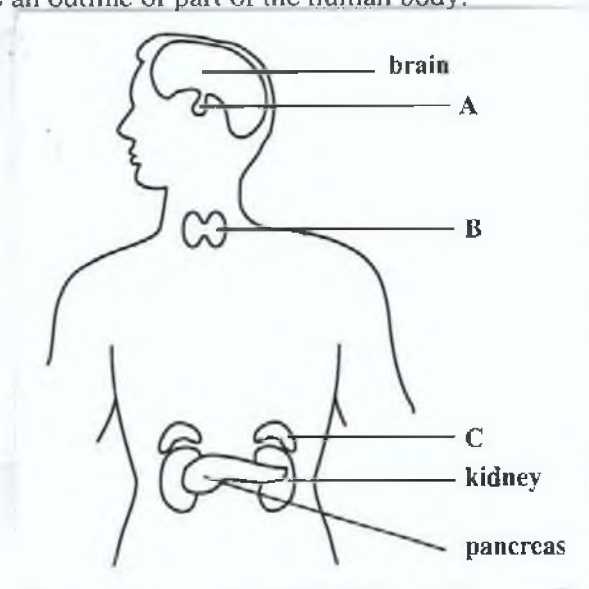


Figure 2. Outline of part of the human body

- (i) Name the endocrine glands labelled A, B and C in Figure 2.

A : _____

B : _____

C : _____

(3 marks)

- (ii) Why is the pancreas considered as BOTH an endocrine gland and an exocrine gland?

Endocrine: _____

Exocrine: _____

(3 marks)

GO ON TO THE NEXT PAGE

(b) Diabetes mellitus is a common disease among Caribbean people.

(i) Which hormone, produced by the pancreas, is likely to be deficient in people suffering from diabetes mellitus?

_____ (1 mark)

(ii) Explain how the hormone named in 2 (b) (i) above functions to lower blood glucose levels.

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

3. Human beings need a variety of foods for healthy living.

(a) (i) Define the term 'malnutrition'.

(2 marks)

(ii) Fashion models tend to view slimming as very important for their profession. When taken to the extreme, slimming can lead to a mental illness called anorexia nervosa.

Describe THREE effects of anorexia nervosa on an individual.

(3 marks)

(b) Your friend, Ancil, thinks that human beings should not have fibre in their diet.

(i) Name ONE food which is high in fibre.

(1 mark)

(ii) Advise Ancil of ONE reason why fibre is important to his diet.

(1 mark)

(c) Ancil drinks water with all his meals. Suggest THREE functions of water in the human body.

(3 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

4. Many countries in the Caribbean use family planning as a means of controlling population. This is achieved by the use of natural or artificial methods.

(a) (i) Name ONE natural method of birth control.

Natural method: _____ (1 mark)

(ii) Name TWO artificial methods of birth control, OTHER THAN the contraceptive pill.

Artificial methods: _____

(2 marks)

(b) Complete the following sentences by writing the correct word from the list given in brackets below.

(medical, natural, genetic, abuse, rape)

Spontaneous abortion is nature's way of controlling population. Sometimes, spontaneous abortion occurs when the foetus has a _____ problem.

In some countries, a _____ abortion may be performed in cases of _____, or if the foetus is deformed in some way.

(3 marks)

(c) Mrs. Wise believes that the most reliable method of birth control is the contraceptive pill. Explain how the contraceptive pill functions to prevent pregnancy.

(2 marks)

(d) Suggest TWO benefits to a family of having a small number of children.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

5. (a) Gastroenteritis is caused by typhoid, cholera and amoebic dysentery.

(i) Complete the following sentences by writing the correct word from the list given in brackets below.

(damage, pain, lungs, intestines, bacterium, virus)

Gastroenteritis results from _____ to the walls of the stomach and _____ by inflammation.

Typhoid is caused by a _____ .

(3 marks)

(ii) Suggest ONE method of treating someone who has typhoid.

_____ (1 mark)

(b) Your friend, Indar, has dengue fever, which is caused by a pathogen, and the doctor says that he needs a lot of fluids and rest.

(i) A pathogen is a disease-causing organism, for example, a virus or bacterium. How is a vector different from a pathogen?

Vector: _____

_____ (2 marks)

(ii) Identify the pathogen and the vector for Indar's disease (dengue fever).

Pathogen: _____

Vector: _____

(2 marks)

(iii) Suggest TWO symptoms of the dengue fever which Indar may be experiencing.

_____ (2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

6. (a) (i) What is meant by the term 'drug abuse'?
- _____
- _____
- (1 mark)
- (ii) Name TWO commonly abused legal (social) drugs in the Caribbean.
- _____
- _____
- (2 marks)
- (b) A woman who smokes gives birth to a small baby, who dies within one week of its birth.
- (i) Suggest how smoking causes babies to be smaller than normal.
- _____
- _____
- (2 marks)
- (ii) Nicotine passes across the placental barrier to the foetus. Describe the effect of nicotine on **infants**.
- _____
- (1 mark)
- (iii) Name ONE OTHER way in which nicotine may be passed to an **infant** from the mother.
- _____
- (1 mark)
- (c) Suggest TWO effects of **alcohol** consumption on the foetus.
- _____
- _____
- (2 marks)
- (d) Breast feeding is the recommended form of nutrition for babies.
- What form of immunity is passed from the mother to the baby by breast milk?
- _____
- (1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

7. Human beings in early civilization did not pollute their environment. They maintained the balance of nature.

(a) (i) Define the term 'pollution'.

(2 marks)

(ii) ONE type of pollution is air pollution. Name ONE OTHER type of pollution.

(1 mark)

(b) Vehicular transport causes pollution by the pollutant, carbon dioxide, CO₂. Suggest TWO OTHER pollutants resulting from vehicles.

(2 marks)

(c) A vast amount of carbon dioxide, CO₂, is produced by human activities. This CO₂ forms a blanket over the earth, leading to what is described as the greenhouse effect. Figure 3 is a diagrammatic representation of how the greenhouse effect may be responsible for global warming.

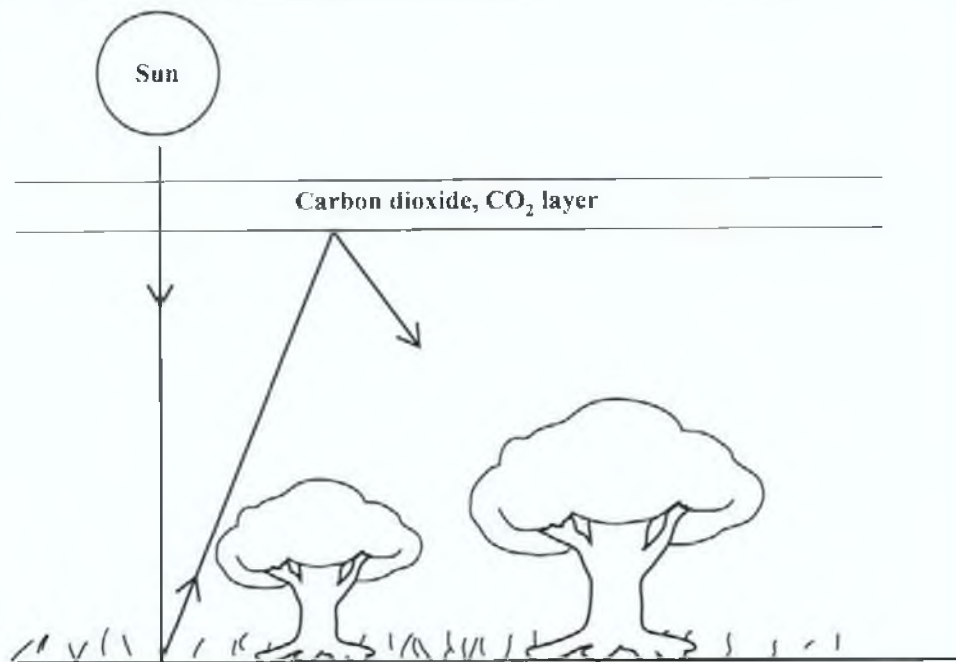


Figure 3. The greenhouse effect

GO ON TO THE NEXT PAGE

- (i) Complete the following sentences by writing the correct word from the list given in brackets below.

(heat, light, CO₂, radiation)

The sun radiates _____ energy which passes through the CO₂ layer. This is converted to _____ energy which cannot pass through the CO₂ layer. This _____ becomes trapped in the atmosphere over the earth's surface, causing global warming.

(3 marks)

- (ii) Suggest TWO possible effects of global warming.

(2 marks)

Total 10 marks

8. In the Caribbean, waste disposal is becoming increasingly important to maintaining a healthy society.

(a) Solid waste may be categorized as biodegradable or non-biodegradable.

(i) What is meant by 'non-biodegradable'?

(1 mark)

(ii) Give ONE example of a biodegradable waste material and ONE example of a non-biodegradable waste material.

Biodegradable: _____

Non-biodegradable: _____

(2 marks)

(b) It is possible to reuse, reduce or recycle household waste. Write ONE word from the list in brackets, which BEST applies to EACH of the following situations. EACH word must be used ONCE.

(reuse, reduce, recycle)

(i) Mrs. Karing puts all her empty bottles in a green bin, and all old newspapers and magazines in a blue bin, for the garbage collector.

(1 mark)

(ii) Mr. Atkin takes his water bottle to the supermarket to have it refilled.

(1 mark)

(iii) Mrs. Ram takes her basket to the market. She does not buy vegetables from Mr. Daniel because he packages his vegetables in plastic bags. She buys from Mr. Peter, who does not use plastic bags. She puts all the vegetables which she buys in her basket.

(1 mark)

GO ON TO THE NEXT PAGE

- (c) Dumps and landfills are used to dispose of solid waste. A dump is a hole in the ground where garbage is thrown. Suggest TWO negative effects of a dump.

(2 marks)

- (d) Suggest TWO benefits of proper disposal of household and industrial waste.

(2 marks)

Total 10 marks

9. Viruses and bacteria are pathogens, causing diseases like the common cold, AIDS and cholera.

(a) Determine whether EACH of the following statements is true or false. Write TRUE next to the true statements and FALSE next to the false statements.

- (i) All bacteria are parasites. _____
- (ii) There are harmful and useful bacteria. _____
- (iii) A virus is a non-cellular organism. _____

(3 marks)

(b) Zara's class tests a sample of water for bacteria. Zara explains that a similar test can be used to test for the presence of bacteria in the mouth.

She sets up an experiment to demonstrate to her classmates that bacteria are present in the mouth. Figure 4 shows the steps which Zara followed.

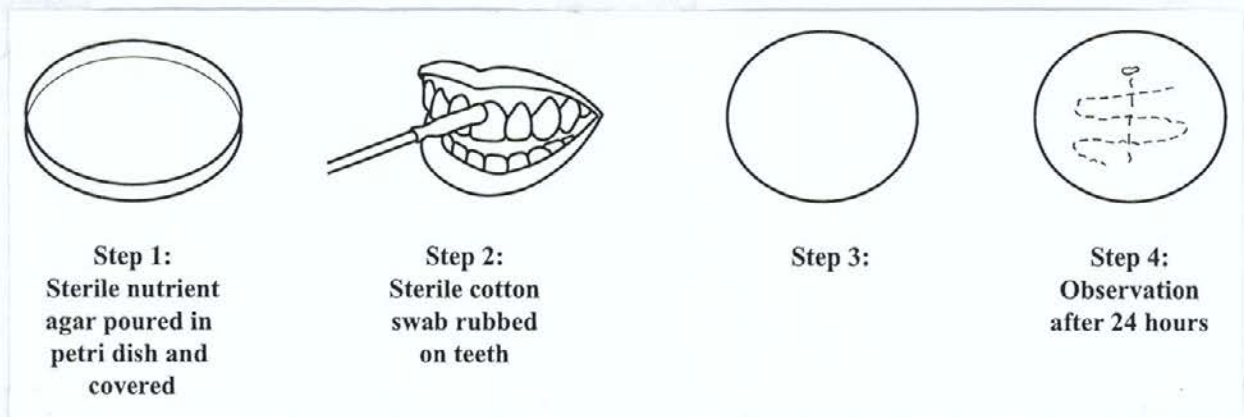


Figure 4. Experiment to demonstrate the presence of bacteria

(i) What does Zara do in Step 3?

(1 mark)

(ii) Zara asks her classmates to set up a control for this experiment by changing Step 2. What should her classmates do at Step 2?

(1 mark)

GO ON TO THE NEXT PAGE

(c) After severe flooding, some villagers complain of having diarrhoea. This results from an outbreak of cholera.

(i) Suggest ONE OTHER sign or symptom of cholera.

_____ (1 mark)

(ii) Explain how the villagers may have contracted cholera from the flood waters.

_____ (2 marks)

(d) (i) AIDS is caused by the human immunodeficiency virus (HIV), which affects the T lymphocytes. How does this affect the immune system of a human being?

_____ (1 mark)

(ii) Suggest ONE method of preventing the spread of HIV.

_____ (1 mark)

Total 10 marks

10. The skeleton in human beings has many functions. One function is locomotion.

(a) (i) What is meant by 'locomotion'?

_____ (1 mark)

(ii) State TWO OTHER functions of the skeleton.

(2 marks)

(b) Suggest TWO reasons why locomotion is important to human beings.

(2 marks)

(c) George is involved in a vehicular accident, which caused injury to the tendons and ligaments in his legs.

What is the function of EACH of the following in the leg?

(i) Tendons

_____ (1 mark)

(ii) Ligaments

_____ (1 mark)

(d) Osteoarthritis is a degenerative disease caused by wear and tear on the joints.

The cartilage in your grandfather's knee has become worn and thin.

(i) What is the function of cartilage in the knee?

_____ (1 mark)

(ii) Suggest TWO effects that the worn, thin cartilage will have on your grandfather when he walks.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of the booklet.

11. Cell division occurs by mitosis and by meiosis.

(a) Copy Table 1 on your answer page. Complete Table 1 to show THREE differences between mitosis and meiosis.

TABLE 1: DIFFERENCES BETWEEN MITOSIS AND MEIOSIS

Differences	
Mitosis	Meiosis
(i) Occurs in normal body cells	(i)
(ii) Produces cells having the diploid number of chromosomes	(ii)
(iii)	(iii) Results in genetic variation

(3 marks)

(b) Meiosis results in genetic variation.

(i) In continuous variation there are small differences among individuals. Give ONE example of continuous variation in human beings.

(ii) Discontinuous variation shows distinct differences among individuals. Give ONE example of discontinuous variation in human beings. (2 marks)

GO ON TO THE NEXT PAGE

(c) The genotype of Mr. Henry is $X^H Y^-$ and the genotype of Mrs. Henry is $X^H X^h$. X and Y represent the sex chromosomes, H represents the dominant normal allele, and h represents the recessive allele for haemophilia. One of their two children, John and Jenny, inherited the sex-linked disorder, haemophilia.

(i) Using a clearly labelled diagram, show how the haemophilia disorder is passed from the parents to one of the children.

Your diagram must include the genotype and phenotype of Mr. and Mrs. Henry, and the children. The beginning of the diagram has been done for you, as follows:

	Carrier female	Normal male	
Parents:	$X^H X^h$	$X^H Y^-$	(8 marks)

(ii) Which of the children, John or Jenny, inherited haemophilia? Give a reason for your answer. (2 marks)

(d) Haemophilia is a disease in which the blood does not clot. One of your classmates, who suffers from haemophilia gets a cut on his hand.

Suggest ONE sign of the disease, and how can it be treated. (2 marks)

(e) Your friend, Rita, is an albino.

(i) What kind of alleles, dominant or recessive, causes albinism?

(ii) Suggest ONE characteristic that distinguishes Rita as an albino, and ONE precaution which Rita must take in her daily life. (3 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

12. Human beings are surrounded by both beneficial and harmful microorganisms. Care must be taken to prevent harmful microorganisms from affecting us.

- (a) (i) What is meant by 'sterilization' as it relates to microorganisms?
- (ii) Name TWO processes which use heat to preserve milk.
- (iii) State ONE method of sterilizing instruments used in a hospital.
- (iv) What is an 'antibiotic'? (5 marks)

(b) A new student, Marsha, has joined your class. She has difficulty finding friends because of her poor hygiene. Advise Marsha on how she can maintain good personal hygiene. Your answer must include:

- TWO reasons for maintaining good personal hygiene
- TWO methods of hands hygiene
- TWO methods of skin hygiene
- ONE reason for EACH method of hands and skin hygiene (10 marks)

(c) Vectors, like the housefly, cause diseases in human beings.

- (i) After feeding on faeces containing bacteria, the housefly can transmit bacteria to us when it feeds, walks or defecates on our food.

Explain how the bacteria are transmitted to our food when the housefly

- a) feeds
- b) walks
- c) defecates.

- (ii) Suggest TWO ways of controlling houseflies. (5 marks)

Total 20 marks

13. Many diseases are caused by the activities of human beings.

- (a) Some infectious diseases are caused by drinking water which has been contaminated by human beings. To prevent this, large-scale water purification is undertaken to supply households with clean drinking water.
- (i) The final stage in the water purification process is chlorination. List the first THREE steps in the water purification process.
 - (ii) What is the function of chlorination?
 - (iii) Why is fluoride sometimes added to drinking water? **(5 marks)**
- (b) Lifestyle diseases occur as a result of the way we live. Sometimes our choices lead to obesity, alcoholism and sexually transmitted diseases.
- (i) One effect of obesity, caused by eating too much animal fat, is an increase in coronary heart disease. Suggest TWO OTHER effects of obesity.
 - (ii) Identify TWO school activities which you can undertake to prevent obesity.
 - (iii) Write a report on the effects of alcoholism. Your report must include:
 - THREE effects of alcohol on the human body
 - TWO effects of alcoholism on society
 - (iv) Gonorrhoea and syphilis are two sexually transmitted diseases. Identify TWO signs or symptoms of gonorrhoea and TWO signs or symptoms of syphilis.
 - (v) Suggest ONE method of treatment for gonorrhoea and ONE for syphilis. **(15 marks)**

Total 20 marks

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14. The human body has developed a very efficient transport system, with the heart functioning as a double pump.

(a) Figure 5 is a diagrammatic representation of the heart and major blood vessels.

Identify the parts labelled A, B, C, D and E.

(5 marks)

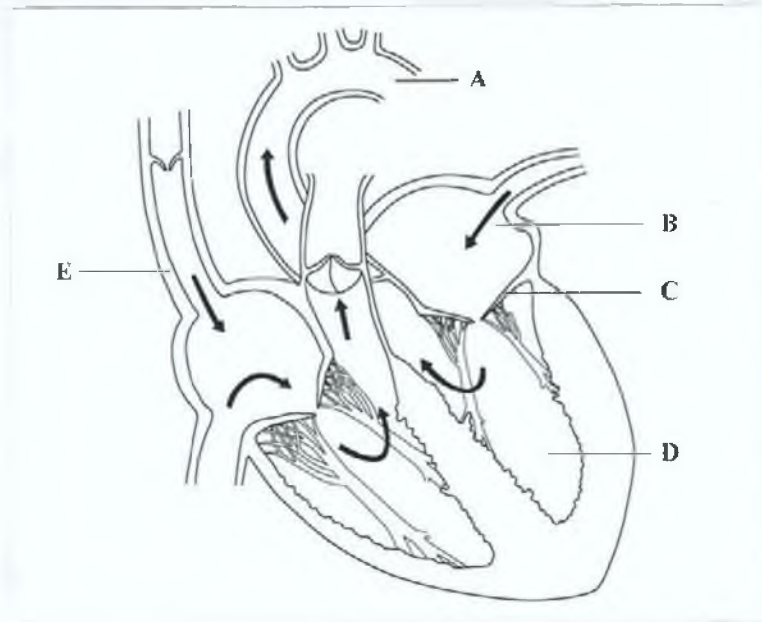


Figure 5. Diagram of the heart

(b) Explain how the heart functions as a double pump.

(4 marks)

(c) During one beat of the heart, a series of events occurs in the cardiac cycle.

- (i) What is the function of the special tissue in the heart, called the 'pacemaker'?
- (ii) The pulse rate of your friend, Kimran, during a Human and Social Biology class is 72. How many times does his heart beat in one minute?
- (iii) After lunch, Kimran's pulse rate is 82. Suggest TWO reasons why his pulse rate may have increased.

(4 marks)

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- (d) Figure 6 represents a transverse section of an artery showing atherosclerosis.

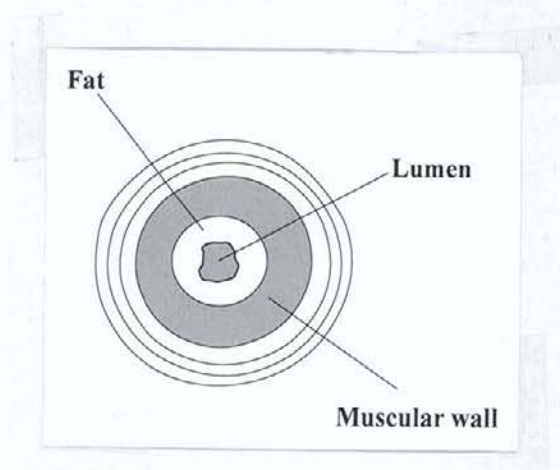


Figure 6. An artery with atherosclerosis

- (i) Suggest ONE possible cause of atherosclerosis.
- (ii) What effect do arteries, like the one in Figure 6, have on blood pressure?
- (iii) One difference in structure between an artery and a vein is the thicker muscular wall of the artery.

Identify ONE OTHER difference in structure. **(3 marks)**

- (e) Blood vessels in the skin (capillaries) assist the body in regulating its temperature.

Explain how vasodilation and vasoconstriction regulate body temperature. **(4 marks)**

Total 20 marks



TEST CODE **01253020**

FORM TP 2010010

JANUARY 2010

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

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

- 1.** This paper consists of **FOURTEEN** questions in **TWO sections**.
- 2.** **SECTION A** consists of **TEN** questions. Answer **ALL TEN** questions. Write your answer in the space provided in this answer booklet. Each question is worth **10 marks**.
- 3.** **SECTION B** consists of **FOUR** questions. Answer **ONLY TWO** questions. Write your answer on the pages provided at the end of this booklet. Each question is worth **20 marks**.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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01253020/JANUARY/F 2010

SECTION A

Answer ALL questions in this section.

1. Plant and animal cells consist of various cell organelles.

(a) (i) State ONE function of EACH of the following cell organelles:

a) Cell membrane

b) Mitochondria

(2 marks)

(ii) Which type of cells, muscle or skin cells, contain **more** mitochondria?

(1 mark)

(b) Your friend, Dennis, looked at the structure of a bacterium and classified it as a plant cell, NOT an animal cell.

Which cell organelle is present in BOTH a bacterium and a plant cell, but NOT in an animal cell?

(1 mark)

GO ON TO THE NEXT PAGE

(c) Dennis has been diagnosed with athlete's foot (ringworm).

(i) What is the causative agent of this disease?

_____ (1 mark)

(ii) Suggest ONE sign and ONE symptom of the disease, which Dennis may be observing and experiencing.

Sign: _____

Symptom: _____

(2 marks)

(iii) Dennis advises you to practise good personal hygiene to prevent athlete's foot. Identify TWO bad personal hygiene practices which may have caused the disease.

(2 marks)

(iv) Suggest ONE treatment for athlete's foot.

(1 mark)

Total 10 marks

2. (a) Plants manufacture sugars by the process of photosynthesis.

(i) Complete the following word equation for photosynthesis.

_____ + _____ $\xrightarrow[\text{chlorophyll}]{\text{light}}$ _____
sugar + _____

(3 marks)

(ii) In what form, starch or glycogen, is sugar stored in plants?

(1 mark)

GO ON TO THE NEXT PAGE

(b) Plants provide human beings with foods containing the nutrients, carbohydrates, proteins and fats.

(i) Identify ONE plant food which is rich in carbohydrates and ONE plant food rich in proteins.

Carbohydrate:

Protein:

(2 marks)

(ii) Digestion is the process by which human beings break down foods to release the nutrients.

Suggest ONE way the human body uses carbohydrate and protein.

Carbohydrate:

Protein:

(2 marks)

(c) Normally, carbon dioxide levels remain constant in the atmosphere. Photosynthesis removes carbon dioxide from the atmosphere.

Suggest TWO ways by which human beings return carbon dioxide to the atmosphere.

(2 marks)

Total 10 marks

3. (a) Figure 1 shows part of the human skeleton.

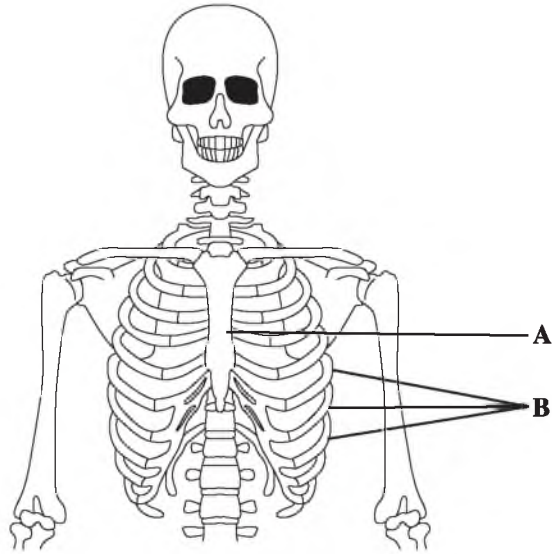


Figure 1. Part of the human skeleton

- (i) Name the parts labelled A and B in Figure 1.

A: _____

B: _____

(2 marks)

- (ii) State ONE function of the parts labelled B.

_____ (1 mark)

- (b) Jean and Dinah are playing volleyball. Jean throws the ball at Dinah's face and Dinah blinks.

- (i) Explain what is meant by the term 'reflex action'.

(2 marks)

- (ii) Which of the TWO actions, throwing the ball or blinking, is a reflex action, and which is a voluntary action?

Reflex action: _____

Voluntary action: _____

(2 marks)

GO ON TO THE NEXT PAGE

- (c) (i) Dinah is long sighted. Complete the diagram of the eye in Figure 2, to show where the light from a near object will focus, when Dinah is looking at the object.

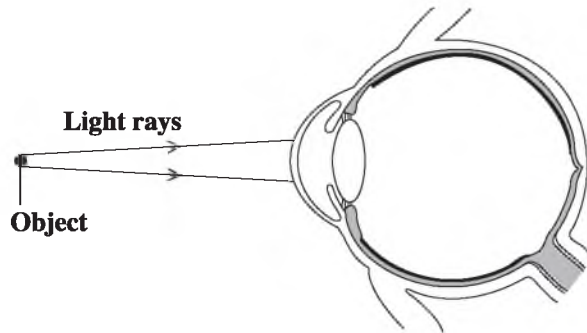


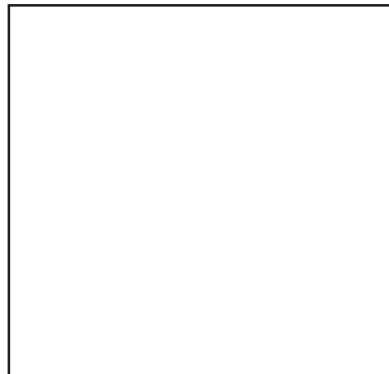
Figure 2. A section through the eyeball

(1 mark)

- (ii) Suggest the type of lens Dinah must use to correct this problem of long sightedness.

(1 mark)

- (iii) In the box below, draw the shape of the lens needed to correct **short sightedness**.



(1 mark)

Total 10 marks

4. Figure 3 shows a simplified diagram of the human circulatory system.

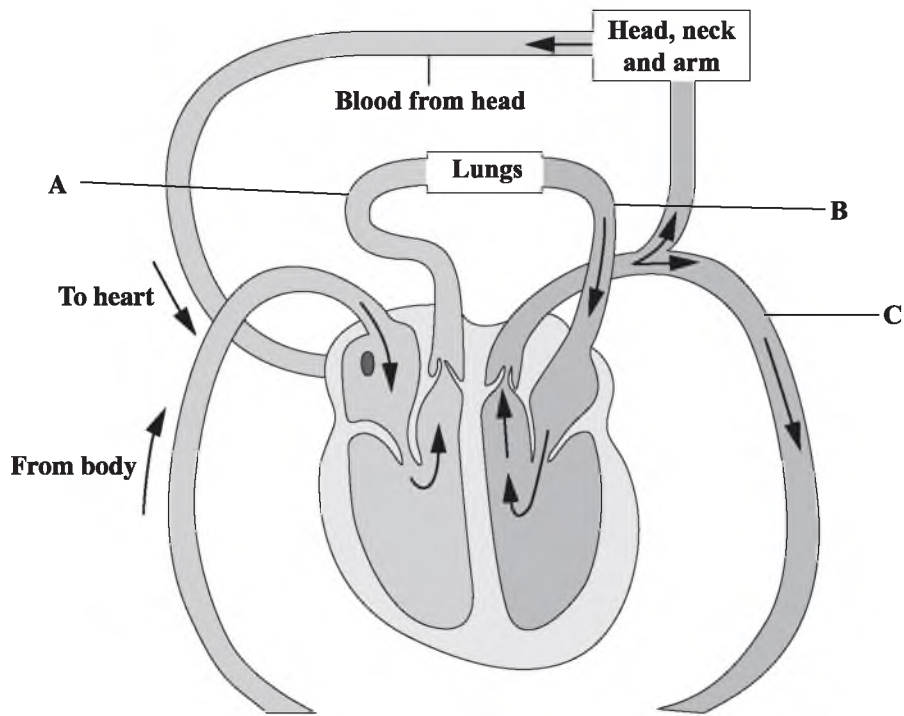


Figure 3. Simplified diagram of the human circulatory system

(a) Name the blood vessels labelled A, B and C.

A: _____

B: _____

C: _____

(3 marks)

(b) Explain why humans need a circulatory system to transport oxygen, while single-celled organisms like the amoeba do not.

(2 marks)

GO ON TO THE NEXT PAGE

- (c) Your friend, Lacy, is suffering from a deficiency of iron. Explain how this affects the transport of oxygen by the red blood cells.

(4 marks)

- (d) Suggest ONE sign or symptom which may result from a deficiency of iron.

(1 mark)

Total 10 marks

5. Figure 4 shows a cross-section through human skin.

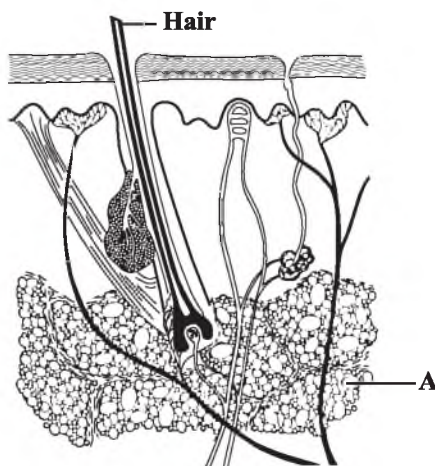


Figure 4. Cross-section through human skin

- (a) (i) Use a single square bracket ([]) to label EACH of the following layers of the skin:
- a) D for the dermis
 - b) E for the epidermis
- (ii) Identify the part labelled A in Figure 4.

A: _____
(1 mark)

GO ON TO THE NEXT PAGE

(b) After a game of football, your friend, Dwight, looks flushed (red in the face).

(i) Explain how his skin causes this reaction.

(2 marks)

(ii) Dwight goes to a closed room with a fan to cool down after the football game. Why does he take a long time to cool down, even though he is sweating?

(2 marks)

(c) The kidney, like the skin, plays a role in homeostasis. Give TWO examples of how the kidney maintains balance in the human body.

(2 marks)

(d) Dwight drank a lot of water during the football game. Explain why this excess water did NOT pass out as urine.

(1 mark)

Total 10 marks

6. (a) Complete the following sentences by choosing the correct word from the list in brackets.

(mitosis, meiosis, identical, different, bulbs, pollen)

- (i) Asexual reproduction involves a form of cell division known as

_____ .

- (ii) The genotype of the offspring and parents is _____
in asexual reproduction.

- (iii) One method of asexual reproduction in plants involves the use of

_____ .

(3 marks)

- (b) A 15-year-old student who was raped is two months pregnant. She and her parents seek advice from the School Counsellor, who suggests that she should have a medical abortion as an option.

- (i) Name TWO instances when a medical abortion could be legally carried out.

(2 marks)

- (ii) Suggest ONE OTHER option that the School Counsellor could advise.

(1 mark)

- (c) Explain why tubal ligation is considered a reliable method of birth control and the rhythm method is NOT considered reliable.

Tubal ligation:

Rhythm:

(4 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

7. (a) State the meaning of EACH of the following terms:

(i) Genetic variation

(ii) Environmental variation

(2 marks)

(b) What is the name of the chemical which forms a gene?

(1 mark)

(c) Suggest ONE benefit of genetic variation.

(1 mark)

(d) (i) Complete Figure 5 below to show how sex (gender) is inherited in humans.

	Male	Female
Genotype:	_____	_____
Gametes:	_____	_____
Offspring genotype:	_____	_____
Offspring phenotype:	_____	_____

(4 marks)

Figure 5. Genetic diagram to show inheritance of sex in humans

(ii) Use your answer to (d) (i) above to explain why the number of males and females in a population is approximately the same.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

8. (a) (i) Name the vector for dengue fever.
- _____
- (1 mark)
- (ii) Name the microorganism responsible for dengue fever.
- _____
- (1 mark)
- (iii) What is the name of the form of dengue in which there is bleeding?
- _____
- (1 mark)
- (b) Indra wakes up one morning with a high fever and suspects it might be dengue.
- (i) Name THREE OTHER signs or symptoms that could confirm her suspicion.
- _____
- _____
- (3 marks)
- (ii) Suggest TWO recommended practices in treating dengue fever.
- _____
- _____
- _____
- (2 marks)
- (c) Leptospirosis is a disease caused by another vector, rats.
- Suggest TWO methods of controlling rats.
- _____
- _____
- (2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

9. Some people believe that changes in human behaviour, particularly changes in moral values, have been responsible for the rapid increase in sexually transmitted infections such as AIDS.

(a) (i) What is 'AIDS'?

(1 mark)

(ii) Name TWO methods of transmission of HIV, OTHER THAN sexual transmission.

(2 marks)

(b) You are required to do a presentation on sexually transmitted infections. In your presentation, outline:

(i) TWO effects of gonorrhoea on a developing foetus

(2 marks)

(ii) TWO ways in which babies become infected by mothers with HIV

(2 marks)

(c) (i) Suggest ONE change in human behaviour which may have resulted in an increase in sexually transmitted infections.

(1 mark)

(ii) Write TWO pieces of advice you would give to teenagers to prevent the spread of sexually transmitted infections.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

10. (a) Pollution is the harming of the environment as a result of the activities of human beings. Complete Table 1 to show the name, the origin and the effect of some pollutants.

TABLE 1: POLLUTANTS AND THEIR EFFECTS

Pollutants	Origin	Effects
Carbon dioxide	(i)	Greenhouse effects of overheating
(ii)	Petrol – car exhaust	Toxic to the nervous system
Sulphur dioxide	Fuel combustion for example, coal, oil, petrol	(iii)

(3 marks)

- (b) Figure 6 shows some materials which could be used for purifying water at home.

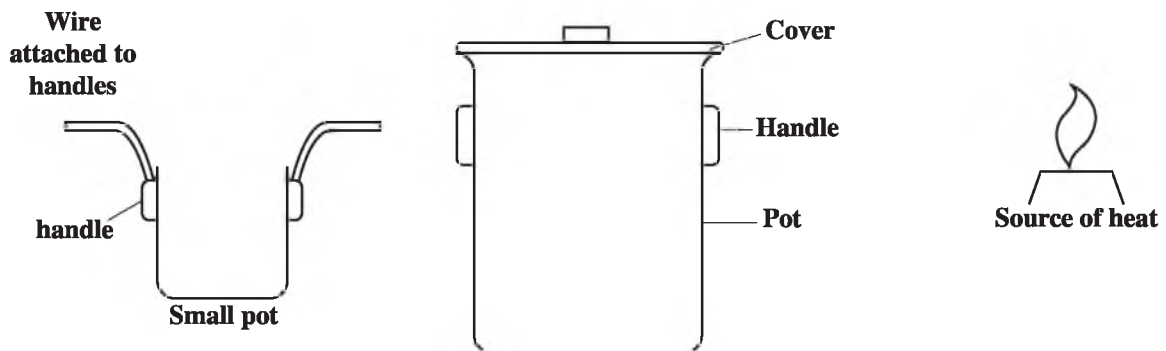


Figure 6. Materials for purifying water at home

Describe TWO ways of purifying water, using the materials in Figure 6.

GO ON TO THE NEXT PAGE

(5 marks)

- (c) Suggest TWO water-borne diseases that can be contracted if bacteria are NOT removed from drinking water.

(2 marks)

Total 10 marks

SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of this booklet.

- 11.** (a) Proper nutrition contributes to a healthy body.
- (i) State TWO functions of water in the human body.
- (ii) Name the vitamin which, when deficient, is responsible for night blindness and identify TWO food sources of the vitamin. (5 marks)
- (b) Hansraj eats a meal of fish, rice and steamed vegetables.
- (i) Explain how Hansraj's body gets protein from the fish. Your answer should include
- a labelled diagram of the digestive tract
 - the stages in the digestion of the fish
 - the absorption of the end product of the digestion of the fish. (11 marks)
- (ii) Is Hansraj's meal considered a balanced meal? Give TWO reasons for your answer. (4 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

12. (a) Propagation of the human species takes place by sexual reproduction.
- (i) What is 'testosterone'?
 - (ii) State TWO functions of testosterone.
 - (iii) In which part of the male reproductive system are sperms made, and where are they stored? (5 marks)
- (b) Many males are now suffering from cancer of the prostate gland.
- Explain how a prostate gland which is NOT functioning properly will affect fertilisation of an egg. (4 marks)
- (c) Cancer of the ovary is a serious illness among women.
- Identify TWO functions of the ovary and, hence, suggest how an ovary which is NOT functioning properly will affect the reproductive processes in a human female. (4 marks)
- (d) Figure 7 is a graph showing levels of oestrogen and progesterone over a 28-day period.

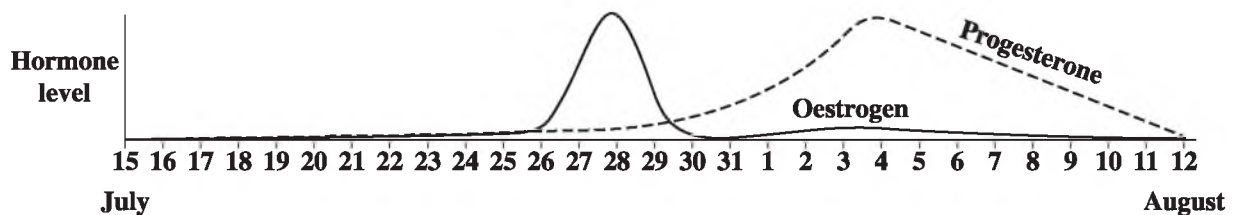


Figure 7. Levels of oestrogen and progesterone in a human female

Identify the approximate dates for EACH of the following:

- (i) Ovulation
 - (ii) Possible fertilisation
 - (iii) Possible implantation of the fertilised egg
 - (iv) Menstruation (4 marks)
- (e) The government of a country is concerned about population 'explosion'.
- Provide THREE arguments which may be used in an education programme to convince young people about the benefits of family planning. (3 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

13. (a) Figure 8 is a diagram of the human respiratory system.

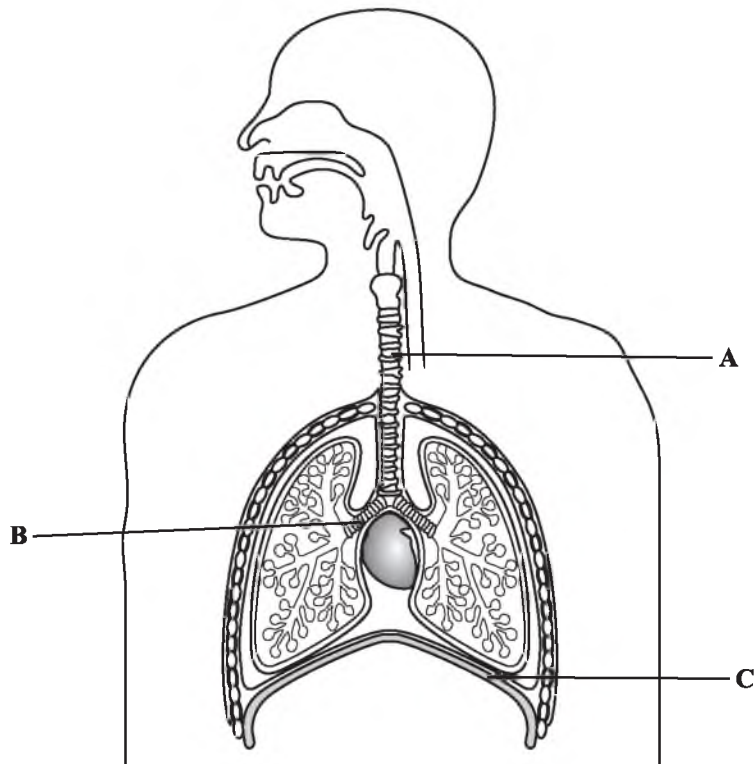


Figure 8. Diagram of the human respiratory system

- (i) Identify the parts labelled A, B and C. (5 marks)
- (ii) What is meant by the term 'vital capacity'? (5 marks)
- (b) You witness an accident in which your friend stops breathing.
- Outline the steps which should be taken immediately to resuscitate your friend. (6 marks)
- (c) When carbon dioxide concentration of the blood increases, breathing becomes deeper and faster.
- Suggest TWO factors, OTHER THAN illness, which may affect breathing rate, and explain how EACH of these factors causes an increase in carbon dioxide in the blood. (6 marks)
- (d) Acute respiratory infections like tuberculosis also affect breathing.
- Identify ONE sign of tuberculosis and TWO ways by which the disease is spread. (3 marks)

Total 20 marks

GO ON TO THE NEXT PAGE

14. (a) (i) Define EACH of the following terms:

- Herbivore
- Carnivore
- Omnivore

(ii) What is meant by the term 'primary producer'? (5 marks)

(b) Mountain chicken, which is a tree frog, is a popular dish in some Caribbean countries.

Construct a food chain consisting of the following organisms: mountain chicken, cricket, humans, grass and lizard. (3 marks)

(c) Figure 9 shows part of a food chain.

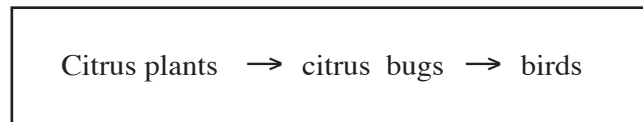


Figure 9. Part of a food chain

(i) Farmers use insecticides to control the citrus bugs which feed on the citrus fruits.

Discuss the adverse effects of insecticides on the environment. Your answer should include THREE points. (6 marks)

(ii) The citrus bug population increased, so farmers decided to use biological control. This involved the use of a wasp to kill the citrus bug.

Suggest ONE advantage of this method of controlling the citrus bug and TWO possible effects on the food chain. (6 marks)

Total 20 marks

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TEST CODE **01253020**

FORM TP 2011012

JANUARY 2011

CARIBBEAN EXAMINATIONS COUNCIL

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

- 1.** This paper consists of **FOURTEEN** questions in **TWO** sections.
- 2.** **SECTION A** consists of **TEN** questions. Answer **ALL TEN** questions. Write your answer in the space provided in this answer booklet. Each question is worth **10 marks**.
- 3.** **SECTION B** consists of **FOUR** questions. Answer **ONLY TWO** questions. Write your answers on the pages provided at the end of this booklet. Each question is worth **20 marks**.

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01253020/JANUARY 2011

SECTION A

Answer ALL questions in this section.

1. (a) Infectious diseases are caused by pathogens. Name the type of organism that causes EACH of the following diseases:

(i) Typhoid

_____ (1 mark)

(ii) Dengue

_____ (1 mark)

(iii) Tuberculosis

_____ (1 mark)

(b) Identify TWO differences between bacteria and viruses.

(2 marks)

(c) Suggest ONE reason why a bacterium may be considered a plant cell.

(1 mark)

(d) A river has overflowed its banks and the drinking water supply in the area has been contaminated. The Ministry of Health has placed posters in the area outlining the signs/symptoms of cholera, and measures to control its spread. Suggest TWO signs/symptoms, and TWO control measures which may be on the poster.

Signs/symptoms:

Control:

(4 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

2. (a) Complete the statement below by choosing the correct word from the list provided in brackets.

(motor, sensory, central, spinal, peripheral)

The nervous system, consisting of the brain and spinal cord, is known as the

_____ nervous system, while the _____ nervous system is made up of the paired cranial nerves and the _____ nerves.

(3 marks)

- (b) Melissa and her parents are involved in a vehicular accident. Upon recovery, Melissa is having difficulty remembering things, while her father is unable to maintain his balance.

Suggest the region of the brain that may have been damaged for:

- (i) Melissa

- (ii) Melissa's father

(2 marks)

- (c) The doctor suspects that Melissa's hypothalamus may also have been affected. Figure 1 shows a drawing of the human brain.

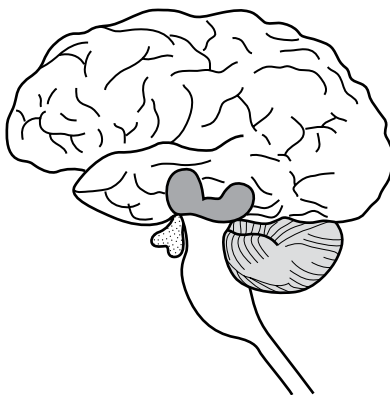


Figure 1. The human brain

- (i) Write X on Figure 1 to show the hypothalamus.
- (ii) Suggest ONE way Melissa's bodily functions may be affected by a malfunctioning hypothalamus.

(2 marks)

GO ON TO THE NEXT PAGE

(d) Paul and Paula are eight-year-old twins. Paul's thyroid gland is not producing sufficient thyroxine.

(i) Suggest how Paul's thyroid gland would make his physical and mental development different from Paula's.

Physical: _____

Mental: _____

(2 marks)

(ii) Identify ONE effect of an overactive thyroid gland on a human adult.

(1 mark)

Total 10 marks

3. (a) State TWO functions of blood in the human body.

(2 marks)

(b) Name the pigment that gives red blood cells their colour.

(1 mark)

(c) (i) On a site visit to a hospital, Dana views some blood slides under a microscope and observes some differences in the blood cells.

Suggest TWO differences Dana may have observed between the red blood cells and white blood cells.

(2 marks)

GO ON TO THE NEXT PAGE

- (ii) Dana also sees platelets in the blood sample.

Identify ONE feature of the platelets which may have assisted her in identifying the platelets.

_____ (1 mark)

- (iii) What role do the platelets play in the human body?

_____ (1 mark)

- (d) (i) Explain what is meant by 'atherosclerosis'.

_____ (2 marks)

- (ii) Suggest ONE way an individual may prevent atherosclerosis.

_____ (1 mark)

Total 10 marks

4. Breathing is the movement of air in and out of the lungs.

- (a) Identify the structures labelled A, B and C in Figure 2. Write your answers in the spaces provided in Figure 2. (3 marks)

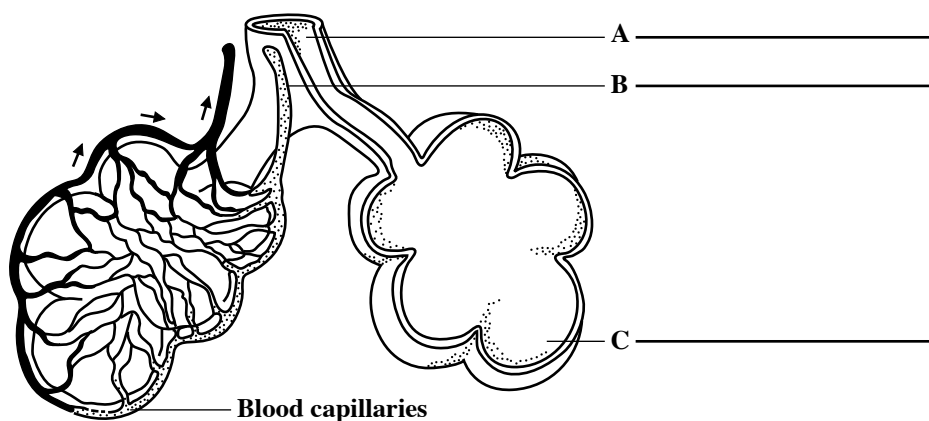


Figure 2. Gaseous exchange in the lung

GO ON TO THE NEXT PAGE

(b) Ian got into difficulties while sea-bathing, causing the lifeguard to employ mouth-to-mouth resuscitation to revive him.

(i) Explain why the lifeguard performed EACH of the following actions during mouth-to-mouth resuscitation:

a) Pressed Ian's head back, and his lower jaw upward

_____ (1 mark)

b) Pressed down on Ian's chest

_____ (1 mark)

(ii) The air blown into Ian's lungs contains 4% - 6% carbon dioxide.

Suggest which part of the brain the carbon dioxide stimulates to cause breathing to restart.

_____ (1 mark)

(c) Some acute respiratory infections, like influenza, occur when we breathe in pathogens.

(i) Name the type of organism that causes influenza.

_____ (1 mark)

(ii) Suggest how the organism named in (c)(i) is spread.

_____ (1 mark)

(iii) Identify TWO signs/symptoms of the flu.

_____ (2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

5. The bulk of our food consists of the nutrients, carbohydrates, fats and proteins. We require vitamins and minerals in very small quantities.

(a) State ONE function of EACH of the following nutrients in the human body.

(i) Carbohydrates

(ii) Fats

(iii) Proteins

(3 marks)

(b) Stella's lunch consists of chicken, baked potato, lettuce, milk and a slice of mango. David eats a chicken leg and two slices of bread, with a soda and a slice of cake.

(i) Explain what is meant by a 'balanced diet'.

(2 marks)

(ii) Which of the two lunches, Stella's or David's, is balanced? Explain your answer.

(3 marks)

(c) The teeth of your six-month-old baby sister are now beginning to grow.

(i) Which mineral is particularly important for the growth of her teeth?

(1 mark)

(ii) Suggest ONE vegetable which may be a source of the mineral named in (c) (i) above.

(1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

6. (a) Name the organ that produces oestrogen.

_____ (1 mark)

(b) State TWO functions of oestrogen in the human female.

_____ (2 marks)

(c) The birth process involves three stages, illustrated in Figure 3.

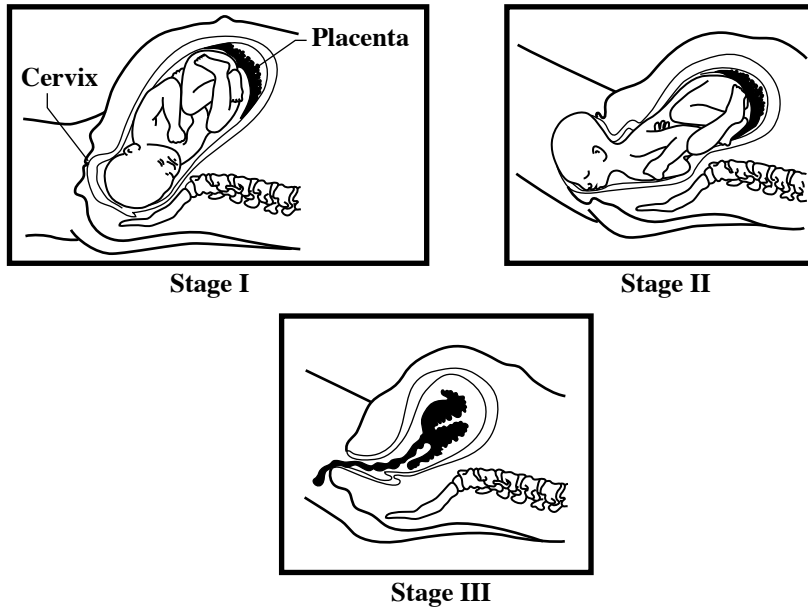


Figure 3. Stages of the birth process

Outline what occurs in EACH of the three stages in Figure 3.

Stage I:

Stage II:

Stage III:

(5 marks)

GO ON TO THE NEXT PAGE

(d) A newborn baby shows severe growth deficiencies, believed to be caused by the mother's alcohol consumption during pregnancy.

(i) Suggest the name of the disease with which the baby is born.

_____ (1 mark)

(ii) Name ONE other drug that could cause babies to be underweight at birth.

_____ (1 mark)

Total 10 marks)

7. (a) What is meant by EACH of the following terms?

(i) Chromosome

(1 mark)

(ii) Heterozygous

(1 mark)

(b) State the number of chromosomes that are found in muscle cells of humans.

(1 mark)

GO ON TO THE NEXT PAGE

- (c) Figure 4 shows the inheritance of height in humans. C represents the gene for tallness; c represents the gene for dwarfism.

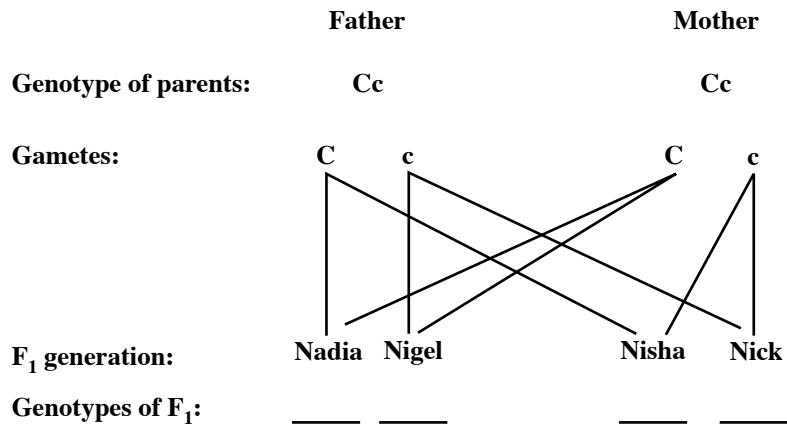


Figure 4. A genetic cross showing inheritance of height

- (i) On Figure 4, write the genotypes for the F₁ generation. **(4 marks)**

- (ii) Name the child who is homozygous dominant.

_____ **(1 mark)**

- (iii) Name ONE child who is short and ONE child who is tall.

Short: _____

Tall: _____

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

8. (a) (i) What is meant by the term 'vector'?

(2 marks)

(ii) Name ONE vector found in the Caribbean region.

(1 mark)

(b) An outbreak of leptospirosis has occurred in your community.

(i) Outline TWO measures which the community can undertake to control the further spread of the disease.

(2 marks)

(ii) Suggest ONE method of treatment for a person infected with leptospirosis.

(1 mark)

(c) A major disease affecting Caribbean populations is AIDS.

(i) Gregory discovers that he is losing weight rapidly. How can he confirm whether or not he has AIDS?

(1 mark)

(ii) Identify ONE OTHER sign/symptom of AIDS.

(1 mark)

(iii) Suggest TWO means by which the virus that causes AIDS is spread.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

9. (a) Instruments in a hospital must be sterilized before use.

(i) What is meant by the term 'sterilization'?

(1 mark)

(ii) Name TWO methods of sterilizing food or other materials.

(2 marks)

(b) After Hurricane Dean, the citizens of Jamaica were advised to add a small amount of chlorine bleach to their drinking water.

(i) Suggest the effect of chlorine bleach on the drinking water.

(1 mark)

(ii) Explain the function of chlorination in large-scale water purification.

(2 marks)

(c) When Johnny steps on a rusty nail, the nurse gives him a tetanus injection, which provides him with artificial passive immunity.

(i) Explain how artificial passive immunity protects Johnny.

(2 marks)

(ii) Outline TWO differences between artificial passive immunity and artificial active immunity.

(2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

10. (a) List THREE structures common to plant and animal cells.

(3 marks)

- (b) Figure 5 is a simplified illustration of osmosis.

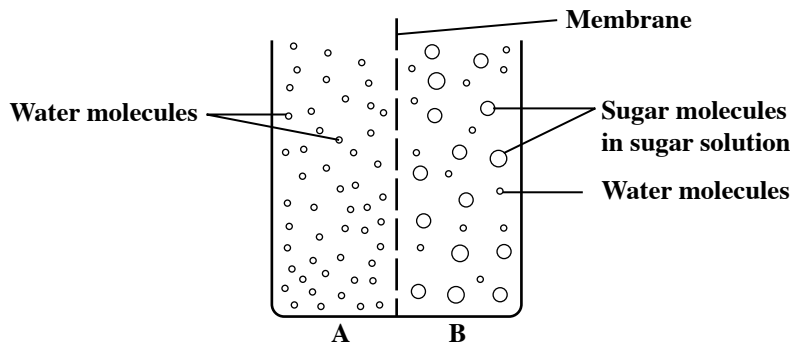


Figure 5. An illustration of osmosis

- (i) Using ONE arrow, show on Figure 5 the movement of molecules. (1 mark)

- (ii) Which part of the container, A or B, has the **greater** concentration of water molecules?

(1 mark)

- (iii) Explain the process of osmosis, using the illustration in Figure 5.

(3 marks)

- (c) During breathing, oxygen and carbon dioxide pass across the alveoli.

- (i) Name the process by which oxygen and carbon dioxide move across the alveoli.

(1 mark)

- (ii) Identify ONE way in which osmosis differs from the process named in (c) (i) above.

(1 mark)

Total 10 marks

GO ON TO THE NEXT PAGE

SECTION B

Answer ANY TWO questions.

Write your answers on the pages provided at the end of this booklet.

11. (a) (i) Explain what is ‘diabetes mellitus’.
- (ii) Name the TWO types of diabetes mellitus.
- (iii) Name the hormone which, when deficient, causes diabetes mellitus. **(5 marks)**
- (b) Figure 6 shows the relationship between obesity and diabetes mellitus in Caribbean people from 1980 to 2005.

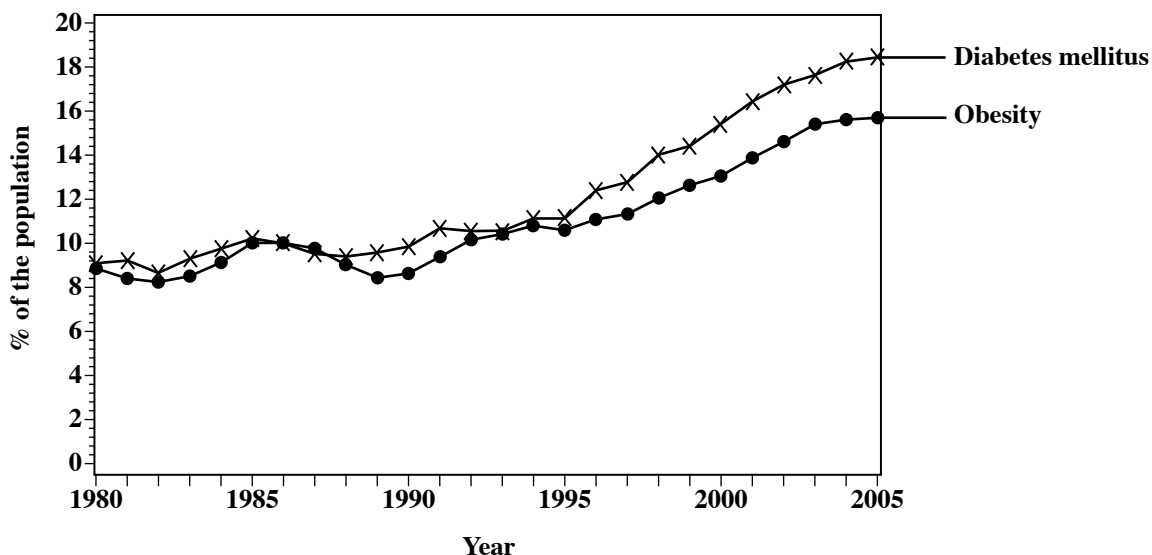


Figure 6. Relationship between obesity and diabetes mellitus, 1980 to 2005
<http://www.cdc.gov/Features/Livingwithdiabetes/>

- (i) Approximately what percentage of the population was diagnosed with diabetes mellitus in 2005?
- (ii) Approximately what percentage of the population was considered obese in 2005?
- (iii) By approximately how much had diabetes mellitus increased from 1980 to 2005?
- (iv) Compare the trends in diabetes mellitus and obesity between 1980 and 2005. **(6 marks)**

GO ON TO THE NEXT PAGE

- (c) (i) Suggest FOUR factors which may have contributed to obesity becoming a problem in the Caribbean.
- (ii) Recommend TWO lifestyle changes in managing obesity. **(6 marks)**
- (d) Explain how obesity may affect blood pressure. **(3 marks)**

Total 20 marks

12. (a) (i) Describe how a landfill is made.
- (ii) Sorting is one activity that is performed in treating with solid waste at a landfill. Name TWO other activities. **(5 marks)**
- (b) Community Y has an effective solid waste management programme. Labelled bins are provided for the collection of household refuse, glass, wood and metal products. Community Y also uses methods of incineration, recycling, and composting to manage its solid waste.
- (i) Explain the processes of incineration, recycling and composting.
- (ii) Suggest ONE advantage of using EACH of the processes in (b)(i) above. **(9 marks)**
- (c) Community Y is concerned about pollution. Explain how Community Y can prevent water pollution. Your answer should include THREE methods. **(6 marks)**

Total 20 marks

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13. (a) The kidney plays an important role in excretion.

Figure 7 shows the structure of a nephron in the kidney.

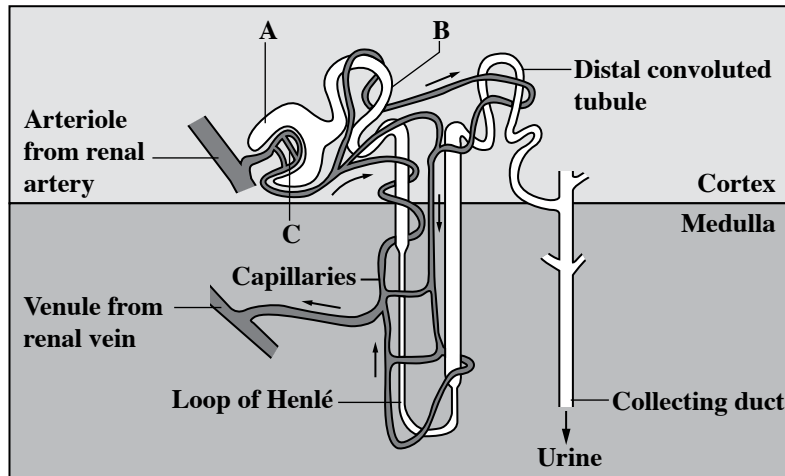


Figure 7. Structure of a nephron

- (i) Identify the parts labelled A, B and C in Figure 7.
- (ii) State the function of EACH of the parts labelled A and B in Figure 7. **(5 marks)**
- (b) Explain how urine is formed. In your answer, explain how the processes of ultrafiltration and selective reabsorption are utilized. **(8 marks)**
- (c) Roger is an excessive consumer of alcohol and this has affected his liver.
- (i) Suggest TWO functions of the liver that would be impaired as a result of this disease.
- (ii) Roger has begun to experience some tremors. Identify THREE OTHER physiological effects of alcoholism that Roger might experience.
- (iii) Suggest TWO **social** effects that could arise as a result of alcoholism. **(7 marks)**

Total 20 marks

GO ON TO THE NEXT PAGE

14. (a) (i) State what is meant by the term 'hormones'.
- (ii) State ONE function of EACH of the following hormones:
- a) Adrenaline
 - b) Glucagon
- (iii) Name the gland that produces adrenaline. **(5 marks)**
- (b) Humans reproduce sexually while some organisms like the amoeba reproduce asexually.
- (i) Your friend, Reeza, believes that the major disadvantage of sexual reproduction in humans is the time and energy it takes to find a mate.
- Convince Reeza of the advantages of sexual reproduction over asexual reproduction. Your answer should include a definition and TWO advantages of sexual reproduction.
- (ii) With the aid of the diagram in Figure 8, describe how semen is produced. **(9 marks)**

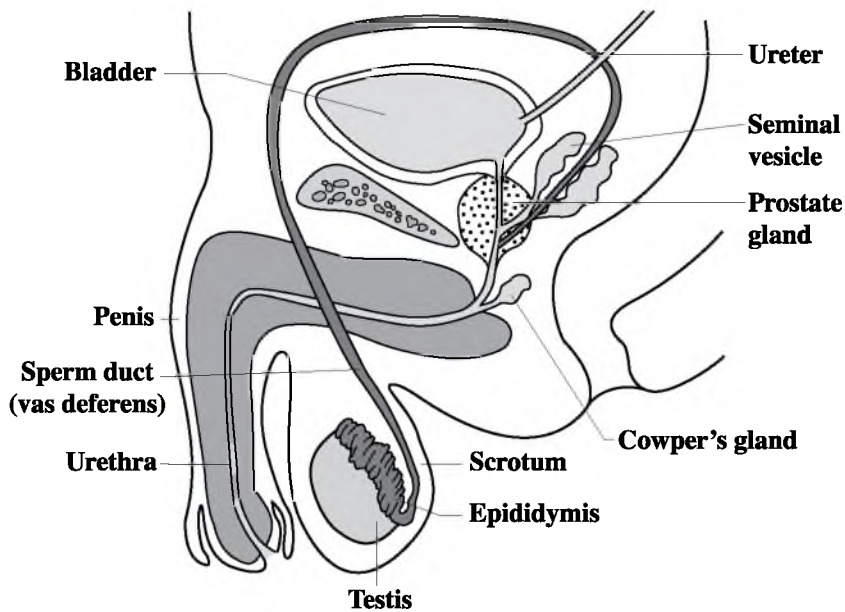


Figure 8. Diagram of the human male reproductive system

- (c) Pregnancy among teenage girls is on the increase.
- (i) Explain TWO disadvantages of very young teenage girls becoming pregnant.
- (ii) Sometimes spontaneous abortion occurs during pregnancy. Explain what is meant by 'spontaneous abortion'. **(6 marks)**

Total 20 marks

END OF TEST

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TEST CODE **01253020**

FORM TP 2011085

MAY/JUNE 2011

CARIBBEAN EXAMINATIONS COUNCIL

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of **SIX** questions in **TWO** sections.
2. Answer **ALL** questions.
3. Write your answers in the spaces provided in this booklet.
4. Each question is worth **15 marks**.

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NOTHING HAS BEEN OMITTED.

SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) The Caribbean region often experiences outbreaks of dengue, and sometimes malaria.

(i) Name the vector that transmits

a) dengue _____

b) malaria. _____

(2 marks)

(ii) The organism that causes malaria is plasmodium.

Name the organism that causes dengue.

(1 mark)

(iii) State TWO signs or symptoms of dengue.

(2 marks)

(iv) Identify ONE method of preventing the spread of dengue.

(1 mark)

- (b) Figure 1 shows the trend in tourist arrivals for two Caribbean countries, and Table 1 shows the data for the outbreak of the flu in Country X and Country Y.

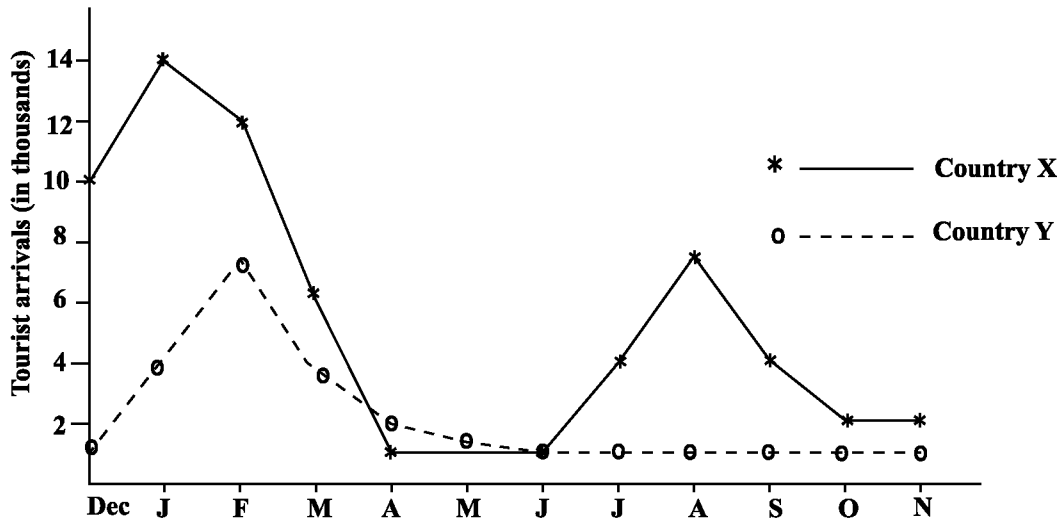


Figure 1. Tourist arrivals for Country X and Country Y

TABLE 1: NUMBER OF PERSONS AFFECTED BY THE FLU EACH MONTH

Month	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
Country X	300	600	1200	900	600	300	100	50	50	400	100	50
Country Y	200	400	800	1600	1200	700	400	100	50	50	50	50

- (i) The data for Country Y in Table 1 has been plotted on Figure 2 on page 5. Plot the data for Country X on the same grid in Figure 2. **(4 marks)**
- (ii) Describe the trend in the population contracting the flu virus in Country X and Country Y.
 Country X: _____

 Country Y: _____

(3 marks)
- (iii) Examine the graphs in Figure 1 and Figure 2. Describe the relationship between tourist arrivals and the spread of the flu virus in both countries.

(2 marks)

Total 15 marks

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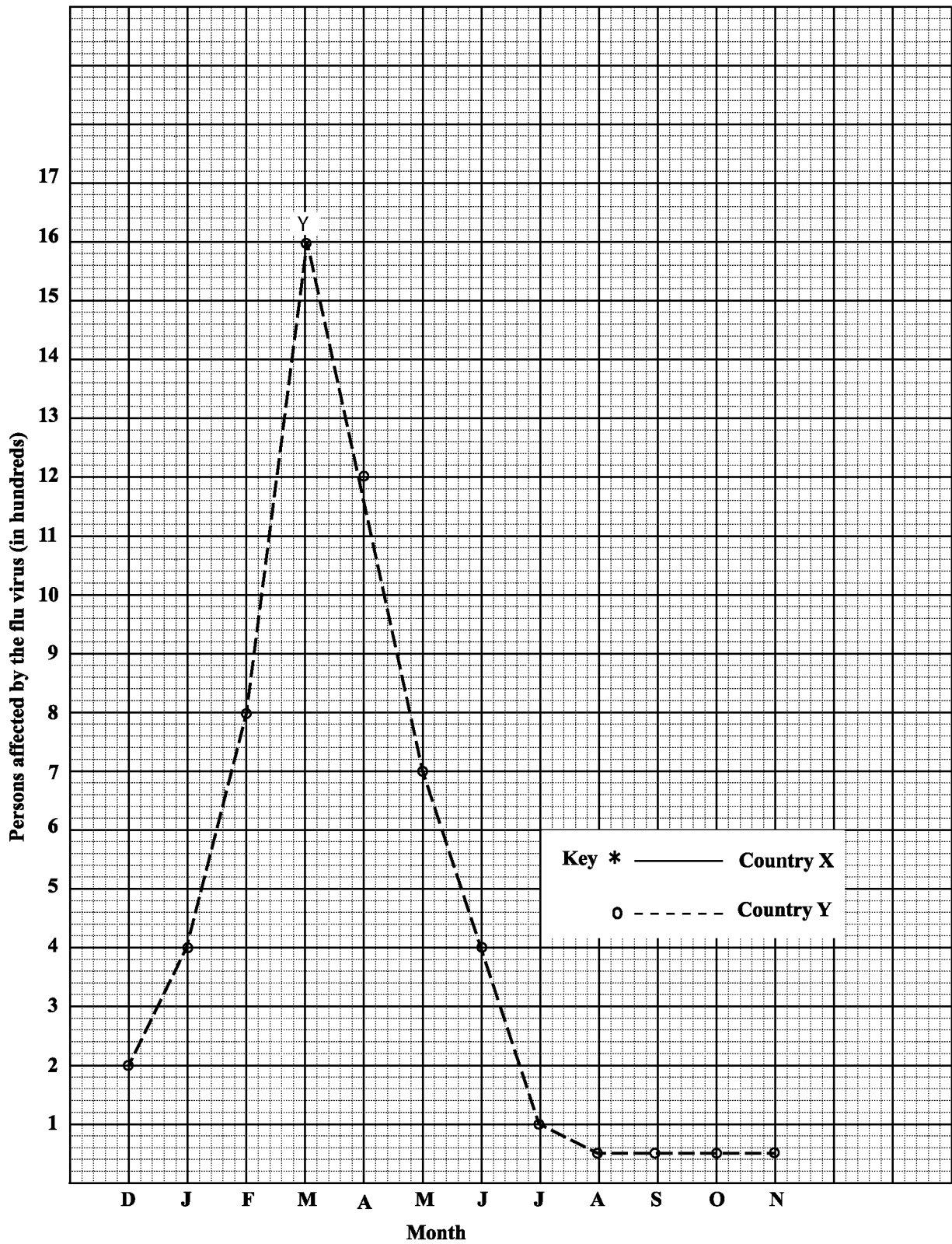


Figure 2. Number of persons affected by the flu virus each month

GO ON TO THE NEXT PAGE

2. (a) Peggy has been eating three meals a day and still feels weak and tired. She goes to the clinic and her doctor tells her that she could be lacking some vitamins and minerals.

(i) List TWO vitamins **other than** vitamin A, and ONE mineral that could be lacking in Peggy's diet.

Vitamins: _____

Mineral: _____ (3 marks)

(ii) Name a water-soluble vitamin.

_____ (1 mark)

(iii) Name ONE nutrient **other than** a vitamin or mineral that could be lacking in Peggy's diet which could cause her to feel weak and tired.

Nutrient: _____ (1 mark)

(iv) Identify the end-product of the digestion of the nutrient named in (a) (iii) above.

End-product: _____ (1 mark)

(b) Figure 3 is a diagram of part of the human alimentary tract.

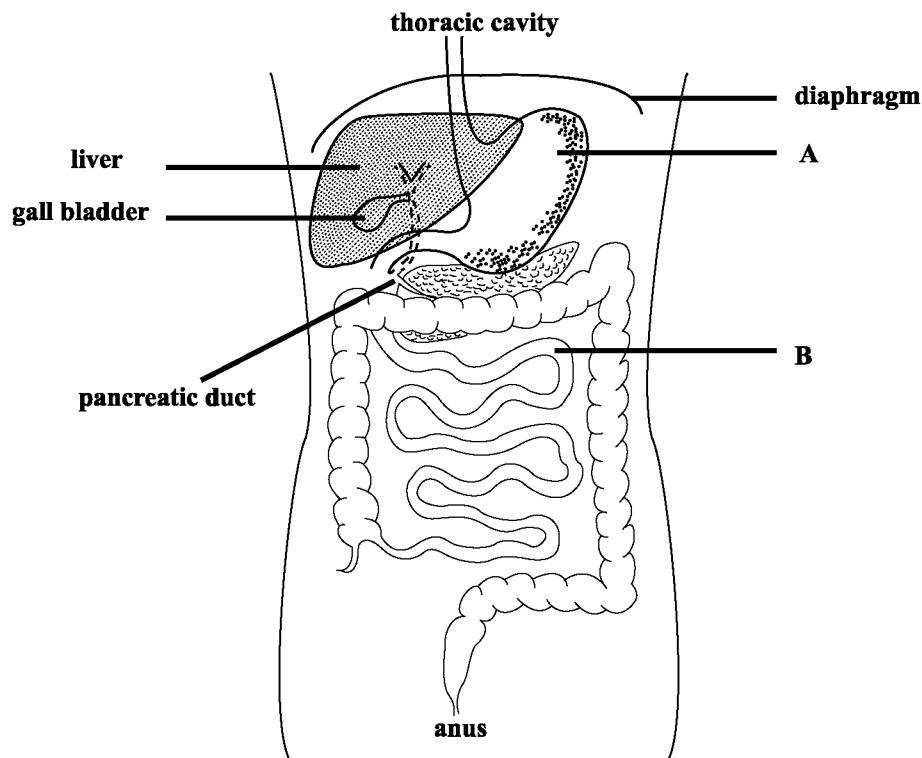


Figure 3. Diagram of part of the human alimentary tract

GO ON TO THE NEXT PAGE

- (i) State ONE function of EACH of the parts labelled A and B in Figure 3.

A _____

B _____

(2 marks)

- (ii) Peggy's pharmacist suggests that she may need some amino acids in her diet so she adopts a protein-rich diet.

Describe the digestion of proteins in the stomach and the small intestine.

Stomach: _____

Small intestine: _____

(5 marks)

- (iii) Suggest TWO benefits of amino acids to Peggy's body.

(2 marks)

Total 15 marks

3. (a) Mary and Suresh are playing with mummy's perfume in the bedroom. Mummy smells the perfume as she is preparing dinner in the kitchen.

(i) Name the process that allows the scent of the perfume to travel from the bedroom to the kitchen.

Process: _____
(1 mark)

(ii) How does the process in (a) (i) above differ from osmosis?

(2 marks)

(b) (i) Define the term 'active transport'.

(2 marks)

(ii) State ONE part of the body where active transport occurs.

(1 mark)

(iii) Name the part of the cell where active transport takes place.

(1 mark)

(c) Anna-Nicole has difficulty breathing after running long distances. She has been told that she may have problems with her circulation.

(i) Suggest how problems with her **pulmonary** circulation could account for her symptoms.

(3 marks)

(ii) The heart is a four-chambered organ whose walls are made up almost entirely of muscles.

How would a problem associated with the walls of the heart affect the **systemic** circulation?

(3 marks)

(iii) Another component of the circulatory system is the lymphatic system.

State TWO functions of the lymphatic system.

(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

4. Figure 4 shows part of the respiratory system of a human being.

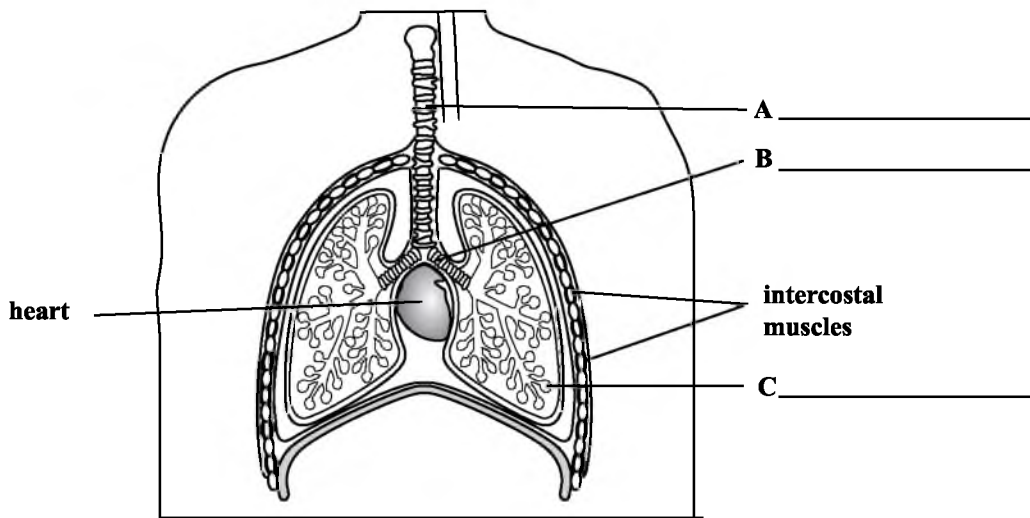


Figure 4. Part of the respiratory system of a human being

(a) (i) Label the diagram at the points marked A, B and C. (3 marks)

(ii) Fill in the blank spaces in the following sentence.

On breathing in, the ribcage moves _____ and
_____ while the diaphragm _____.

(3 marks)

(b) Mr Speedy, a middle-aged man, decides to train for a sprint competition. Since retiring from sports, Mr Speedy has become a heavy smoker. He sets off on a 100 m sprint but by the halfway mark he experiences pain in his legs and sides. He cannot complete the sprint. He remains bent over, breathing through his mouth for several minutes.

(i) Suggest how the changes in the process of respiration (aerobic and anaerobic) might be responsible for Mr Speedy being unable to complete the sprint.

(2 marks)

GO ON TO THE NEXT PAGE

- (ii) Explain why his heart rate increases during the sprint.

(2 marks)

- (iii) Account for the pain in his leg muscles.

(2 marks)

- (iv) Explain why Mr Speedy has to breathe through his mouth.

(2 marks)

- (v) How does Mr Speedy's smoking contribute to his inability to complete the sprint?

(1 mark)

Total 15 marks

SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided at the end of each question.

5. Figure 5 shows part of the human female reproductive system, and Figure 6 shows part of the human male reproductive system.

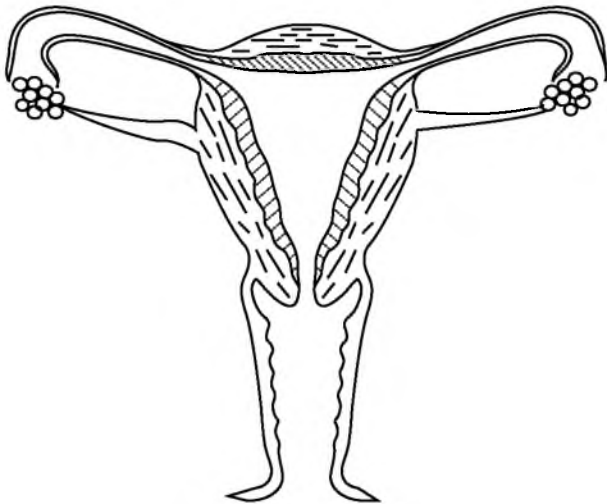


Figure 5. Diagram of part of the human female reproductive system

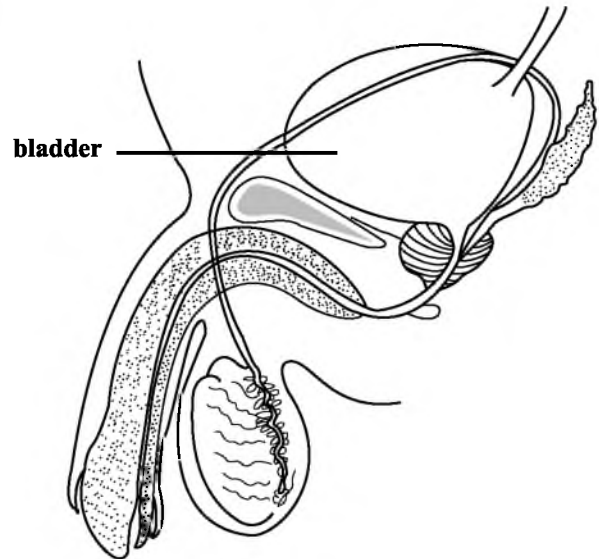


Figure 6. Diagram of part of the human male reproductive system

- (a) (i) Label the oviduct and vagina on Figure 5.
- (ii) Label the prostate gland and the urethra on Figure 6.
- (iii) Concerning the passage of gametes and urine, state ONE major difference between the male and female reproductive systems. **(6 marks)**
- (b) Vishana is nine months pregnant and has been told that it is almost time for her to deliver her baby. Describe the THREE stages of the birth process. **(5 marks)**
- (c) Vishana is fearful of becoming pregnant again too soon but is undecided about using contraceptives because she believes her baby may be harmed.
- (i) Suggest ONE natural method of birth control and give ONE disadvantage of using this method.
- (ii) State TWO benefits of family planning to a country. **(4 marks)**

Total 15 marks

GO ON TO THE NEXT PAGE

6. (a) (i) State what is meant by EACH of the following terms:
- Biodegradable
 - Landfill
 - Sewage
 - Pollutant
- (ii) Identify TWO ways of decreasing the volume of solid waste, **other than** by reducing the production of such waste. **(6 marks)**
- (b) Explain how the proper construction and location of pit latrines contribute to improved health in communities without pipe-borne water supplies. **(4 marks)**
- (c) Persons in a remote community have heard about an outbreak of cholera and they need information. Write the information that should be put in a brochure to advise this community about
- how the disease is caused
 - signs and symptoms of the disease
 - ways to avoid contracting the disease. **(5 marks)**

Total 15 marks

Write your answer to Question 6 here.

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FORM TP 2012012



TEST CODE **01253020**

JANUARY 2012

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

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

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2. Answer ALL questions.
3. Write your answers in the spaces provided in this booklet.
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SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) Complete the following sentences using the correct word from the list provided in brackets.

(evaporates, condenses, evaporation, condensation)

When water from our rivers and oceans _____, water vapour is formed.

When water vapour cools, _____ occurs. **(2 marks)**

- (b) Contaminated water is harmful to one's health. Name TWO agricultural activities that may cause water pollution.

(2 marks)

- (c) The Ministry of Health advises that after severe flooding, drinking water should be boiled.

Name TWO water-borne diseases.

(2 marks)

GO ON TO THE NEXT PAGE

- (d) Information from the Copenhagen Climate Conference 2009 has shown that there is an increase in pollutants worldwide. Table 1 shows the percentage increase in pollutants and the percentage increase in cancers over a 70-year period.

**TABLE 1: PERCENTAGE INCREASE IN POLLUTANTS AND
PERCENTAGE INCREASE IN CANCERS**

Year	% Increase in Pollutants	% Increase in Cancers
1940 – 1949	5	1
1950 – 1959	7	3
1960 – 1969	11	4
1970 – 1979	20	12
1980 – 1989	38	30
1990 – 1999	42	40
2000 – 2009	44	51

- (i) On the grid provided in Figure 1 on page 5, construct a histogram of the data in Table 1. (The first bar has been drawn for you.) **(3 marks)**

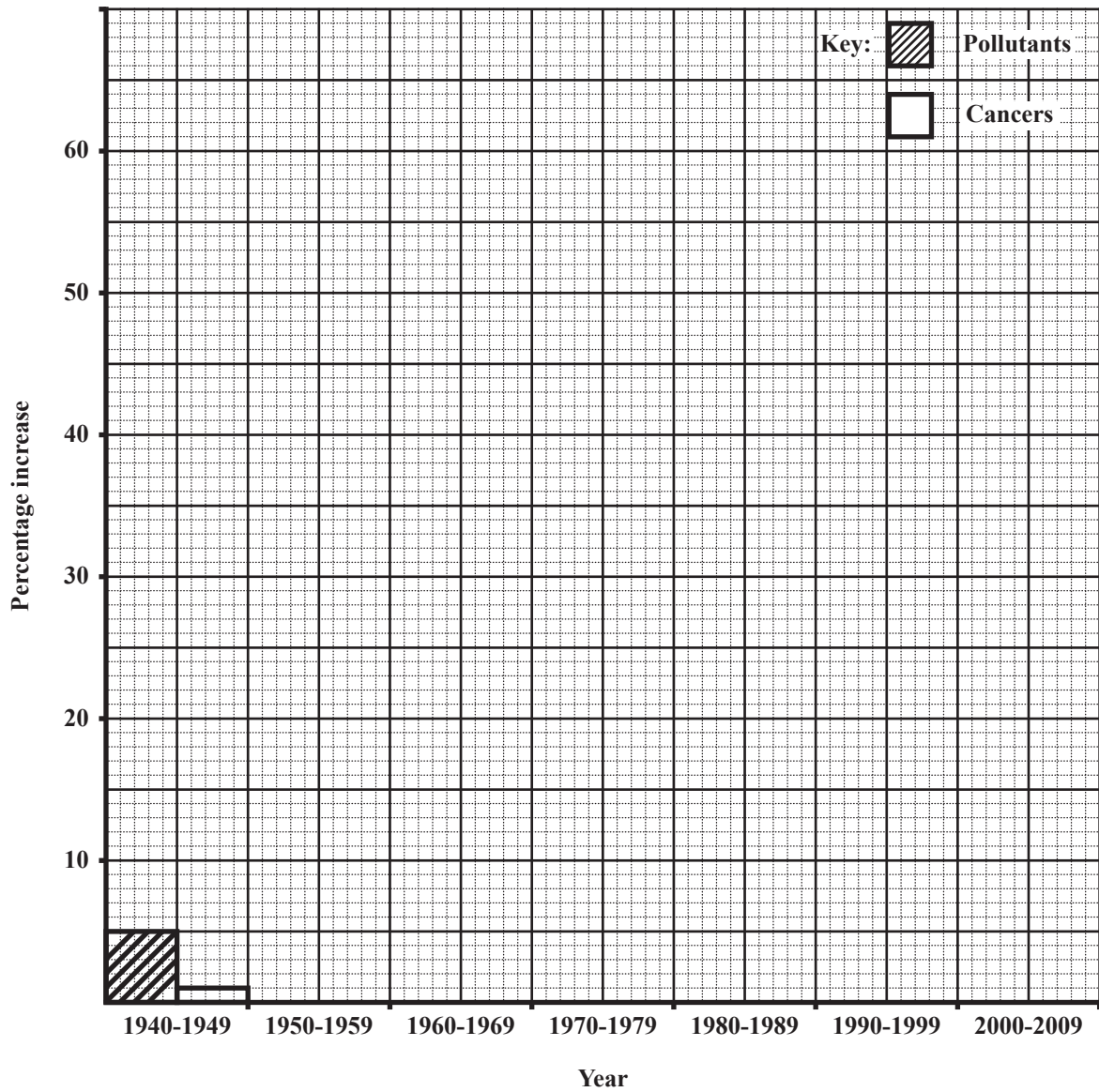


Figure 1. Histogram of data on pollutants and cancers

GO ON TO THE NEXT PAGE

- (ii) From the data provided in Table 1, deduce the link between pollutants and cancers.

(2 marks)

- (iii) The increase in pollutants is 2% greater during the period 2000 – 2009 over 1990 – 1999. However, there is a sharp increase in the percentage of cancers during 2000 – 2009.

Suggest ONE reason for this sharp increase.

(2 marks)

(e) Figure 2 is a diagram of an experiment being conducted.

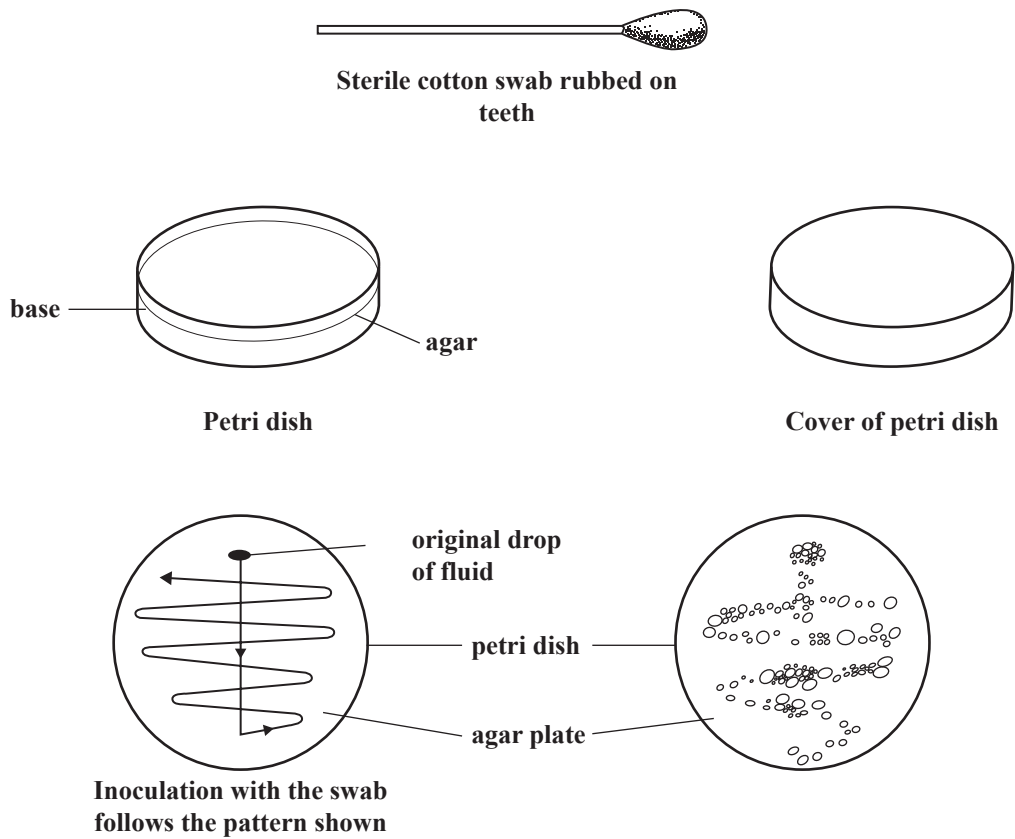


Figure 2. Diagram of an experiment being conducted

(i) What is the purpose of the experiment in Figure 2?

_____ (1 mark)

(ii) Suggest ONE possible danger associated with conducting this type of experiment.

_____ (1 mark)

Total 15 marks

2. Figure 3 is a schematic diagram showing the human heart and related blood vessels.

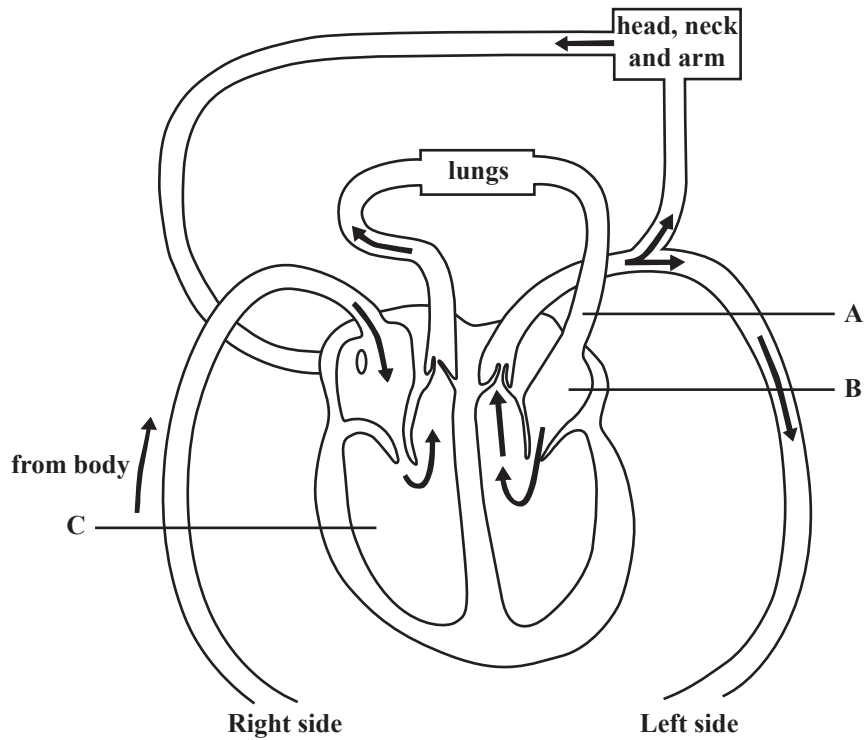


Figure 3. Schematic diagram of the human heart and related blood vessels

(a) Identify the parts labelled A, B and C.

A: _____

B: _____

C: _____

(3 marks)

- (b) Use the words provided in brackets and complete Table 2 to show THREE differences in structure between arteries and veins.

(Thin, Thick, Elastic, Inelastic, Absent, Present)

TABLE 2: DIFFERENCES BETWEEN ARTERIES AND VEINS

	Differences	
	Arteries	Veins
Walls		
Valves		

(3 marks)

- (c) A pump is a machine that takes in a liquid or gas at low pressure and pushes it at high pressure to another location, without any back flow.

- (i) Using the **right side** of the heart shown in Figure 3, relate the heart to the functioning of a pump by discussing the entrance and exit of blood.

(3 marks)

GO ON TO THE NEXT PAGE

- (ii) Name the structure that prevents the back flow of blood between the chambers on the **left side** of the heart in Figure 3.

(1 mark)

- (iii) What action of the heart causes the blood to be pushed under high pressure?

(1 mark)

- (d) (i) The doctor told Uncle Ali that the muscles on the left side of his heart are weak. Explain why this heart problem causes Uncle Ali to lack energy.

(2 marks)

- (ii) Explain how uncontrolled high blood pressure could affect the left side of the heart.

(2 marks)

Total 15 marks

NOTHING HAS BEEN OMITTED.

3. (a) (i) State ONE advantage and ONE disadvantage of EACH of the following:

a) Sexual reproduction

Advantage: _____

Disadvantage: _____

(2 marks)

b) Asexual reproduction

Advantage: _____

Disadvantage: _____

(2 marks)

(ii) Give TWO examples of asexual reproduction.

(2 marks)

(b) Researchers have developed a new contraceptive that targets the lining of the uterus. The 'old' contraceptive functions by preventing ovulation, thus tricking the body into believing that it is pregnant.

(i) What is the relationship between oestrogen and ovulation?

(2 marks)

(ii) What is the role of the lining of the uterus in pregnancy?

(2 marks)

GO ON TO THE NEXT PAGE

(iii) Which hormone causes the lining of the uterus to thicken?

_____ (1 mark)

(iv) Suggest TWO ways that the **new** contraceptive, which targets the lining of the uterus, may prevent pregnancy.

_____ (4 marks)

Total 15 marks

4. Homeostasis plays an important part in all body functions.

(a) (i) Define the term 'homeostasis'.

_____ (2 marks)

(ii) Feedback mechanisms are involved in the process of homeostasis.

Define and give an example of a negative feedback mechanism.

Definition: _____

_____ (2 marks)

Example: _____
_____ (1 mark)

GO ON TO THE NEXT PAGE

- (b) Trevor notices that his urine changes colour when he drinks a lot of water. Figure 4 is a diagram showing a renal tubule involved in urine production.

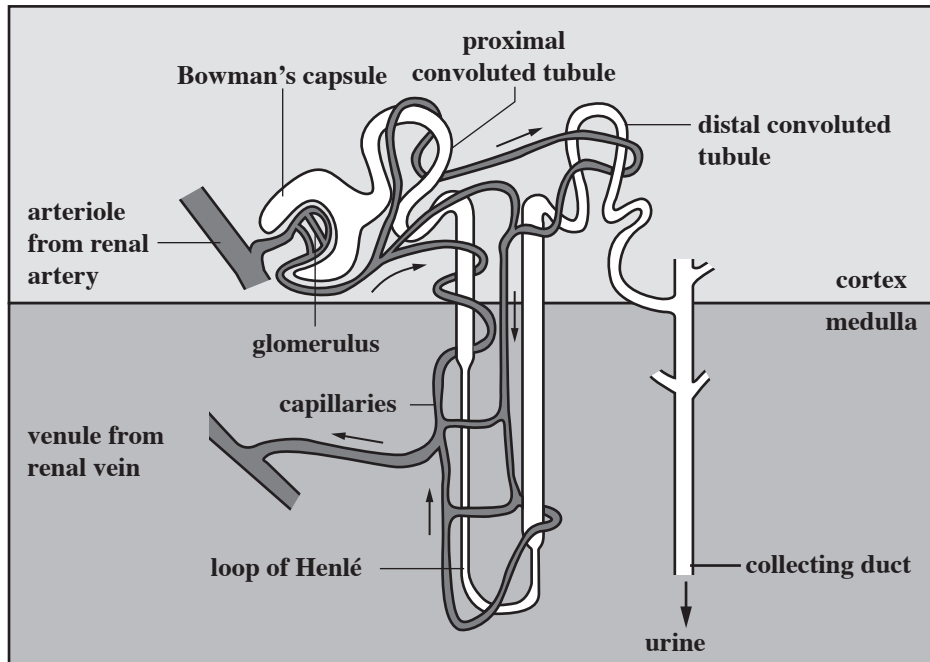


Figure 4. Diagram of a renal tubule involved in urine production

- (i) What is meant by the term 'excretion'?

(1 mark)

- (ii) With the aid of Figure 4, explain how the following parts of the renal tubule function when Trevor drinks a lot of water.

Bowman's capsule:

(1 mark)

Proximal convoluted tubule:

(1 mark)

GO ON TO THE NEXT PAGE

Loop of Henlé:

(1 mark)

Distal convoluted tubule:

(1 mark)

- (iii) State the difference in the colour of Trevor's urine when he drinks a lot of water from when he does not drink a lot of water.

(1 mark)

- (c) Carbon dioxide is produced as an end-product of cellular respiration. Inspired air (air breathed in) contains approximately 0.04% carbon dioxide, while expired air (air breathed out) contains approximately 4% carbon dioxide.

Describe the path of the 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.

(4 marks)

Total 15 marks

SECTION B

Answer ALL questions.

Write your answers in the spaces provided at the end of each question.

5. (a) Health is defined by the World Health Organization as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, while disease is the loss of health brought about by an association between the person and a disease agent.
- (i) Two categories of disease are degenerative and inherited. Name TWO OTHER categories of disease, and the factors that cause them. **(4 marks)**
- (ii) State ONE substance that may trigger an asthma attack, and name ONE form of treatment. **(2 marks)**
- (b) Rajin is five years old and is about to enter primary school. His parents are informed that before he starts school, he must receive all of his vaccinations. Explain to Rajin's parents why he needs to receive his vaccinations. **(2 marks)**
- (c) Rajin was born with some immunity from his mother. Describe the type of immunity that Rajin would have received from his mother and compare it with the type of immunity he would receive from his vaccinations. **(7 marks)**

Total 15 marks

Write your answer to Question 5 here.

GO ON TO THE NEXT PAGE

6. (a) (i) State TWO functions of the skeleton, OTHER THAN movement. **(2 marks)**
- (ii) Name TWO types of joint and state the type of movement associated with EACH joint named. **(4 marks)**
- (b) The car in which Tdoosy is travelling is involved in an accident. The driver's left knee is bruised and the tendons at the end of the radius in Tdoosy's right arm are severed.
- (i) Using your knowledge of the interactions between muscles, bones and tendons, explain why Tdoosy is unable to use his injured arm to lift anything. **(5 marks)**
- (ii) A few days later, a doctor tells the driver that his bruised knee is painful because of the fluid lost from the knee joint.
- Explain how the loss of fluid from the knee joint would account for the pain. **(4 marks)**

Total 15 marks

Write your answer to Question 6 here.

GO ON TO THE NEXT PAGE

FORM TP 2012085



TEST CODE **01253020**

MAY/JUNE 2012

CARIBBEAN EXAMINATIONS COUNCIL

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections.
2. Answer ALL questions.
3. Write your answers in the spaces provided in this booklet.
4. Each question is worth 15 marks.

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01253020/F 2012

NOTHING HAS BEEN OMITTED.

SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) Figure 1 shows a diagram of the human respiratory system.

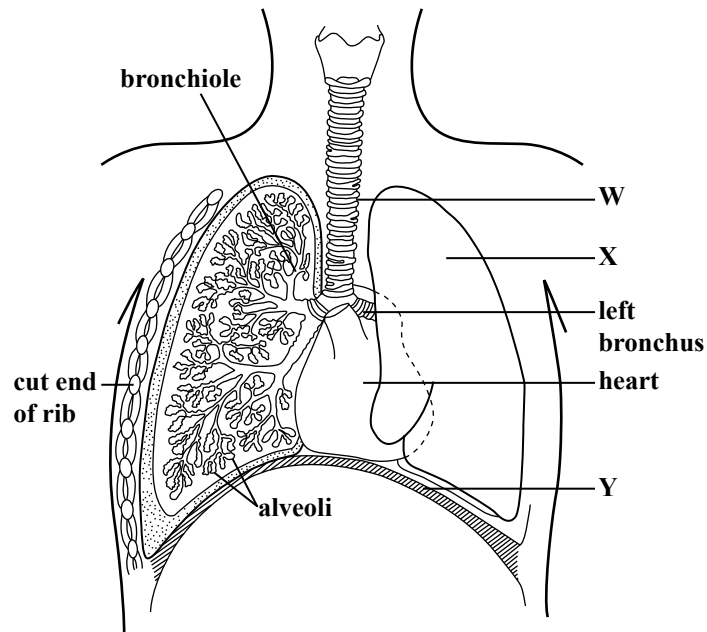


Figure 1. The human respiratory system

Identify the structures labelled W, X and Y in Figure 1.

W: _____

X: _____

Y: _____

(3 marks)

- (b) The location and structure of the alveoli enable them to carry out their function efficiently. Identify ONE feature of their location and TWO features of their structure that allow for this efficiency.

Location: _____

Structure: _____

(3 marks)

GO ON TO THE NEXT PAGE

- (c) Figure 2 shows the number of male and female smokers over the period 1970–2010, while Figure 3 shows the incidence of lung cancer in males and females over the same period.

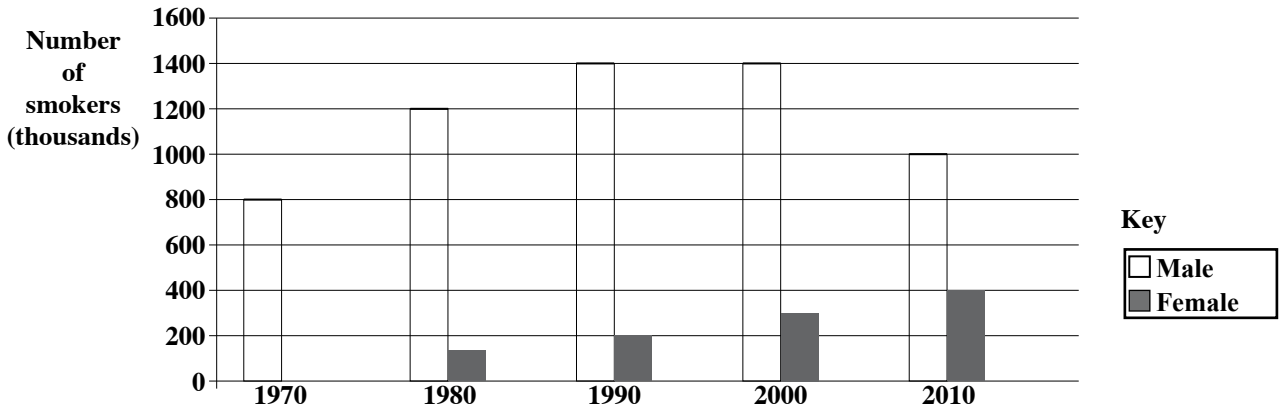


Figure 2. Number of male and female smokers, 1970–2010

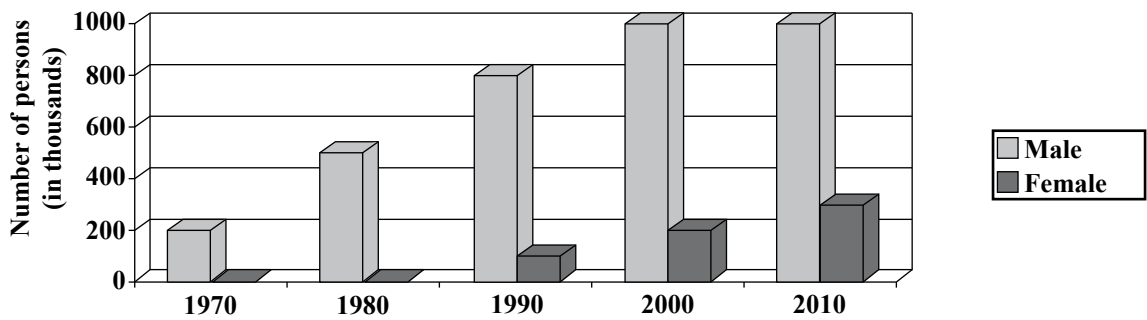


Figure 3. Incidence of lung cancer, 1970–2010

- (i) In which year was the total number of smokers the HIGHEST?

_____ (1 mark)

- (ii) In which period was there the GREATEST **increase** in the total number of smokers?

_____ (1 mark)

- (iii) Compare the pattern of smoking in men to that of women, between 1990 and 2010.

(2 marks)

- (iv) How does the pattern of cancer in females compare to that of smoking for females?

(2 marks)

- (v) Suggest ONE reason for the change in the pattern of smoking seen in men between 2000 and 2010.

(1 mark)

- (vi) Suggest TWO reasons for the pattern of smoking seen in females.

(2 marks)

Total 15 marks

2. (a) Mark is fascinated by the wide variety of highly coloured species he sees on the reefs, while he is snorkeling.

(i) Construct an aquatic food chain using three organisms found on reefs.

_____ (2 marks)

(ii) Identify a herbivore from the food chain in (i) above.

_____ (1 mark)

(iii) Which trophic level of a food chain, first, second or third, has the HIGHEST number of species?

_____ (1 mark)

(iv) Account for the differences in available energy at the different trophic levels of the food chain.

_____ (4 marks)

(b) Fill in the blank spaces in the following sentences.

A _____ obtains its food by living in or on another organism but does not normally kill the organism. In contrast, a _____ lives by capturing, killing and feeding on other organisms. (2 marks)

GO ON TO THE NEXT PAGE

- (c) Mark becomes unhappy when his mother asks him to cut the grass and rake up the leaves in his yard. Mark says that if he has his way he will get rid of all trees, plants and grass everywhere.

Using the information in Figure 4, explain why Mark's idea is **not** a good one. Your answer must include an equation for photosynthesis.

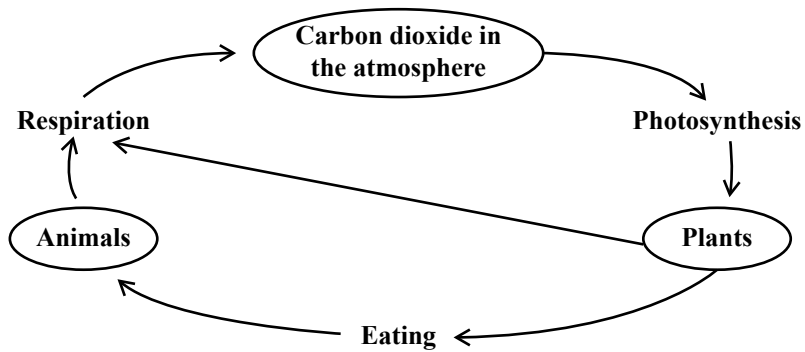


Figure 4. Part of the carbon cycle

Photosynthesis:

Explanation:

(5 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

3. (a) The nervous system is composed of two subdivisions. Name the TWO subdivisions.

(2 marks)

- (b) Figure 5 shows a diagram of a neurone.

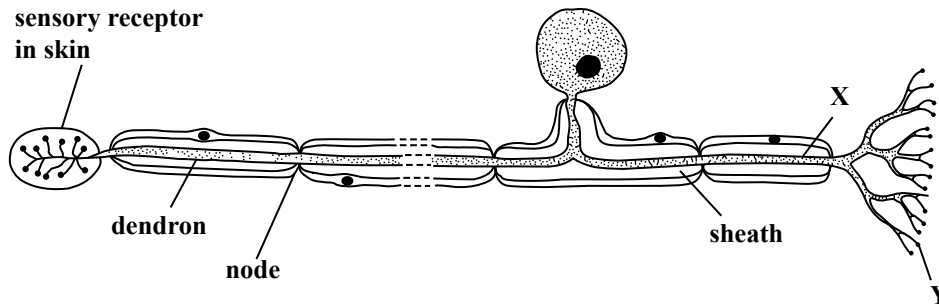


Figure 5. Diagram of a neurone

- (i) State the names of the parts labelled X and Y.

X: _____

Y: _____

(2 marks)

- (ii) State ONE function of EACH of the parts labelled X and Y.

X: _____

Y: _____

(2 marks)

- (c) Cindy, who is 17 years old, has been experiencing a fever that is not constant, and her heartbeat and breathing are irregular.

Suggest the parts of Cindy's brain that may be responsible for the

- (i) intermittent fever

- (ii) irregular heartbeat and breathing.

(2 marks)

GO ON TO THE NEXT PAGE

(d) Robert wants to become a medical doctor. He is fascinated by the fact that he has no control over blinking, when his friend tries to poke him in his eyes.

(i) Explain the difference between voluntary and involuntary actions.

Voluntary actions

Involuntary actions

(2 marks)

(ii) Give ONE example of a voluntary action and ONE example of an involuntary action OTHER THAN blinking.

Voluntary action

Involuntary action

(2 marks)

(e) During Robert's science class, his teacher mentions that when a nerve impulse arrives at the synapse, chemicals are released from vesicles.

(i) What is the term used for these chemicals that are released?

(1 mark)

(ii) Explain the role of these chemicals that are released.

(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

4. (a) Genetic engineering is also referred to as genetic modification. What is meant by the term 'genetic engineering'?

(2 marks)

- (b) Explain how biotechnology, involving recombinant DNA, is used to assist persons with diabetes. Your answer should include the name of ONE product and an outline of how the product is made.

Product:

How it is made:

(5 marks)

- (c) The general public is fearful of ingesting food produced as a result of genetic engineering. Give ONE advantage and ONE disadvantage associated with the use of genetic engineering for food production.

Advantage:

Disadvantage:

(2 marks)

GO ON TO THE NEXT PAGE

(d) Sunil, who is 45 years old, has a diet which consists predominantly of fatty foods. Upon visiting his doctor, Sunil is diagnosed with hypertension which resulted from atherosclerosis.

(i) Complete the following sentence to describe atherosclerosis.

Atherosclerosis is a condition which occurs when fat _____

(1 mark)

(ii) Describe to Sunil TWO effects that hypertension could have on his cardiovascular system.

(2 marks)

(iii) Suggest to Sunil THREE changes he could make to his lifestyle to control his hypertension.

(3 marks)

Total 15 marks

SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided at the end of each question.

5. (a) Figure 6 shows the position of endocrine glands in the human body. State the hormones produced by A and B and give ONE function of EACH hormone stated. **(4 marks)**

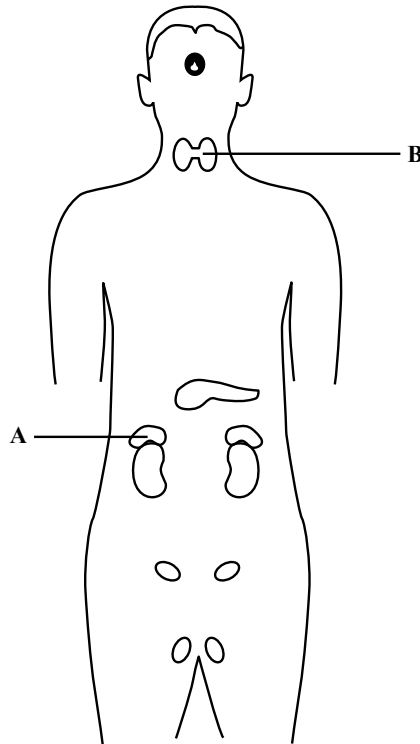


Figure 6. Position of the endocrine glands in the human body

- (b) As a result of a nuclear explosion in the Ukraine in the 1980s, many people developed tumours of the pituitary gland. This resulted in an underproduction of some of the hormones produced by this gland.
- (i) Name TWO hormones produced by the pituitary gland which affect both the testes and the ovaries. **(2 marks)**
 - (ii) Explain how an underproduction of the hormones named in (b) (i) above affects the human body. **(4 marks)**
 - (iii) Suggest what may have been the effect of an underproduction of the hormones named in (b) (i) above, on the Ukraine population. **(2 marks)**
- (c) The nervous system and the endocrine system both control the activities of the human body. Outline THREE differences between these two systems. **(3 marks)**

Total 15 marks

GO ON TO THE NEXT PAGE



TEST CODE **01253020**

FORM TP 2013012

JANUARY 2013

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**CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

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01253020/JANUARY/F 2013

SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) There are several hormones produced by the testis and the ovary.

(i) State ONE hormone produced by EACH of the following:

a) Testis

b) Ovary

(2 marks)

(ii) State ONE function of the hormone named in (i) a) above.

Function of hormone (testis):

(1 mark)

- (b) Figure 1 shows a foetus just before birth.

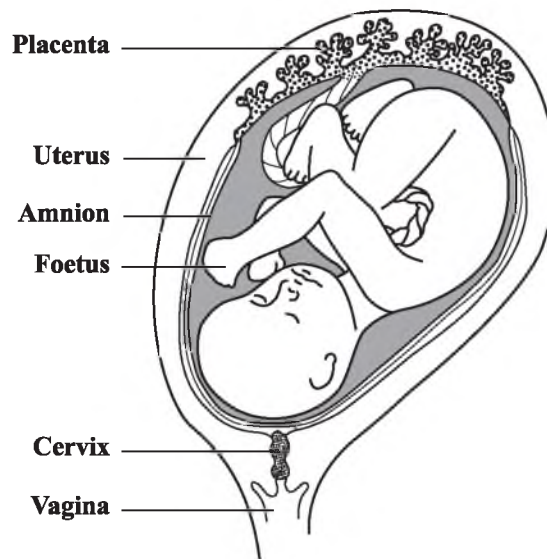


Figure 1. A foetus just before birth

- (i) Outline the function of the parts labelled 'placenta' and 'amnion'.

Placenta:

Amnion:

(2 marks)

- (ii) Label the umbilical cord, on Figure 1.

(1 mark)

- (c) The World Health Organization is concerned about the number of still-born babies (babies born dead) delivered by mothers who have a history of smoking.
- (i) Table 1 shows the percentage of still-born babies delivered by mothers who smoke tobacco.

TABLE 1: PERCENTAGE OF STILL-BORN BABIES OF MOTHERS WHO SMOKE TOBACCO

Age Group (years)	% of Still-born Babies
15–19	22
20–29	25
30–39	37
40–49	42
50–59	61

- a) On the grid provided in Figure 2 on page 5, construct a bar graph of the data in Table 1. **(3 marks)**
- b) Use the graph drawn in Figure 2 to describe the trend that occurs in mothers who are 30–59 years of age.

_____ **(1 mark)**

- (ii) Explain how smoking tobacco may lead to mothers delivering still-born babies.

_____ **(2 marks)**

- (iii) It is known that smoking tobacco affects foetal growth and contributes to stillbirths. Suggest THREE diseases that smoking tobacco may cause in adults.

_____ **(3 marks)**

Total 15 marks

GO ON TO THE NEXT PAGE

The image shows a large grid for data entry. It consists of 12 columns and 20 rows of small squares. The grid is empty and intended for recording data.

Figure 2. Grid for data in Table 1

2. (a) Figure 3 shows the arrangement of teeth in the upper jaw of an adult human.

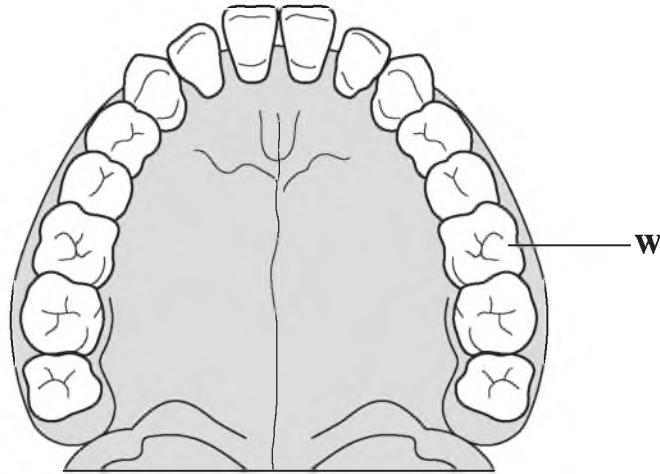


Figure 3. Teeth in the upper jaw of an adult human

Name the type of tooth labelled W and state its function.

Type of tooth _____

Function _____

(2 marks)

- (b) At a Caribbean school where free meals are provided, it is observed that 40% of the children taking these meals have Body Mass Indices (BMI) that are much greater than 25, which is above the normal range. Also, it is found that some of the children show signs of night blindness. Potato, yam, rice, chicken, beef, cabbage, lettuce and carrot form the main part of the meals.

- (i) From the above-mentioned foods, name ONE source and ONE function of Vitamin A.

Source of Vitamin A _____

Function _____

(2 marks)

- (ii) Give the definition of 'Body Mass Index'.

(2 marks)

GO ON TO THE NEXT PAGE

- (iii) a) Andy is 1.0 m tall and weighs 45 kg. Calculate his BMI.

$$\left[\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height}^2 \text{ (m)}} \right]$$

- b) Based on your calculation in (iii) a) above, is Andy overweight?

(3 marks)

- (iv) Recommend to those providing the meals, how the portions of starches, proteins and vegetables can be adjusted to reverse the observed trend (that is, children who are overweight and suffer from night blindness). Give a reason for EACH adjustment recommended.

Starches:

Proteins:

Vegetables:

(4 marks)

- (v) Suggest TWO factors, other than poor diet, that could contribute to the children having BMI above the normal range.

(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

3. (a) Figure 4 shows the main bones of part of the human skeleton.

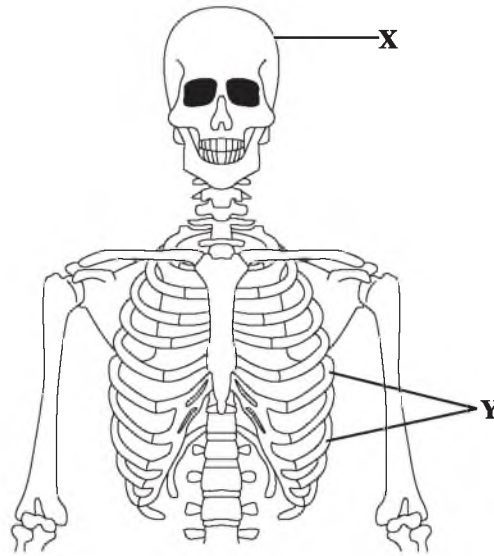


Figure 4. Main bones of part of the human skeleton

- (i) Name the bones labelled X and Y in Figure 4.

X: _____

Y: _____

(2 marks)

- (ii) State ONE function of EACH bone named in (i) above.

Function of X:

Function of Y:

(2 marks)

- (b) The skeletal system is made up of both bone and cartilage. State TWO distinguishing features of bone and cartilage.

Feature 1 – Bone: _____

Cartilage: _____

Feature 2 – Bone: _____

Cartilage: _____

(2 marks)

GO ON TO THE NEXT PAGE

- (c) Charles has been complaining of severe pain in his lower back. His wife, Summer, has problems with the arches of her feet. They both visit the doctor and are told that he has poor posture and that she needs to stop wearing very high-heeled shoes.

Explain how poor posture and wearing high-heeled shoes could contribute to Charles' back pains and Summer's painful arches, respectively.

Poor posture:

Wearing high-heeled shoes:

(5 marks)

- (d) Granny Luanda has had a history of malformed bones in her youth and now that she is old, she has fallen several times and twice fractured her left hip.

- (i) Suggest ONE vitamin and ONE mineral that may be deficient in Granny Luanda's diet.

Vitamin: _____

Mineral: _____

(2 marks)

- (ii) Suggest ONE disease EACH that could develop as a result of a deficiency of the vitamin and mineral named in (d) (i) above.

Vitamin deficiency disease: _____

Mineral deficiency disease: _____

(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

4. (a) The sense organs in our body allow us to detect stimuli. Name TWO sense organs and the stimuli they detect.

Sense organ: _____

Stimulus: _____

Sense organ: _____

Stimulus: _____

(4 marks)

- (b) Figure 5 shows some activities that occur when the human eye focuses on a distant object.

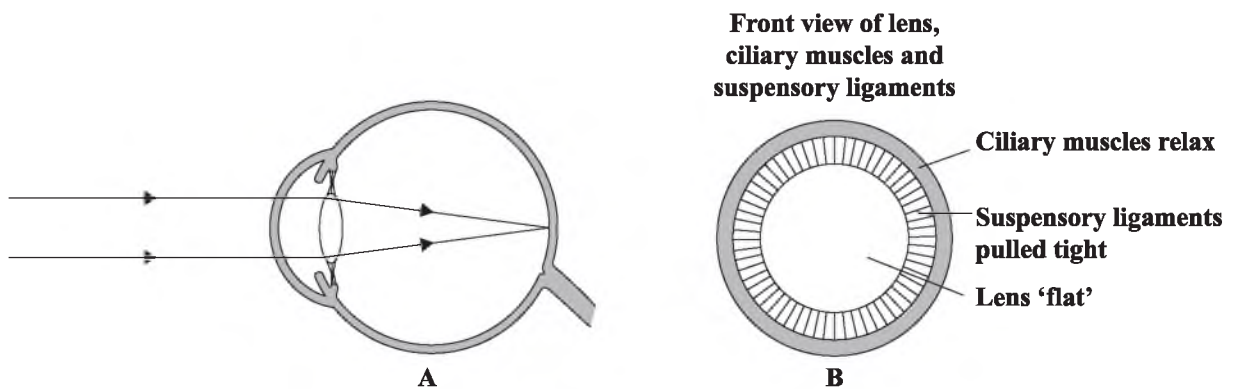


Figure 5. The eye focusing on a distant object

- (i) Annotate Figure 6 to show the activities that occur when the eye is focusing on a **near** object. (3 marks)

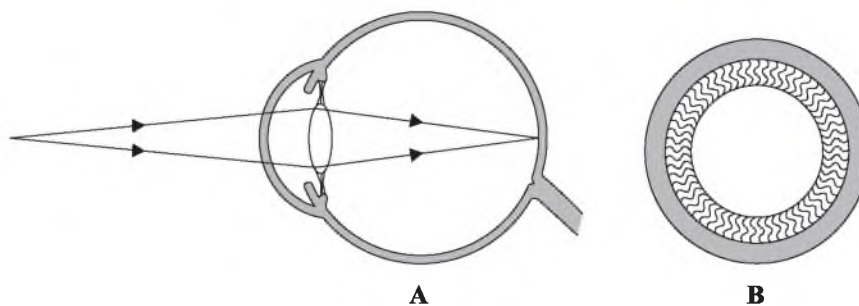


Figure 6. The eye focusing on a near object

GO ON TO THE NEXT PAGE

- (ii) State the name of the process by which the eye focuses on near and far objects.

_____ **(1 mark)**

- (c) When Uncle Khan was a child, he developed an irregularly curved cornea. Now his doctor tells him that he is suffering from a cataract and not glaucoma.

- (i) Name the eye defect that is caused by an irregularly curved cornea.

_____ **(1 mark)**

- (ii) Explain what causes glaucoma.

_____ **(2 marks)**

- (iii) What effect does glaucoma have on eye vision?

_____ **(1 mark)**

- (iv) Explain to Uncle Khan what is a cataract and how it can be treated.

_____ **(3 marks)**

Total 15 marks

SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided at the end of each question.

5. (a) Define the terms 'gene' and 'dominance'. **(3 marks)**

(b) Haemophilia is a sex-linked disease. Mrs Trinbage is a carrier for haemophilia.

(i) Explain what is meant by the term 'carrier'. **(3 marks)**

(ii) Complete the following Punnett square for a cross between Mrs Trinbage and her husband, who is normal. **H** represents the gene for normal blood clotting and **h** represents the gene for abnormal blood clotting.

Mrs Trinbage is $X^H X^h$; her husband is $X^H Y^H$. **(5 marks)**

(iii) Describe the possible phenotype of their offspring. **(4 marks)**

Total 15 marks

Write your answer to Question 5 here.

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FORM TP 2013085



TEST CODE **01253020**

MAY/JUNE 2013

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EXAMINATION**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

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01253020/F 2013

SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. During Carnival, Vishnu got drunk and had unprotected sex with a female. One year later, he starts losing weight rapidly, and is diagnosed with HIV/AIDS.

(a) (i) What do the acronyms 'HIV' and 'AIDS' mean?

HIV _____

AIDS _____

(2 marks)

(ii) State TWO ways in which HIV can be spread within a population, other than by having unprotected sex.

(2 marks)

(iii) State TWO symptoms of AIDS, other than weight loss.

(2 marks)

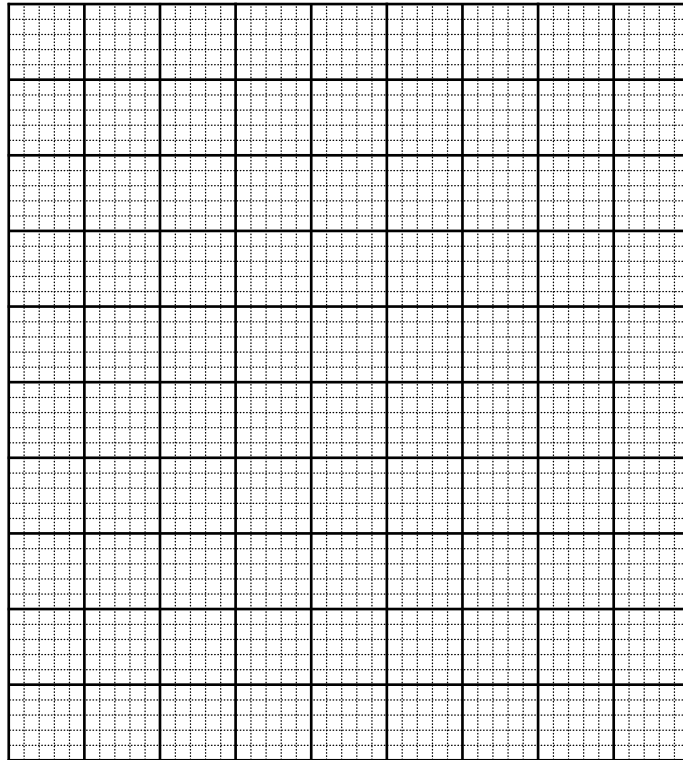
(b) A study was carried out to compare the incidence of HIV/AIDS within various age groups. Table 1 shows the number of AIDS-related deaths in 2010 in various age groups.

TABLE 1: AIDS-RELATED DEATHS IN VARIOUS AGE GROUPS

Age Group	Number of Deaths
15–24	321
25–34	750
35–44	240
45–54	125

GO ON TO THE NEXT PAGE

- (i) On the grid provided below, construct a bar graph of the data in Table 1.



(3 marks)

- (ii) Compare the number of deaths in the various age groups.

(3 marks)

- (iii) Suggest THREE socio-economic effects that deaths within the 25–44 age group would have on a country.

(3 marks)

Total 15 marks

2. (a) State TWO ways in which the structure of a plant cell differs from that of an animal cell.

(2 marks)

- (b) Figure 1 shows a diagram of a specialized cell.



Figure 1. Diagram of a specialized cell

- (i) Identify the type of cell shown in Figure 1.

(1 mark)

- (ii) Explain how the structure of the cell shown in Figure 1 makes it suitable for its function.

(4 marks)

- (c) (i) List THREE characteristics of living organisms, other than respiration and feeding.

(3 marks)

- (ii) Whodat tells his teacher that a car is more alive than a plant because it takes in oxygen and gives out carbon dioxide, and because it moves.

Explain why respiration and feeding are characteristics that CANNOT be applied to a car.

Respiration _____

Feeding _____

(5 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

3. Enzymes are biological compounds which speed up the rate of chemical reactions.

- (a) (i) Give the names of TWO enzymes associated with digestion in humans, and state ONE function of EACH enzyme named.

Enzyme _____

Function _____

Enzyme _____

Function _____

(4 marks)

- (ii) The breakdown of food takes place in the mouth, stomach and small intestine. Name the type of digestion for which the teeth in the mouth are responsible.

(1 mark)

- (iii) Humans have four types of teeth. State which type of tooth is MAINLY responsible for the digestion named in (a)(ii) above.

(1 mark)

- (b) Both temperature and pH affect the manner in which enzymes function. Figures 2 and 3 are graphs showing the rate of reaction of amylase over a range of temperatures and pH.

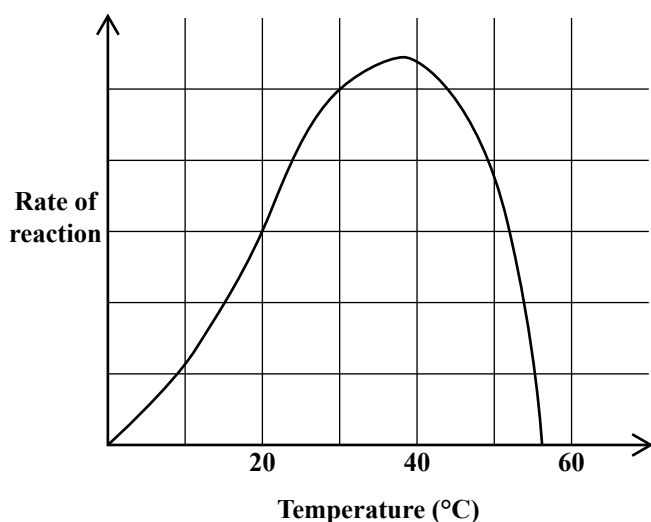


Figure 2. Rate of reaction of amylase over a range of temperatures

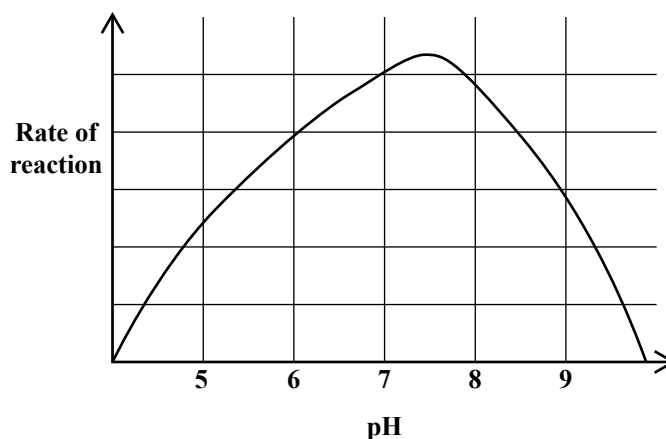


Figure 3. Rate of reaction of amylase at different pH levels

GO ON TO THE NEXT PAGE

- (i) At approximately which temperature and pH does amylase function the BEST?

Temperature _____

pH _____

(2 marks)

- (ii) Suggest what effect temperatures GREATER than 55 °C would have on enzymes.

(1 mark)

- (c) (i) Consumption of excessive amounts of carbohydrates and fats may contribute to the development of diabetes mellitus. Explain the role of the pancreas in the development of this disease.

(4 marks)

- (ii) Suggest TWO methods, other than the use of medication, which could be used to manage diabetes mellitus.

(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

4. Mitosis and meiosis are two types of cell division which take place in humans.

(a) (i) Which type of cell division results in identical offspring?

_____ (1 mark)

(ii) State the number of chromosomes that will be found in the daughter cells of the cell division named in (a)(i) above.

_____ (1 mark)

(iii) In which type of cell does **mitosis** take place?

_____ (1 mark)

(b) During meiosis, an event occurs in which there is the exchange of small parts of DNA between homologous chromosomes.

(i) State the name of this event.

_____ (1 mark)

(ii) State the source of the homologous chromosomes and the importance of the event named in (b)(i) above.

Source _____

Importance _____

_____ (2 marks)

(c) Figure 4 shows the menstrual cycle of a human female, highlighting changes which occur in hormonal levels, the uterus and the ovary.

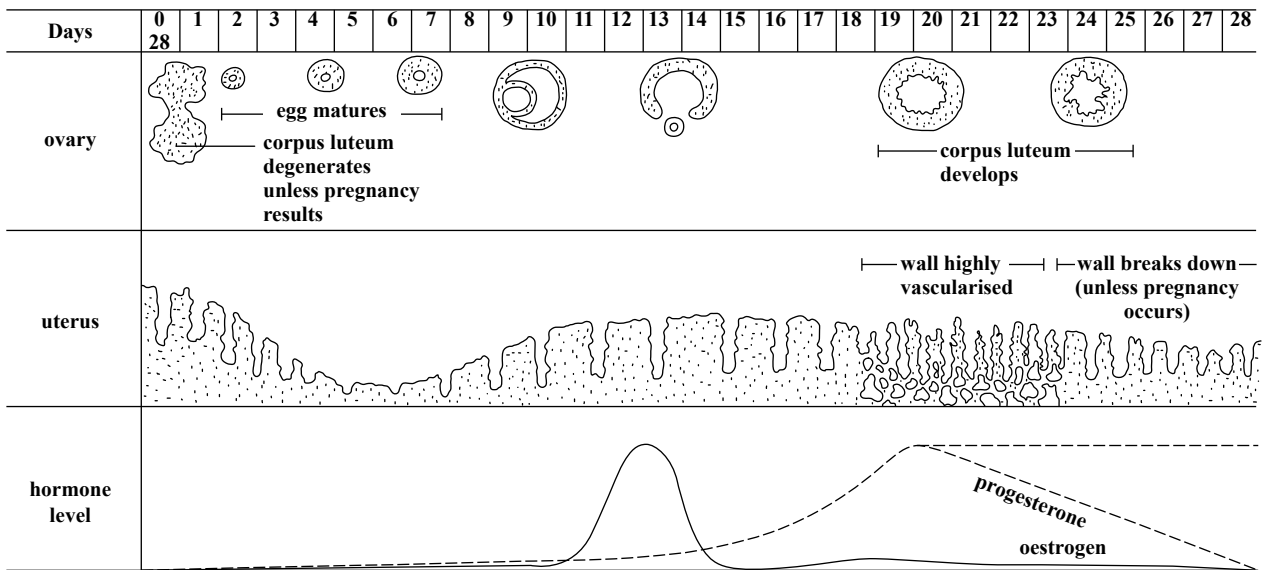


Figure 4. The menstrual cycle of a human female

(i) Describe the changes occurring in the menstrual cycle from

Day 0 – Day 5

Day 6 – Day 14.

4 marks)

GO ON TO THE NEXT PAGE

- (ii) Describe the changes that take place with progesterone levels AFTER ovulation, if pregnancy occurs, and if pregnancy does NOT occur.

After ovulation

If pregnancy occurs

If pregnancy does not occur

(3 marks)

- (d) Outline how follicle-stimulating hormone (FSH) controls the production of oestrogen.

(2 marks)

Total 15 marks

SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided at the end of each question.

5. (a) Name the vector for leptospirosis and the vector for gastroenteritis. **(2 marks)**
- (b) You are asked to educate your community about BOTH leptospirosis and gastroenteritis. Write the information that must be provided for EACH disease, using the following headings:
- Name of disease
 - Signs and symptoms
 - Ways to prevent pathogens from entering the body
 - Prevention and control of the vectors

(13 marks)

Total 15 marks

Write your answer to Question 5 here.

GO ON TO THE NEXT PAGE

FORM TP 2014012



TEST CODE **01253020**

JANUARY 2014

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

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HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections.
2. Answer ALL questions.
3. Write your answers in the spaces provided in this booklet.
4. Each question is worth 15 marks.

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SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) Figure 1 is a diagram of part of the human respiratory system.

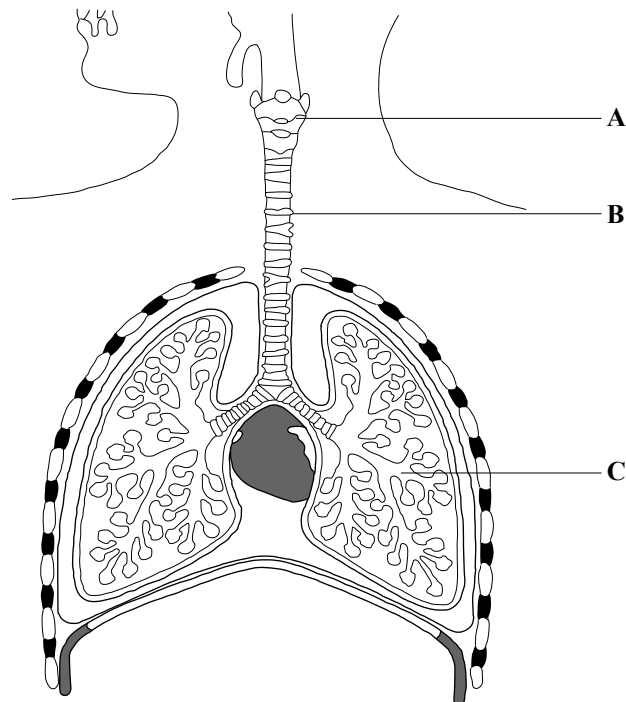


Figure 1. Part of the human respiratory system

Name the structures labelled A, B and C in Figure 1.

A _____

B _____

C _____

(3 marks)

- (b) (i) Choose the correct term from the list provided in brackets to complete the following sentence.

(lifestyle, nutritional, respiratory, sexually transmitted)

Asthma is described as a _____ disease.
(1 mark)

- (ii) State TWO signs/symptoms of asthma.

(2 marks)

- (c) Table 1 shows the number of persons suffering from asthma in different parts of a country.

TABLE 1: DATA ON ASTHMA CASES

Location	Activity	Number of Asthma Cases per 1000 Persons
City	Business	25
Countryside A	Vegetable farming	5
Countryside B	Heavy metal industries	40

- (i) On the grid provided on page 5, draw a bar graph to represent the data in Table 1 (Location and Number of Asthma Cases).

(3 marks)

- (ii) Use your knowledge of the triggers of asthma and the data provided in Table 1 to account for the number of asthma cases in different parts of the country.

(4 marks)

- (d) Figure 2 shows the average number of asthma attacks per person during a year-long study, and the level of Sahara dust particles in the air.

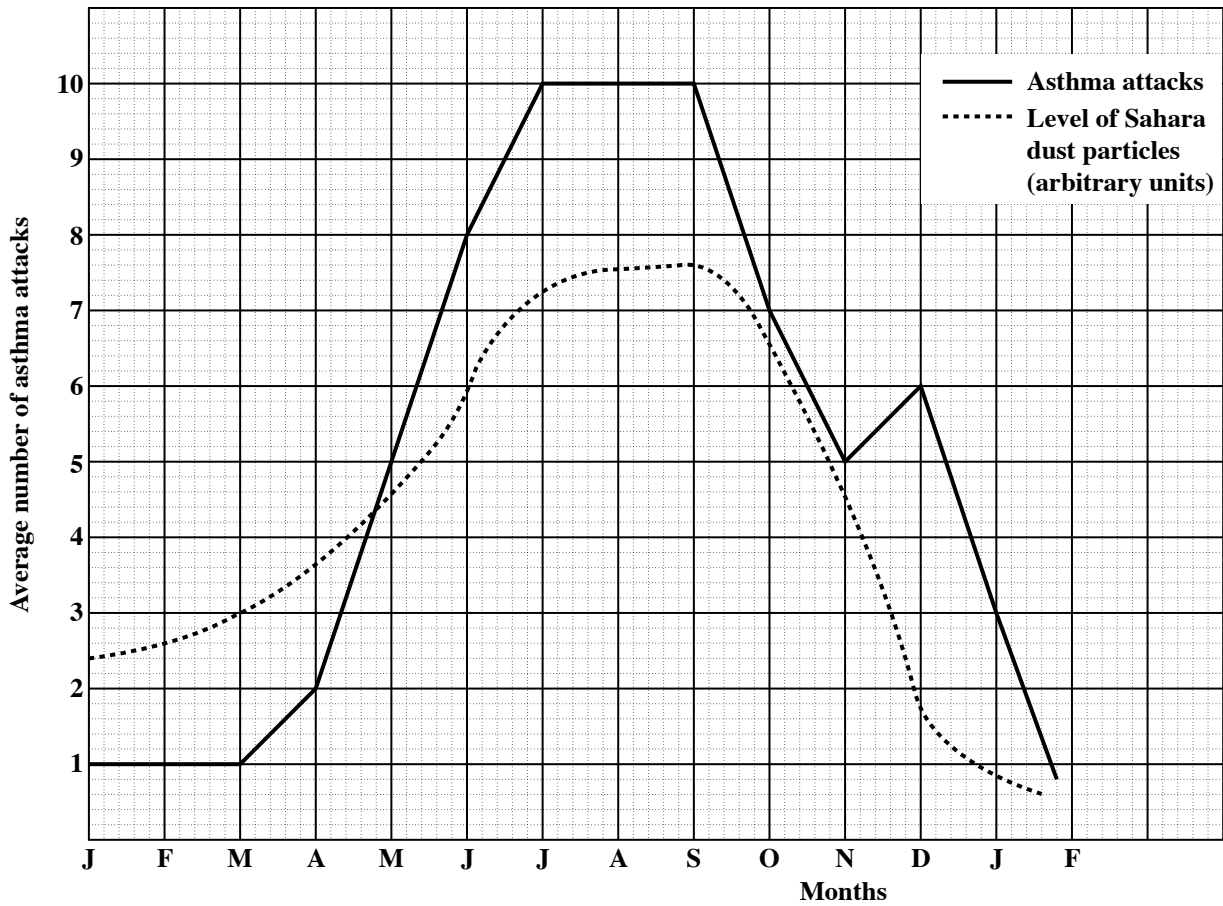


Figure 2. Average number of asthma attacks and level of Sahara dust particles

Describe the trend shown in Figure 2.

(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE

2. The purpose of the circulatory system is to transport substances from one part of the body to another. Figure 3 shows a micrograph of blood cells.

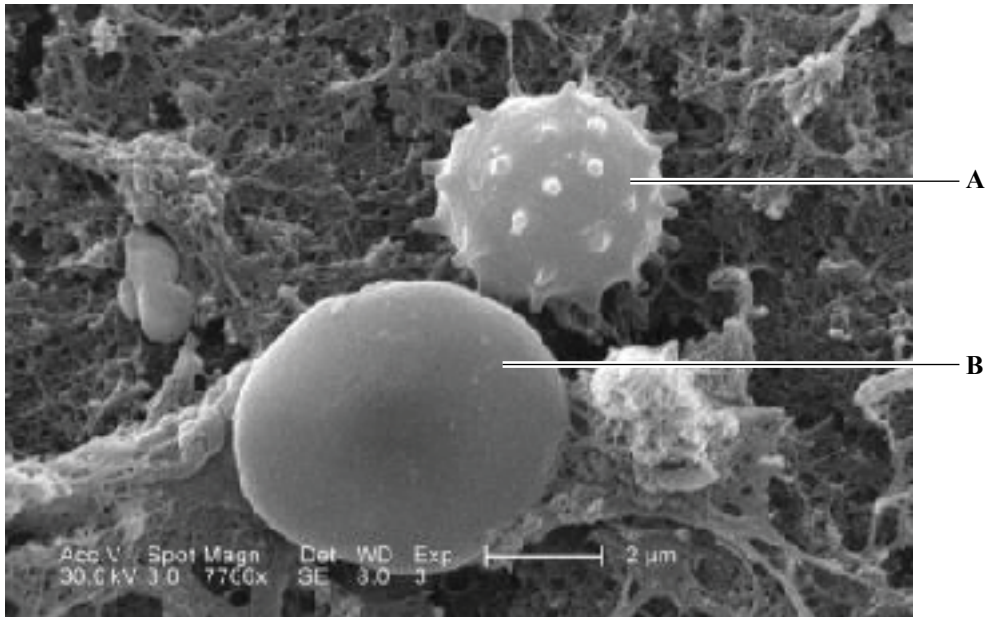


Figure 3. A micrograph of blood cells

- (a) (i) Name the structures labelled A and B in Figure 3.

A _____

B _____

(2 marks)

- (ii) State ONE function of EACH of the structures labelled A and B.

A _____

B _____

(2 marks)

- (b) When a blood vessel is cut, a clot soon forms to prevent the entry of bacteria. During the blood-clotting process, fibrinogen is converted to fibrin. Which of these proteins (fibrinogen and fibrin) is soluble and which is insoluble?

Soluble _____

Insoluble _____

(2 marks)

- (c) Figure 4 shows a transverse section through a normal artery.

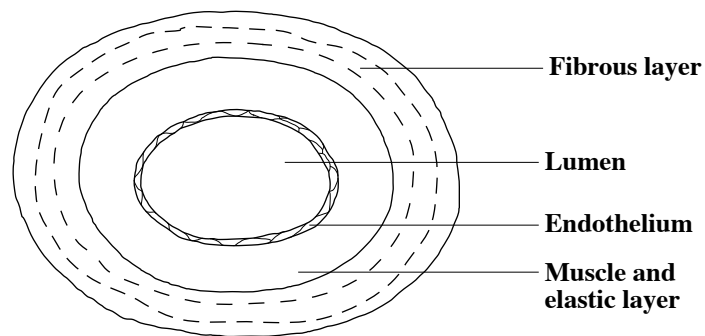


Figure 4. Transverse section through a normal artery

Complete the drawing of the artery in Figure 5 to show the effects of nicotine on the artery. Annotate your drawing to explain how nicotine affects the artery.

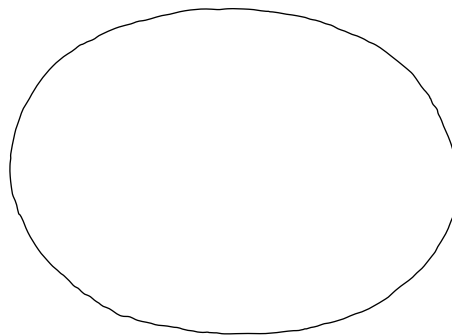


Figure 5. Incomplete drawing of an artery

(5 marks)

- (d) After sitting on a stool in the laboratory for several hours, Robert notices that his lower limbs feel very heavy. After walking around for a while, the heavy feeling goes away. Explain the association of tissue fluid and lymph with Robert's symptoms.

(4 marks)

Total 15 marks

NOTHING HAS BEEN OMITTED.

3. Figure 6 shows a diagram of a human nephron.

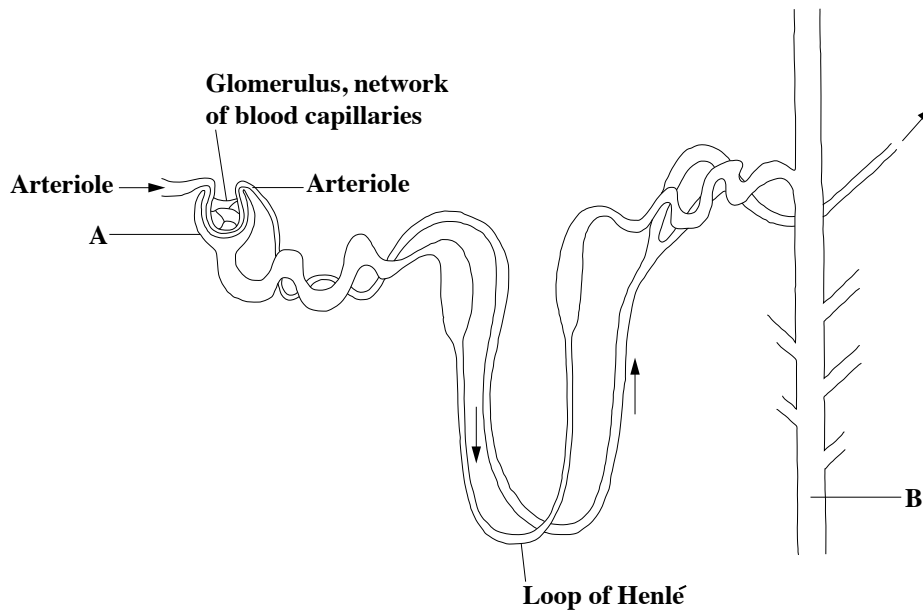


Figure 6. Diagram of a nephron

(a) (i) Name the parts labelled A and B in Figure 6.

A _____

B _____

(2 marks)

(ii) State ONE function of EACH of the parts labelled A and B.

A _____

B _____

(2 marks)

GO ON TO THE NEXT PAGE

- (b) The kidney is an excretory organ. Name ONE OTHER excretory organ, and the substance it excretes.

Organ _____

Substance _____

(2 marks)

- (c) As a result of diabetes, Tommy's kidneys have malfunctioned and he needs renal dialysis to control the volume and composition of his blood. Figure 7 shows a simple representation of the inside of a kidney dialysis machine.

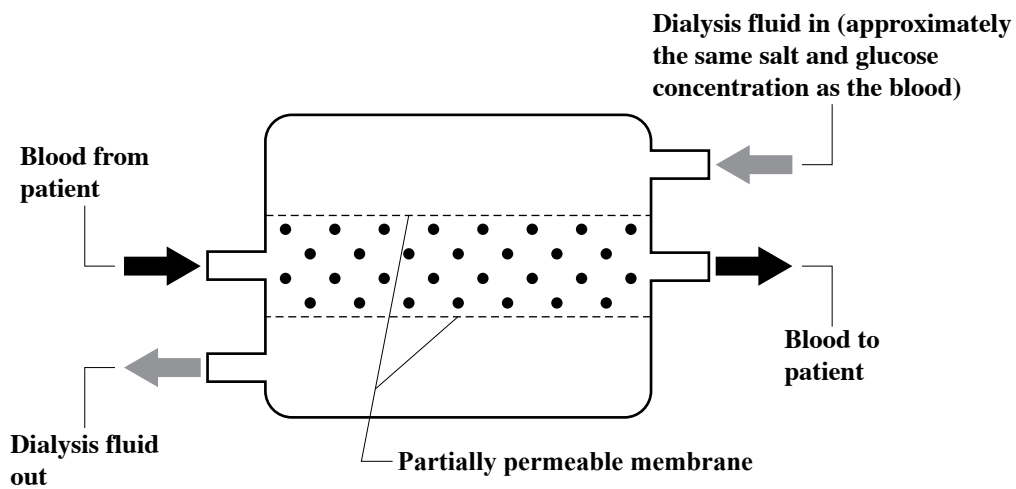


Figure 7. Simple representation of the inside of a kidney dialysis machine

- (i) Based on the diagram in Figure 7, explain why a partially permeable membrane is needed in renal dialysis.

(2 marks)

GO ON TO THE NEXT PAGE

- (ii) Why is it necessary for the dialysis fluid to have approximately the same glucose concentration as Tommy's blood?

(2 marks)

- (iii) If Tommy's kidneys were normal, explain how his hypothalamus would control the water content of his blood when blood solute concentration is high.

(5 marks)

Total 15 marks

4. (a) (i) Complete the following sentence:
Sewage consists of _____ and _____,
along with household _____.

(3 marks)

(ii) State TWO ways that remote communities could reduce the volume of household refuse produced by the community.

(2 marks)

(iii) Your neighbours throw all their household refuse on a vacant piece of land next to the playground. Explain why this improper disposal of household refuse poses a threat to the health of the community.

(2 marks)

(iv) Name TWO diseases that may be caused by this improper disposal of household refuse.

(2 marks)

(b) Two methods used in large-scale sewage treatment are activated sludge and biological filter.

(i) Which component of the treatment plant comes immediately before the activated sludge tank?

_____ **(1 mark)**

(ii) Compare the functioning of the activated sludge and biological filter tanks. Your answer should include TWO similarities and THREE differences.

Similarities _____

Differences _____

(5 marks)

Total 15 marks

SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided at the end of each question.

5. (a) To reduce the chances of babies becoming ill, mothers often use sterilization and disinfection.
- (i) State TWO differences between sterilization and disinfection. **(4 marks)**
 - (ii) Suggest how sterilization and disinfection could be used when caring for a baby. Provide TWO situations for EACH method. **(4 marks)**
- (b) Each time Shoba goes to the beach she gets an ear infection. The doctor prescribes antibiotics for five days but each time, she stops taking the medication after three days, when she is no longer in pain. Now Shoba finds that the antibiotics are not effective anymore.
- (i) What is meant by the term ‘antibiotic’? **(2 marks)**
 - (ii) Explain why the antibiotics are not effective anymore, and suggest the measures that Shoba should take in the future so that the antibiotics would be effective. **(5 marks)**

Total 15 marks

Write your answer to Question 5 here.

GO ON TO THE NEXT PAGE

6. (a) The differences among individuals are due to variation.

Distinguish between continuous and discontinuous variation, and give ONE example of EACH type of variation. **(4 marks)**

(b) Down's syndrome arises from a chromosomal mutation. How does the chromosome number of a person with Down's syndrome differ from that of a normal person?

(2 marks)

(c) Sex-linked inheritance occurs when the genes are on the sex chromosome. In most cases, the genes are on the X chromosome and not on the Y chromosome.

Use a Punnett square to determine the genotype of the offspring of a cross between a female carrier of red-green colour blindness and a normal male. State the phenotype of EACH offspring.

Use $X^R X^r$ to denote the carrier female and $X^R Y$ to denote the normal male.

(6 marks)

(d) Cell phone towers have caused some concern because of their close proximity to homes. Suggest the possible

(i) type of pollution that could result from these towers **(1 mark)**

(ii) effect of the pollution on humans **(1 mark)**

(iii) action that humans could take to reduce the effect of the pollution. **(1 mark)**

Total 15 marks

Write your answer to Question 6 here.

GO ON TO THE NEXT PAGE



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

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H U M A N A N D S O C I A L B I O L O G Y

Paper 02 – General Proficiency

2 hours

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6. **If you use extra pages you MUST write your registration number and question number clearly in the boxes provided at the top of EVERY extra page.**

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SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. Human Immunodeficiency Virus (HIV) is commonly transmitted via unprotected sex with an infected person.

(a) Suggest TWO other ways by which HIV is transmitted.

.....
.....

(2 marks)

(b) Acquired Immune Deficiency Syndrome (AIDS) is caused by a human immunodeficiency virus. This virus affects some cells of the circulatory system.

(i) Name the cell that is specifically targeted and destroyed by the human immunodeficiency virus.

.....

(1 mark)

(ii) State TWO signs or symptoms of AIDS.

.....
.....

(2 marks)

(c) Both gonorrhoea and syphilis are transmitted via unprotected sex with an infected person. Why are these diseases referred to as venereal and AIDS is NOT referred to as venereal?

.....
.....

(1 mark)

- (d) Table 1 shows the estimated prevalence of HIV, and the deaths due to AIDS within the Caribbean, at the end of 2009.

**TABLE 1: ESTIMATED HIV PREVALENCE
AND DEATHS DUE TO AIDS IN THE CARIBBEAN**

Country	Persons Living With HIV/AIDS	Deaths Due to AIDS
The Bahamas	660	50
Barbados	210	12
Cuba	710	15
The Dominican Republic	5 700	230
Haiti	12 000	710
Jamaica	3 200	120
Trinidad and Tobago	1 500	90

- (i) On the grid provided in Figure 1, construct a bar graph of the number of deaths due to AIDS, using the data in Table 1. **(3 marks)**

- (ii) Which country has the HIGHEST number of persons living with HIV/AIDS?

.....
(1 mark)

- (iii) Which country has the LOWEST number of deaths due to AIDS?

.....
(1 mark)

- (iv) The Bahamas and Cuba have almost similar numbers of persons living with HIV/AIDS. However, Cuba has 15 deaths while The Bahamas has 50 deaths due to AIDS.

Suggest ONE reason why Cuba has LESS deaths than The Bahamas.

.....
.....
(2 marks)

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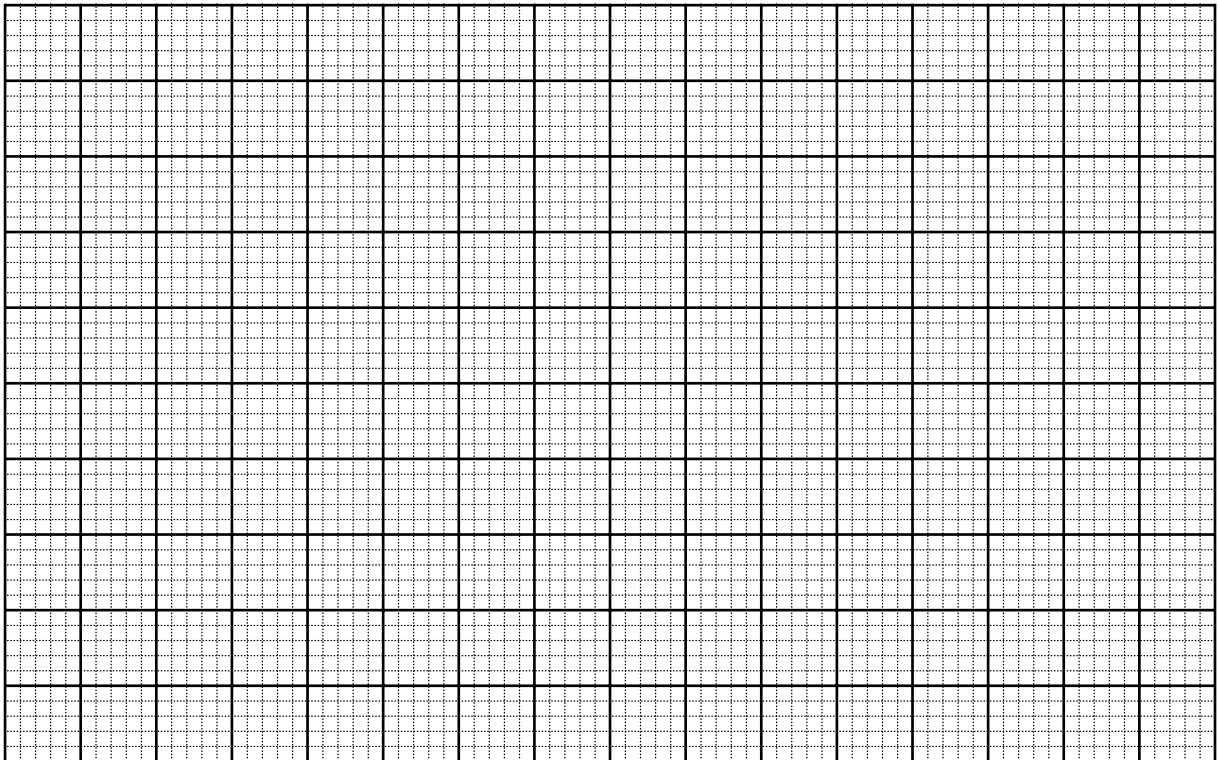


Figure 1. Deaths due to AIDS in some Caribbean countries

- (e) The economy of some countries depends heavily on tourism. Suggest ONE effect that a high incidence of AIDS would have on these countries.

.....

.....

.....

(2 marks)

Total 15 marks

2. Figure 2 shows a typical plant cell.

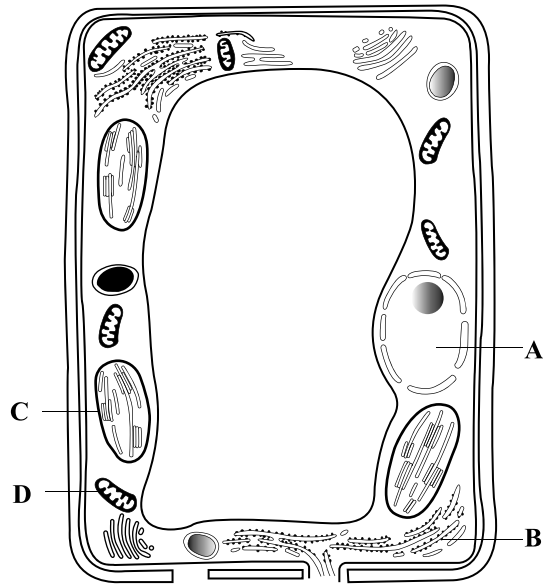


Figure 2. A typical plant cell

(a) (i) Name the organelles labelled A and B in Figure 2.

A

B

(2 marks)

(ii) State ONE function of EACH of the organelles labelled C and D.

Function of C

.....

Function of D

.....

(2 marks)

(b) You are required to view a virus and a typical plant cell under a microscope.

(i) Identify ONE feature that is common to both a virus and a typical plant cell.

.....
(1 mark)

(ii) Suggest TWO differences that would be observed between the virus and the typical plant cell.

.....
.....
(2 marks)

(c) Figure 3 shows three different types of cells found in the human body.

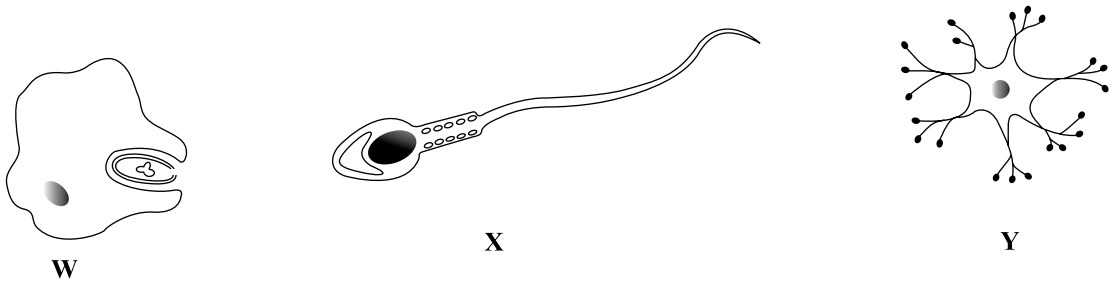


Figure 3. Types of cells found in the human body

(i) Name the cell labelled Y in Figure 3.

.....
(1 mark)

(ii) Are the cells in Figure 3 classified as differentiated or undifferentiated?

.....
(1 mark)

- (d) Children in a pre-school breathe deeply while running around in a park. They laugh a lot even when they are hurt, and they run to mummy for a snack.

Name THREE characteristics of living organisms that these children illustrate while playing in the park.

.....
.....
.....

(3 marks)

- (e) Bernadette tells Georgiana that a flame is a living organism because it moves, grows and reproduces by sparks. Is Bernadette correct? Explain your answer.

.....
.....
.....

(3 marks)

Total 15 marks

3. (a) Figure 4 shows a diagram of the human alimentary canal.

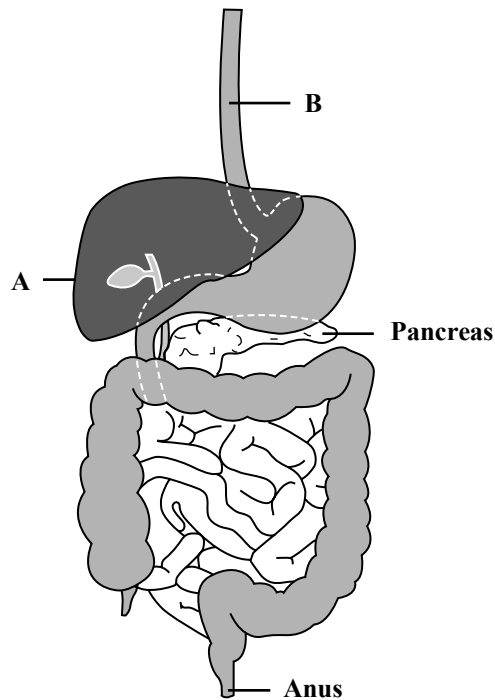


Figure 4. Diagram of the human alimentary canal

Name the structures labelled A and B in Figure 4, and state ONE function of EACH structure.

A

Function of A

B

Function of B

(4 marks)

(b) A pancreas becomes diseased and stops producing pancreatic juice.

(i) Name ONE food group whose digestion would be affected.

.....
(1 mark)

(ii) State ONE effect that a deficiency of the **food group** named in (i) above would have on the human body.

.....
(1 mark)

(c) Figure 5 shows an experiment used to demonstrate the digestion of starch by amylase.

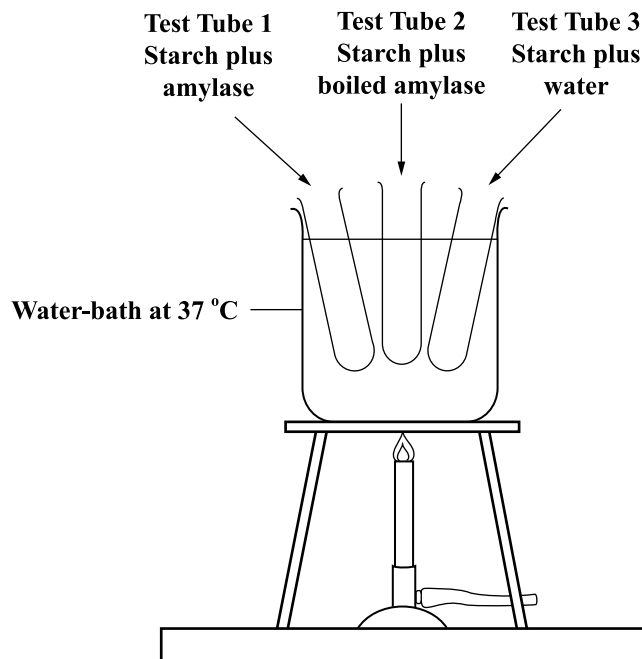


Figure 5. Experiment to demonstrate the digestion of starch by amylase

(i) In which of the three test tubes would the starch be digested?

.....
(1 mark)

- (ii) Explain why starch would NOT be digested in the other two test tubes.

.....
.....
.....
.....
.....
.....

(4 marks)

- (d) Veera does not chew her food properly before swallowing it.

- (i) Explain why Veera's way of briefly chewing her food is bad for the digestion of the food.

.....
.....
.....
.....
.....
.....

(3 marks)

- (ii) In which region of the digestive system would the final stage of the digestion of starches occur?

.....

(1 mark)

Total 15 marks

4. (a) Complete the following sentences:

Meiosis is a type of cell division in which the chromosome number is

At the end of meiosis in humans, each daughter cell contains chromosomes.

(2 marks)

- (b) Both mitosis and meiosis occur in human cells. Meiosis occurs in only one type of cell while mitosis occurs in all other types of cell.

- (i) Name the type of cell in which meiosis occurs.

.....

(1 mark)

- (ii) State TWO differences between mitosis and meiosis.

.....

.....

.....

.....

(2 marks)

- (c) During meiosis, similar chromosomes pair up and exchange genes. During fertilization, the normal chromosome number is attained.

Name a genetic disease that results if the zygote receives an extra chromosome.

.....

(1 mark)

- (d) Nayana is approaching puberty and is curious about the menstrual cycle. Her mother uses the diagram shown in Figure 6 to help her to understand the cycle.

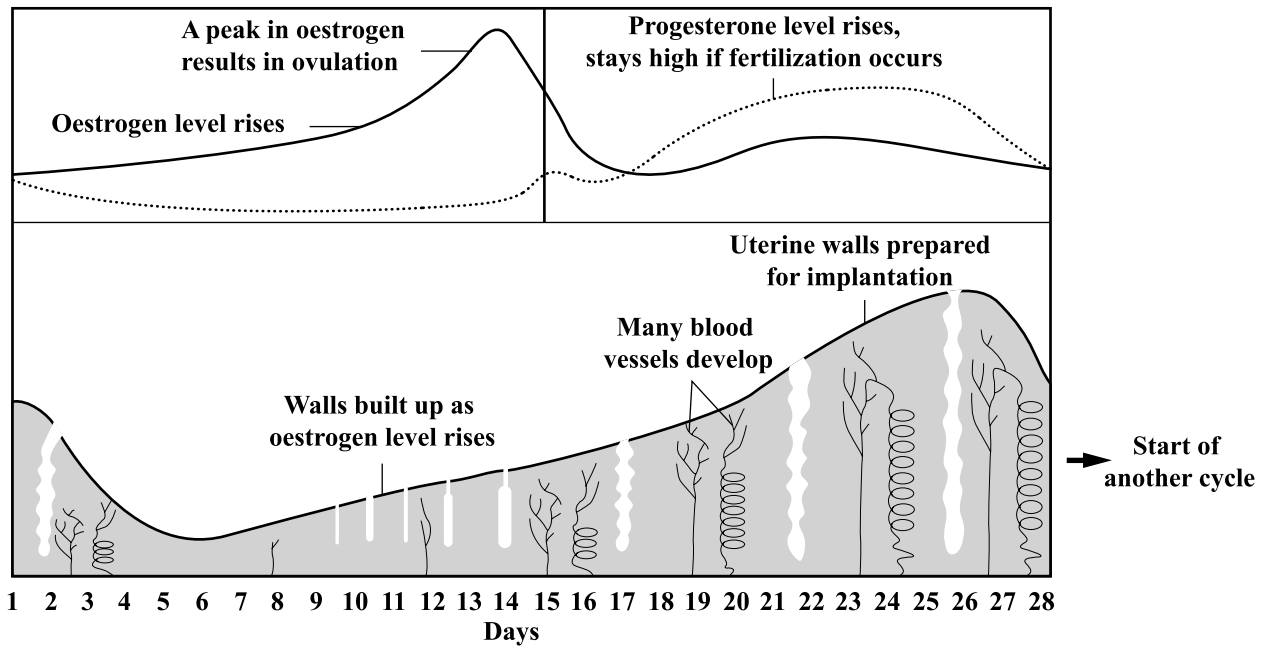


Figure 6. The menstrual cycle in humans

- (i) During which period does menstruation occur?

.....
(1 mark)

- (ii) What occurs within the **ovary** as the wall of the uterus starts to thicken, and during which days of the cycle does this occur?

.....
.....
(2 marks)

GO ON TO THE NEXT PAGE

- (iii) Between days 14 and 28, what is the pattern seen with the ovarian hormonal levels if pregnancy does NOT occur?

.....
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.....
.....
.....

(4 marks)

- (iv) Nayana's mother also explains to her that there are hormones produced by her pituitary gland which stimulate her ovaries to produce hormones.

- a) Which pituitary hormone controls ovulation?

.....
(1 mark)

- b) On which day does ovulation occur?

.....
(1 mark)

Total 15 marks

SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided at the end of each question.

5. (a) (i) Name the mosquito that causes dengue and state TWO symptoms of dengue. **(3 marks)**
- (ii) Explain how a mosquito spreads dengue. **(3 marks)**
- (b) The garbage collectors where Devon lives have been on strike for three weeks and the neighbours are now experiencing vomiting and diarrhoea.
- (i) Explain why these signs of diseases (vomiting and diarrhoea) have spread through the neighbourhood. **(3 marks)**
- (ii) Suggest THREE measures that Devon's community could take to prevent the spread of diseases such as gastroenteritis and leptospirosis. Provide reasons for your suggestions. **(6 marks)**

Total 15 marks

Write your answer to Question 5 here.

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6. (a) (i) Define the term 'pollution' and give ONE example of a water pollutant. **(3 marks)**
- (ii) Describe the process of eutrophication. **(3 marks)**
- (b) Heavy rains cause flooding in farmland areas in a Caribbean country.
- (i) Explain why members of your community become ill after eating vegetables from the flooded areas, and suggest TWO measures that they should take to prevent the illness. **(5 marks)**
- (ii) Your class is required to test the flood water for bacteria. Describe the test for bacteria, and suggest TWO methods that could be used to sterilize the flood water. **(4 marks)**

Total 15 marks

Write your answer to Question 6 here.

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FORM TP 2015082



TEST CODE **01253020**

MAY/JUNE 2015

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

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01253020/F 2015



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SECTION A

Answer ALL questions in this section.

1. (a) The human body is composed of about 70% water. All of our body reactions take place in a fluid medium.

State TWO functions of water OTHER THAN it is the medium in which reactions occur.

.....
.....
.....

(2 marks)

- (b) Apart from water, the human body needs a balanced diet in order for it to perform at its best.

- (i) What is meant by the term 'balanced diet'?

.....
.....

(2 marks)

- (ii) Name TWO nutrients which must be present in a balanced diet to provide the energy for a person's activities.

.....
.....

(2 marks)



DO NOT WRITE IN THIS AREA

- (c) Amari visits the National Science Centre and sees the following experiment being conducted.

A sample of a substance is divided into two parts, one part placed in Test Tube 1 and the other part in Test Tube 2. Benedict's solution is added to both test tubes and the test tubes are shaken. Test Tube 1 is then heated.

- (i) The colour changes from blue to orange-red in Test Tube 1. Name the nutrient that is MOST likely present in the sample.

.....
(1 mark)

- (ii) Would there be a colour change in Test Tube 2? Give a reason for your answer.

.....
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.....
.....
(3 marks)

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- (d) A survey is conducted on four groups of secondary school students on the number of servings of carbohydrates, fats and proteins that they eat during a one-week period. Table 1 shows these results. Study the information in Table 1 and answer the questions that follow.

TABLE 1: RESULTS OF A SURVEY AMONG FOUR GROUPS OF STUDENTS

Group of Students	Number of Servings of Carbohydrate	Number of Servings of Fat	Number of Servings of Protein
A	125	115	60
B	100	80	81
C	60	7	30
D	60	50	140

- (i) Which group of students had the MOST balanced diet? Give a reason for your answer.

.....
.....
.....

(2 marks)

- (ii) Which group of students would be MOST prone to becoming obese? Give a reason for your answer.

.....
.....
.....

(2 marks)

- (iii) Other than diet and exercise, suggest ONE factor that could contribute to obesity.

.....

(1 mark)

Total 15 marks

GO ON TO THE NEXT PAGE



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2. (a) Figure 1 shows a diagram of a long bone.

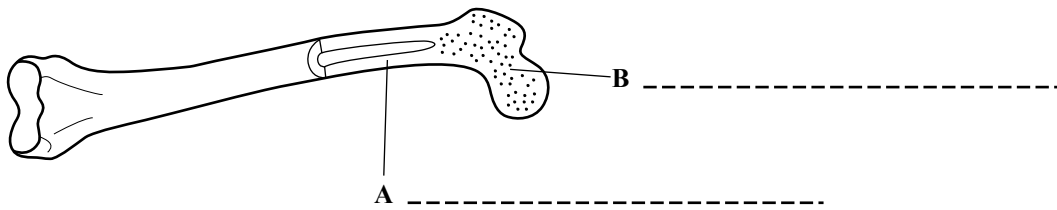


Figure 1. Diagram of a long bone

- (i) Identify the parts labelled A and B. Write your answers on Figure 1. **(2 marks)**
- (ii) State ONE benefit of bones being hollow rather than solid.

.....
(1 mark)

- (b) Name TWO raw materials required for the process of photosynthesis and ONE product of photosynthesis.

Raw materials

Product

(3 marks)

- (c) Cindy de-starches (starch removed from the leaf) a variegated leaf and then exposes it to light for several hours. She then tests the leaf for starch using iodine.

What are the expected results of her experiment? Explain your answer.

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(4 marks)

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(d) Figure 2 shows a food web.

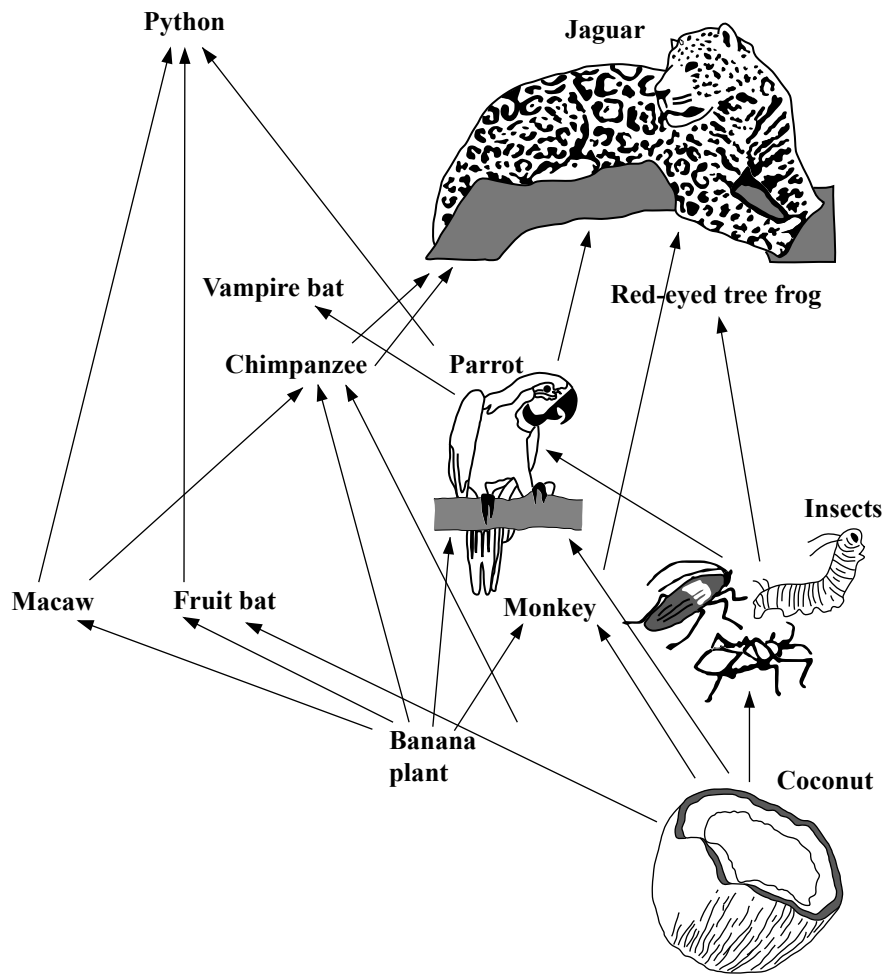


Figure 2. A food web

(i) Identify the group of organisms that possesses the GREATEST amount of biomass, and suggest the role that they play in the food web.

Organism

Role

.....

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(2 marks)



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- (ii) Explain why each subsequent trophic level possesses LESS energy than the previous level.

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(2 marks)

- (iii) Suggest ONE consequence of the parrots being removed from the food web shown in Figure 2.

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(1 mark)

Total 15 marks

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3. (a) (i) Identify the LARGEST source of air pollutants in the world today.
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(1 mark)

(ii) Name TWO gases that contribute to global warming.
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(2 marks)

(b) What is the function of breathing in humans?
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(2 marks)

(c) Fredrick is training for a track and field event at school. His coach tells him he needs to increase his vital capacity.

(i) State what is meant by the term 'vital capacity'.
.....
.....
(1 mark)

(ii) To increase his vital capacity, the coach recommends that Fredrick increases his exercise regime and avoid smoking. Explain the effects of exercise and smoking on his vital capacity.

Exercise

Smoking

(4 marks)

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- (iii) Fredrick's team-mate advises him to start training at higher altitudes in preparation for his next race. Would training at a higher altitude improve his performance? Explain your answer.

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(3 marks)

- (iv) Fredrick trains in a city that has polluted air. Will this adversely affect his performance? Give a reason for your answer.

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(2 marks)

Total 15 marks

DO NOT WRITE IN THIS AREA



4. (a) Complete the following sentences by choosing the correct words from the list provided in brackets.

(blood pressure, systole, ventricles, atria, diastole)

When the chambers of the heart contract, this is called When they relax, this is called These alternating contractions and relaxations are necessary to force the blood through the blood vessels.

(2 marks)

- (b) Plaque on the walls of arteries causes the hardening of the arteries.

- (i) Name the disease that describes the condition of hardening of the arteries and state ONE symptom of this disease.

Disease

Symptom

(2 marks)

- (ii) As a result of the disease named in (b) (i) above, the internal diameter of the artery is reduced and this could lead to the development of hypertension. Name TWO factors that may contribute to hypertension.

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(2 marks)

- (c) The arteries leading to Brian's brain are becoming clogged. Briefly describe the effects that these clogged arteries would have on Brian's brain, and hence on Brian.

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(4 marks)

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- (d) Hypertension is often linked to diabetes mellitus. Figure 3 shows the relationship between blood glucose levels and meals, of two persons, Axel and Golda.

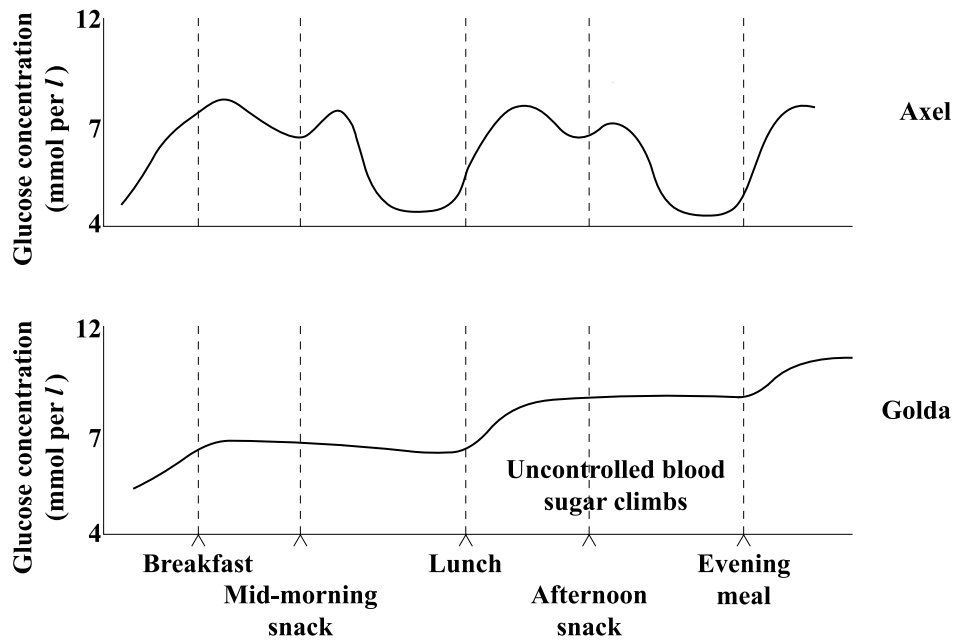


Figure 3. Relationship between blood glucose levels and meals, for two persons

- (i) Which person, Axel or Golda, is MOST likely suffering from diabetes mellitus? Explain your answer.

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(3 marks)

- (ii) Explain ONE way in which genetic engineering has assisted in the treatment of diabetes mellitus.

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(2 marks)

Total 15 marks

GO ON TO THE NEXT PAGE



SECTION B

Answer ALL questions in this section.

5. (a) (i) Name the process by which eggs and sperms are made and state the importance of this process to fertilization. **(3 marks)**

(ii) Name TWO processes by which genetic variation occurs in humans and state ONE advantage of genetic variation. **(3 marks)**

(i) Process

Importance

.....

.....

(ii) Processes

.....

Advantage

.....

DO NOT WRITE IN THIS AREA



(b) José and Maria are a young married couple. José is just starting a new job in which there are many opportunities for promotion but for the time being is not making very much money. Maria is returning to school to study nursing. Maria's parents advise the young couple to seek family planning counselling.

(i) Suggest THREE advantages to José and Maria of practising family planning. **(3 marks)**

(ii) Discuss THREE ways in which family planning benefits a country at large and not just the nuclear family. **(6 marks)**

(i)

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6. The housefly is an insect which transmits pathogens from waste or faecal matter to foods thus causing diseases. Figure 4 shows the life cycle of the housefly.

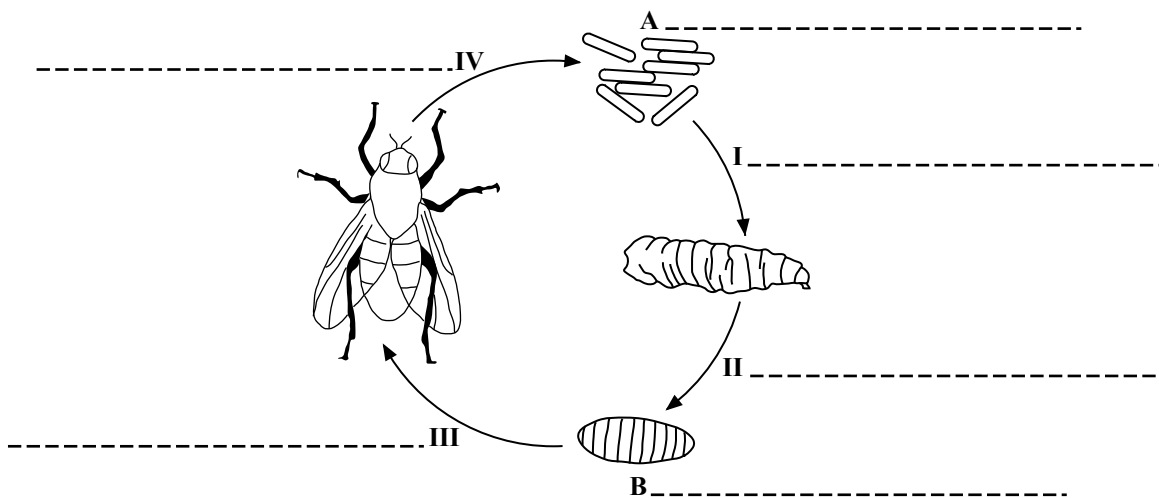


Figure 4. Life cycle of the housefly

- (a) Name the stages labelled A and B and identify the duration of the processes labelled I, II, III and IV in Figure 4. **Write your answers on Figure 4.** (6 marks)
- (b) After Betty Bob’s graduation dinner, she becomes ill and the doctor suggests that she is suffering from gastroenteritis. Suggest THREE signs/symptoms that Betty Bob may have and advise her of the causative agent for gastroenteritis. (4 marks)

Signs/symptoms

.....

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Causative agent

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- (c) Typhoid is a disease that can also cause gastroenteritis. Suggest ONE OTHER disease that can cause gastroenteritis and explain TWO measures that could be used to prevent the occurrence of gastroenteritis. **(5 marks)**

Disease

Measures

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Total 15 marks

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CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

15 JANUARY 2016 (a.m.)



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FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

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SUBJECT HUMAN AND SOCIAL BIOLOGY – Paper 02

PROFICIENCY GENERAL

REGISTRATION NUMBER

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SCHOOL/CENTRE NUMBER

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NAME OF SCHOOL/CENTRE

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CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)

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DATE OF BIRTH

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JANUARY 2016

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

**C A R I B B E A N S E C O N D A R Y E D U C A T I O N C E R T I F I C A T E[®]
E X A M I N A T I O N**

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections.
2. Answer ALL questions.
3. Do NOT write in the margins.
4. Write your answers in the spaces provided in this booklet.
5. Each question is worth 15 marks.
6. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
7. **If you use the extra page(s), you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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SECTION A

Answer ALL questions in this section.

1. (a) Figure 1 is a diagram of a section through a molar tooth.

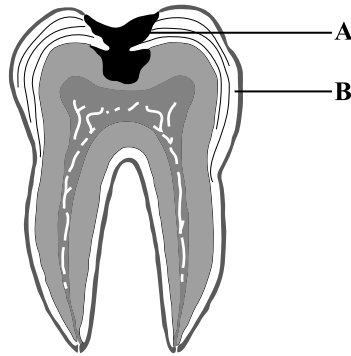


Figure 1. Section through a molar tooth

- (i) Identify the structure labelled B in Figure 1 and state its function.

Structure B

Function

(2 marks)

- (ii) In Figure 1, the label A represents a cavity. State TWO factors that are necessary for tooth decay.

.....

.....

(2 marks)

- (iii) State TWO measures, OTHER than a change in diet, that would reduce the formation of cavities.

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(2 marks)

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- (b) Figure 2 shows the population of males and females who either have AIDS or do not have AIDS.

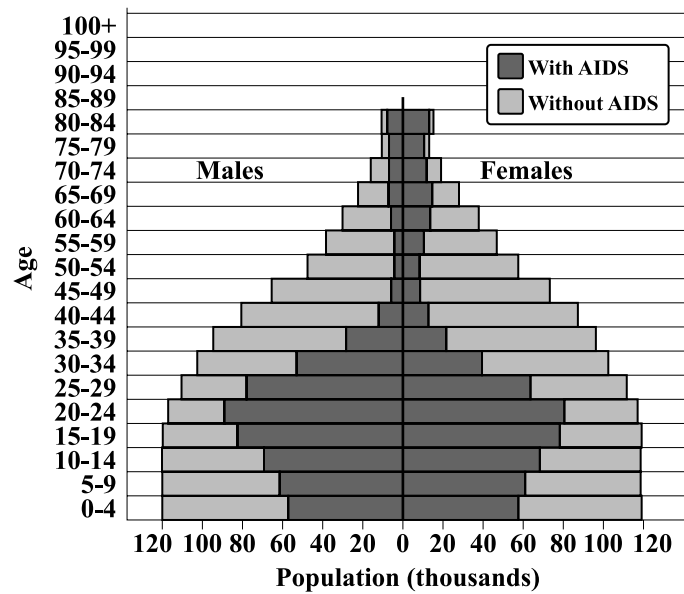


Figure 2. Number of persons with or without AIDS, by age group

- (i) Which age group is MOST severely affected by AIDS?
.....
(1 mark)
- (ii) Based on the data presented in Figure 2, which population, male or female, has MORE persons suffering with AIDS in the 45–69 age group?
.....
(1 mark)
- (iii) Predict the **socioeconomic** future of the population represented in Figure 2. Your answer should consist of THREE predictions.
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(3 marks)



- (c) Explain TWO factors that may have contributed to the reduction in both the incidence of, and death rates from, infectious diseases since 1900.

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(4 marks)

Total 15 marks



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2. (a) Complete Table 1 by indicating whether the named vitamin is water soluble or fat soluble. The first one has been completed for you.

TABLE 1: VITAMIN AND SOLUBILITY

Vitamin	Solubility
A	Water soluble
B ₁	
C	
D	

(3 marks)

- (b) (i) Name TWO elements which make up protein molecules, OTHER than oxygen and hydrogen.

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(2 marks)

- (ii) State ONE function of protein to the human body.

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(1 mark)

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(c) Cameron eats a slice of pizza and drinks a glass of guava juice.

(i) After this meal is digested, which sugar would most likely be present in his bloodstream?

.....
(1 mark)

(ii) Generally, animal products contain saturated fats and plant products contain unsaturated fats. Why would a slice of avocado be a better source of fatty acids than Cameron's slice of pizza?

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(2 marks)

(iii) The structure of the small intestine allows for maximum nutrient absorption after Cameron's snack is digested. Identify the TWO structures on the walls of the small intestine and suggest how these structures facilitate maximum absorption.

Structures

.....

How absorption is facilitated

.....

.....
(3 marks)

(iv) By what process are the nutrients from Cameron's meal absorbed through the intestinal wall? Explain this process.

Process

Explanation

.....

.....
(3 marks)

Total 15 marks

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3. The nervous system and the endocrine system control the activities of the human body.

(a) State TWO activities that are controlled by the hypothalamus in the brain.

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(2 marks)

(b) Glucagon and insulin are two hormones secreted by the pancreas which are responsible for regulating the glucose levels in the blood.

Complete Table 2 by writing the correct information at (i), (ii), (iii) and (iv).

TABLE 2: ACTIVITIES OF GLUCAGON AND INSULIN

Hormone	Secreted when	Action of Hormone
(i)	(ii)	Converts glycogen to glucose.
(iii)	Blood sugar is high.	(iv)

(4 marks)



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(c) A virus destroys Vonrick's pituitary gland, and his urine cannot become concentrated.

(i) Identify the hormone produced by the pituitary gland that is most likely no longer being secreted, and suggest TWO effects this would have on Vonrick's body.

Hormone

Effects

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(3 marks)

(ii) Identify TWO OTHER hormones which are NOT produced if Vonrick's pituitary gland is no longer functional and describe the function of these hormones.

Hormone

Function

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Hormone

Function

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(4 marks)

(iii) Outline TWO ways in which Vonrick's endocrine system differs from his nervous system.

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(2 marks)

Total 15 marks

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4. (a) Figure 3 shows a diagram of a section through Shaka's eye.

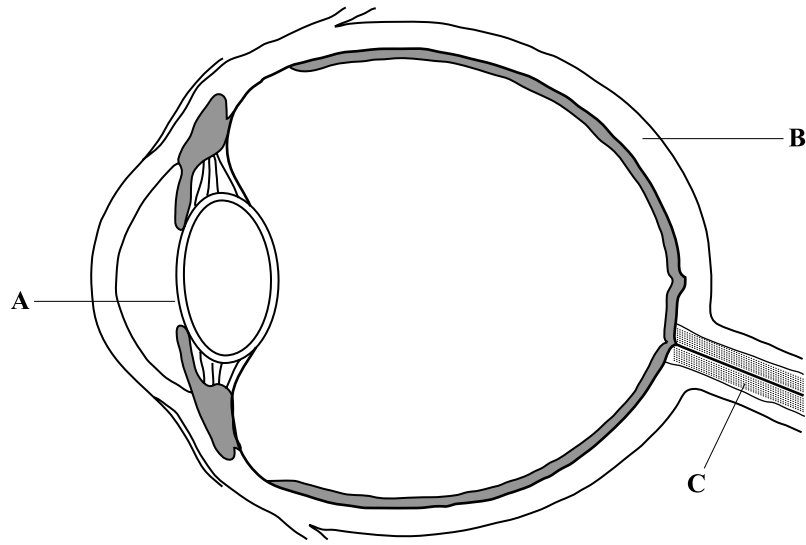


Figure 3. Section through a human eye

- (i) State the function of the parts labelled A, B and C in Figure 3.

Function of A

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Function of B

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Function of C

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(3 marks)

- (ii) Shaka is concerned about glaucoma. Explain to Shaka what occurs in the eye to result in glaucoma.

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(2 marks)



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- (b) Figure 4 is a representation of Shaka's knee jerk spinal reflex.

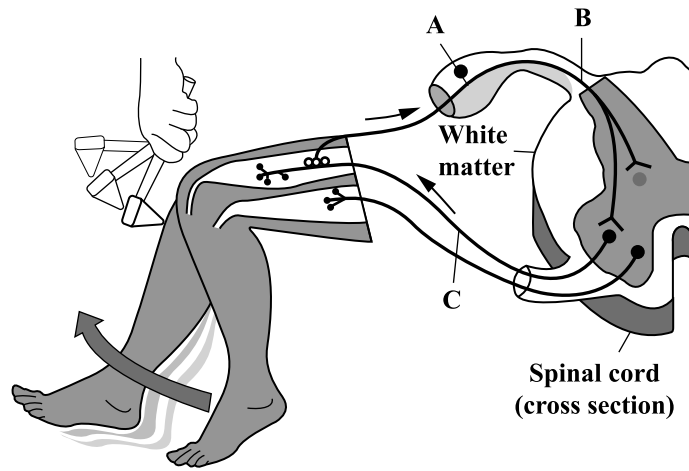


Figure 4. Representation of a knee jerk spinal reflex

- (i) Identify the regions labelled A, B and C in Figure 4.

A

B

C

(3 marks)

- (ii) Shaka has been injured in a football game and the doctor does a knee jerk test. Explain to Shaka the mechanism of a knee jerk spinal reflex.

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(4 marks)



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- (c) Sheena has been taught that she must think before she acts. She picks up a hot teapot and drops it without thinking.

Is Sheena's action voluntary or involuntary? Explain the difference between voluntary and involuntary actions.

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(3 marks)

Total 15 marks

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SECTION B

Answer ALL questions in this section.

5. (a) Drugs are chemicals which change the way the body functions. Some are used for medicinal purposes while others are used as a means to escape from reality.

(i) Name TWO drugs that are used as medicines and ONE that is used to provide an escape from reality.

Medicine

.....

Escape from reality

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(3 marks)

(ii) Describe THREE **social** effects of the continued abuse or misuse of drugs.

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(3 marks)



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(b) There are a number of cardiovascular diseases (CVDs) associated with smoking.

(i) Discuss how smoking most likely contributes to lung cancer **and** stroke.

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(6 marks)

(ii) Suggest **THREE** reasons why cigarette smoking has become very prevalent among teenagers.

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(3 marks)

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6. (a) Figure 5 is a diagram of the water cycle.

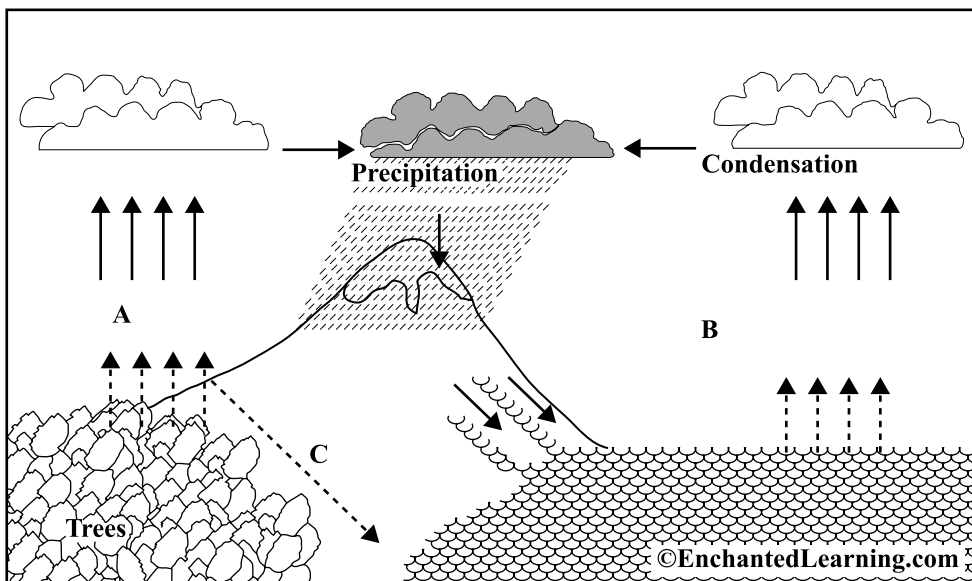


Figure 5. The water cycle

(i) State the processes that occur at A, B and C in Figure 5.

A

B

C

(3 marks)

(ii) Define the term 'pollutant' and identify TWO ways in which humans pollute the water cycle.

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(3 marks)

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(b) Over 71% of the earth's surface is covered with water but only 0.024% is readily available to be used as freshwater in groundwater deposits, lakes, rivers and streams. As our population size has increased, our demand for water and our contamination of it have reduced the amount of available useful water.

(i) Discuss TWO effects of contaminated water on human health and the environment.

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(6 marks)

(ii) Human activities are contaminating not only water resources but also the air. Suggest THREE ways in which humans could reduce **air pollution**.

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(3 marks)

Total 15 marks

END OF TEST

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MAY/JUNE 2016

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**C A R I B B E A N S E C O N D A R Y E D U C A T I O N C E R T I F I C A T E[®]
E X A M I N A T I O N**

H U M A N A N D S O C I A L B I O L O G Y

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections.
2. Answer ALL questions.
3. Write your answers in the spaces provided in this booklet.
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6. **If you use the extra page(s), you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

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SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) Matthew is interested in increasing his body mass. His trainer recommends that his diet should contain more complex carbohydrates and suggests that he use foods such as potato and cassava, which are rich in starch.

(i) Name a test that Matthew could use to determine the presence of starch in his diet.

.....
(1 mark)

(ii) Other than potato and cassava, state TWO foods that are rich in starch.

.....
.....
(2 marks)

(iii) Which of the following foods should Matthew ingest for growth and repair of his muscle tissue: fish, plantain, carrots, lentil peas?

.....
(1 mark)

(iv) Name TWO reagents that Matthew should use to test for the presence of protein in his meal.

.....
.....
(2 marks)

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- (b) Table 1 shows the number of children (in hundreds) who suffer from diet-related diseases in Country X and Country Y.

TABLE 1: DIET-RELATED DISEASES OF CHILDREN IN TWO COUNTRIES, X AND Y

Disease	Number of Children	
	Country X	Country Y
Marasmus	65	55
Kwashiorkor	70	30
Scurvy	35	45
Night blindness	20	25

- (i) **On the grid provided on page 7, draw a bar graph to represent the data in Table 1. (3 marks)**

- (ii) Which country has the HIGHER incidence of BOTH marasmus and kwashiorkor?

.....
(1 mark)

- (iii) Which country has the LOWER incidence of diseases altogether?

.....
(1 mark)

- (iv) Using your knowledge of nutritional diseases, suggest the major nutrient that may be lacking in the diet of children from Country X that could cause them to develop night blindness, and state ONE source of this nutrient.

Nutrient

Source

(2 marks)

- (c) As a result of a change in government, a certain country no longer suffers from the effects of hunger. Suggest TWO diseases that could develop as a result of overeating and lack of exercise.

.....

.....

(2 marks)

GO ON TO THE NEXT PAGE

2. (a) State the meaning of EACH of the following terms:

Diffusion

.....

(2 marks)

Osmosis

.....

.....

(2 marks)

(b) Figure 1 and Figure 2 represent experiments to show the movement of molecules.

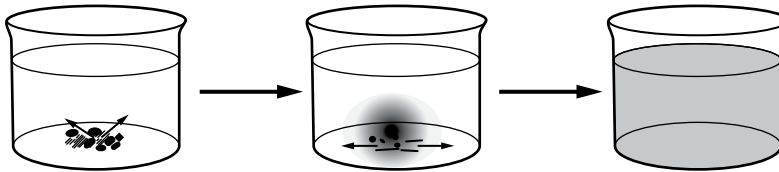


Figure 1. Experiment on movement of molecules

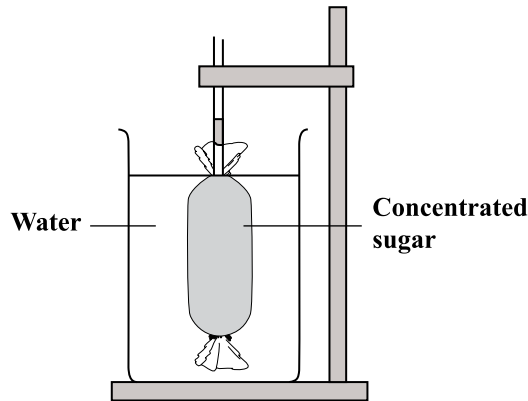


Figure 2. Experiment on movement of molecules

(i) Both experiments show the movement of molecules. Suggest TWO differences between the movement of molecules in Figure 1 and Figure 2.

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(2 marks)

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(ii) In which of the diagrams, Figure 1 or Figure 2, is osmosis taking place?

.....
(1 mark)

(iii) After one hour, what would be expected to happen to the level of water in the beaker in Figure 2? Explain why this would occur.

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.....
(2 marks)

(c) (i) The process of diffusion is necessary in the human body in order for it to obtain essential materials. Other than the small intestine, state TWO organs in the human body in which diffusion occurs.

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.....
(2 marks)

(ii) The inner surface of the small intestine is modified to carry out its function. One modification is the villus. Describe and explain the structure and function of the villus.

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(4 marks)

Total 15 marks

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3. (a) Name the end products of EACH of the following types of cellular respiration:

(i) Aerobic

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(3 marks)

(ii) Anaerobic

.....

.....

(3 marks)

(b) Breathing involves inspiration and expiration. Figure 3 shows the position of the rib cage during breathing.

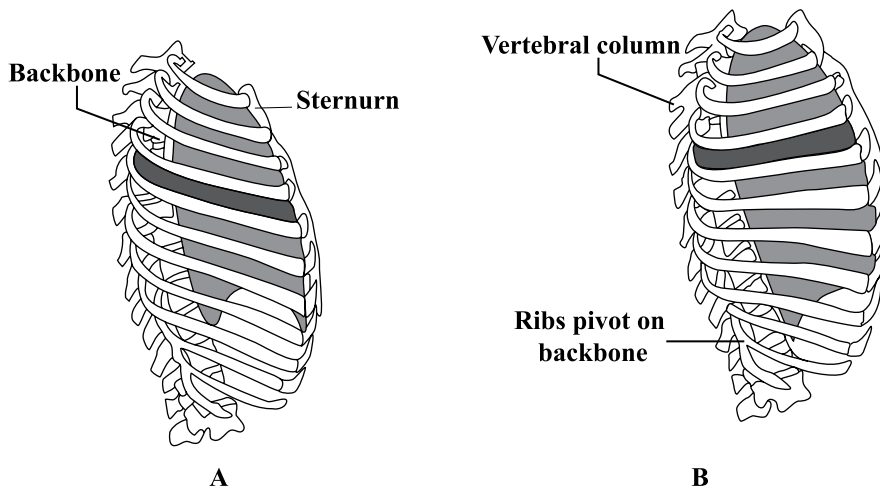


Figure 3. Position of the rib cage during breathing

(i) Which of the drawings in Figure 3, A or B, shows the rib cage during inspiration?

.....

(1 mark)

4. (a) Figure 4 illustrates a form of cell division in humans.

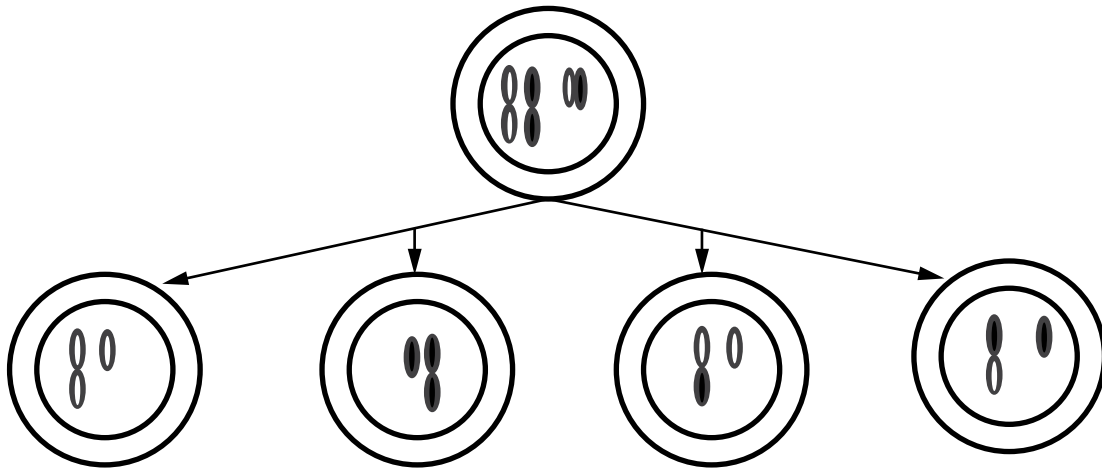


Figure 4. Diagrammatic representation of cell division in humans

(i) Identify the type of cell division illustrated in Figure 4.

.....
(1 mark)

(ii) Which type of cells, sex cells or somatic cells, are produced by this process?

.....
(1 mark)

(iii) What is the chromosome number of the parent cell and the daughter cell?

Parent cell

Daughter cell

(2 marks)

(iv) Which TWO types of sex chromosomes are fathers able to pass on to their offspring?

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(2 marks)

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(b) Sunil receives a painful blow to his groin during a game. Later he wonders why his testes are not protected inside his body.

(i) Explain to Sunil the advantage of his testes being carried outside his body.

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(3 marks)

(ii) Sunil and his wife would like to have a child. Outline the roles that the epididymis, the seminal vesicles and the prostate gland play in forming semen in Sunil's body.

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(3 marks)

(c) (i) Sunil's wife learns that cervical cancer is common and kills many women in the Caribbean. What TWO measures should she take to protect herself from cervical cancer?

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(2 marks)

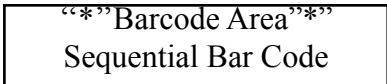
(ii) Cervical cancer is believed to be caused by a sexually transmitted infection. Name ONE other sexually transmitted infection.

.....

(1 mark)

Total 15 marks

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SECTION B

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

5. (a) (i) Identify the single-cell organism that causes malaria and state the TWO tissues/organs that it destroys in the human body.

Organism

Organs

(3 marks)

- (ii) List THREE symptoms that someone suffering from malaria is likely to exhibit.

.....
.....
.....

(3 marks)

- (b) While on vacation Ravi enjoys some oysters and drinks a glass of water. The next morning he experiences severe abdominal cramps and diarrhoea.

Discuss the disease that Ravi most likely contracted. Include in your discussion, the name of the disease, the causative organism, TWO possible ways in which Ravi may have contracted it, and TWO steps that he could take to avoid getting ill like this in the future.

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- (c) Acme Industries have been dumping their chemical waste in a river that is frequented by a diversity of animals and used by humans for swimming and fishing. Explain the effect that these chemicals have on the food chain.

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(4 marks)

Total 15 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

