

FORM TP 2012085



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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

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.

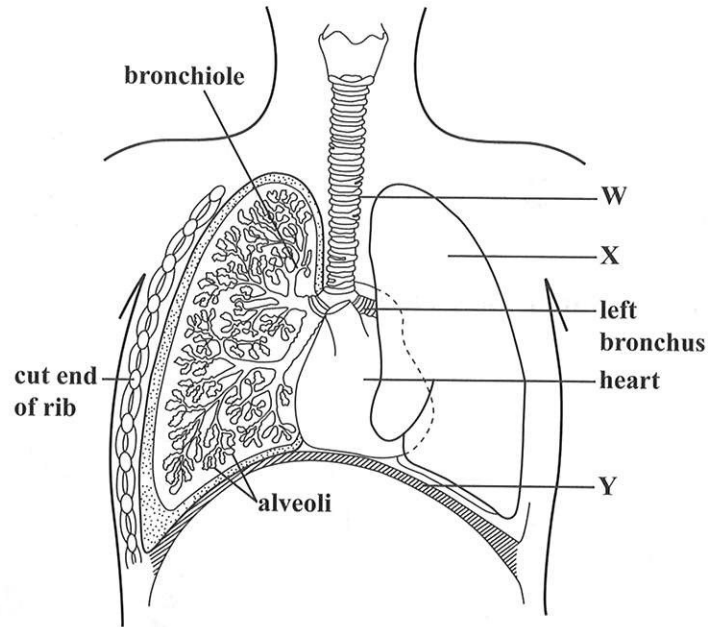


Figure 1. The human respiratory system

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)

- (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.

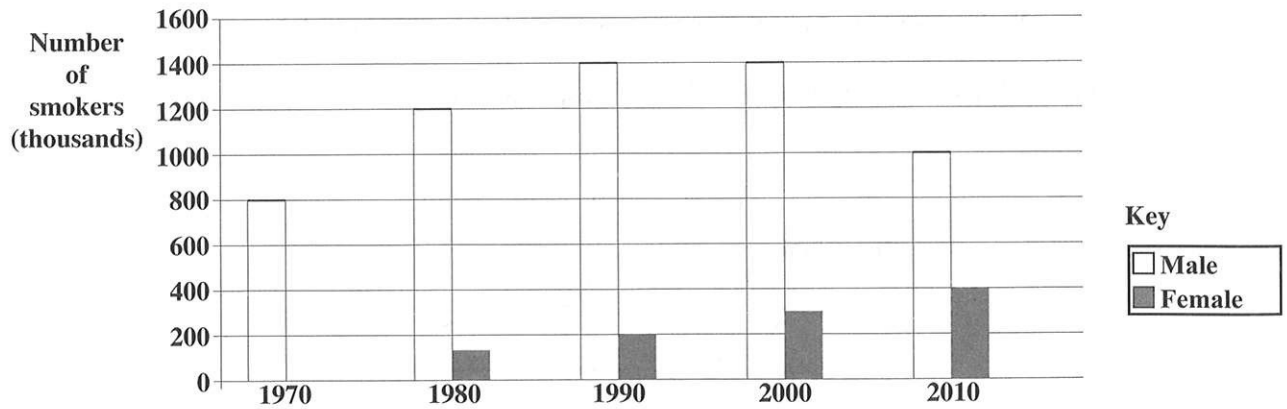


Figure 2. Number of male and female smokers, 1970–2010

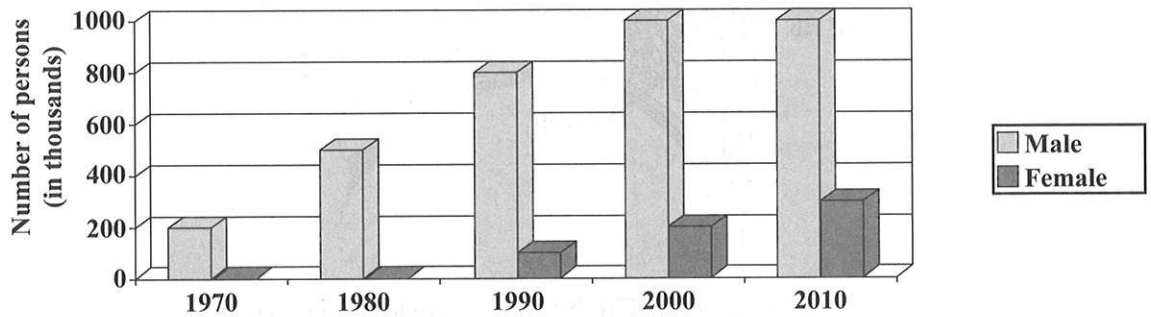


Figure 3. Incidence of lung cancer, 1970–2010

- (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)

- (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.

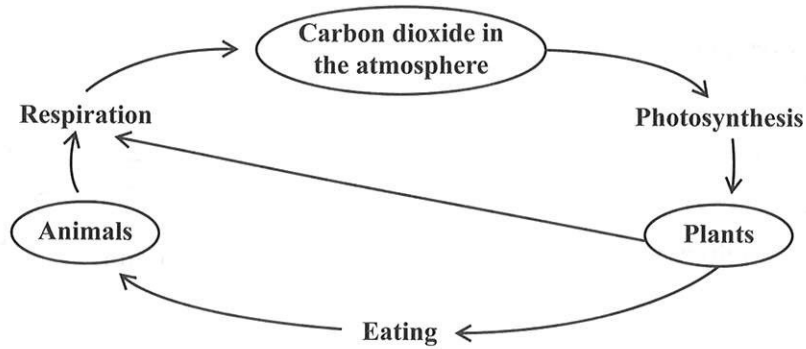


Figure 4. Part of the carbon cycle

Photosynthesis:

Explanation:

(5 marks)

Total 15 marks

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.

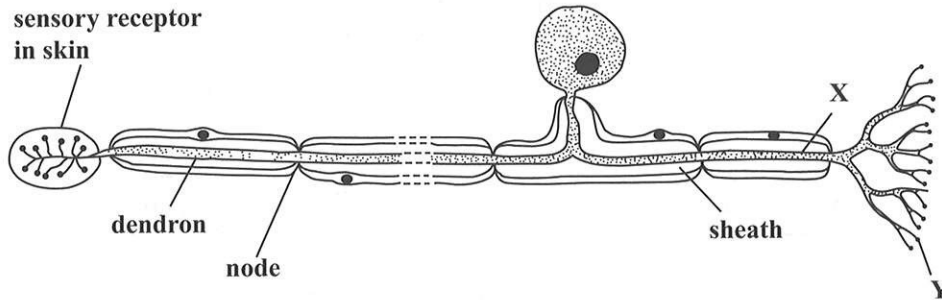


Figure 5. Diagram of a neurone

- (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)

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(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

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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)

(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)**

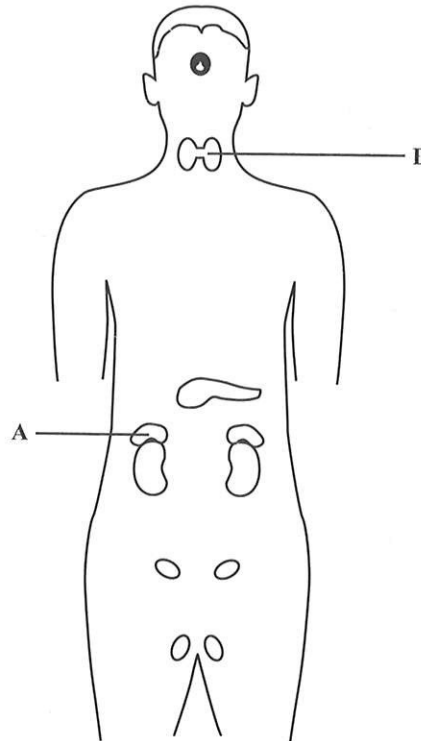


Figure 6. Position of the endocrine glands in the human body

- (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

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6. (a) In the last decade, there has been an increase in the spread of dengue fever in the Caribbean.
- (i) Name the vector that is responsible for the spread of dengue fever, and state TWO signs or symptoms of the disease. **(3 marks)**
 - (ii) State TWO measures taken by health authorities, and ONE measure taken by households, to control the spread of dengue fever. **(3 marks)**
- (b) Malaria has been eliminated/eradicated from most of the territories of CARICOM. Explain, giving details of the process, how a visit from one infected person can lead to a fresh outbreak of the disease in a territory. **(3 marks)**
- (c) Scientists are currently testing a malaria vaccine. Explain how knowledge of passive and active immunity may be used to protect an individual from contracting malaria. In your answer, compare the advantages and disadvantages of the two approaches. **(6 marks)**

Total 15 marks

Write your answer to Question 6 here.
