

FORM TP 2013045



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CARIBBEAN EXAMINATIONS COUNCIL

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION**

BIOLOGY

Paper 02 – General Proficiency

2 hours 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in two sections. Answer ALL questions.
2. For Section A, write your answers in the spaces provided in this booklet.
3. For Section B, write your answers in the spaces provided at the end of each question, in this booklet.
4. Where appropriate, answers should be illustrated with diagrams.

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

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SECTION A

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

1. (a) Figure 1 shows the variation in height of a sample of men in a population.

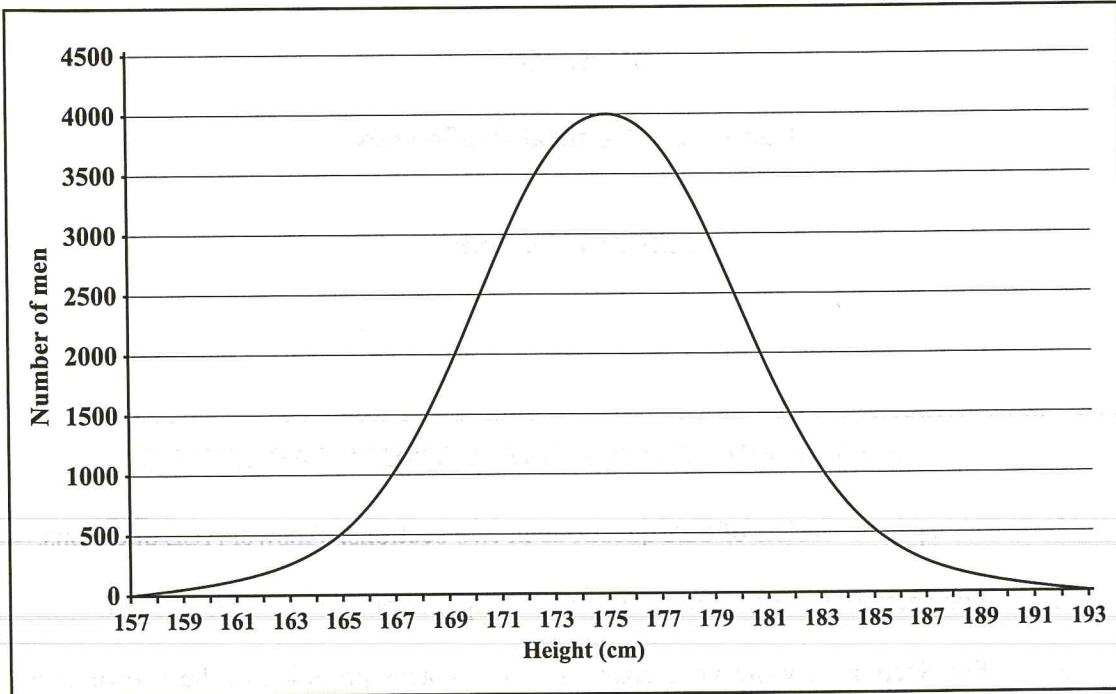


Figure 1. Height of a sample of men in a population

In the space below, construct a table using the data presented in Figure 1.

(3 marks)

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- (b) Suggest TWO **causes** of variation among members of the same species.

(2 marks)

- (c) The blood types of the members of a class of 30 students are recorded in Table 1.

TABLE 1: BLOOD TYPE OF 30 STUDENTS

Blood Type	Number of Students
A	3
B	9
AB	8
O	10

Explain how the **type** of variation shown in Table 1 differs from the type of variation represented by Figure 1.

(4 marks)

- (d) (i) Blood transports substances within the human body. Name TWO substances that are transported by blood.

(2 marks)

- (ii) Blood tests are done for the group of students. The amount of haemoglobin in the blood of three students is found to be below normal. Explain how this will affect the ability of these three students to perform well in sports.

(4 marks)

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- (e) (i) In flowering plants, xylem vessels transport substances.

Draw and annotate a diagram to show how the following materials could be set up to investigate the rate at which water moves through the xylem vessels under TWO different conditions.

Materials: 2 beakers, water, dye, stopwatch, fan, ruler, plants with transparent stems **(4 marks)**

- (ii) Write a suitable hypothesis for this investigation.

(2 marks)

- (f) Relate the structure of xylem vessels to their role in the transport of water through plant stems.

(4 marks)

Total 25 marks

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2. Both plants and animals respond to stimuli.

(a) Figure 2 is a diagram of the human eye.

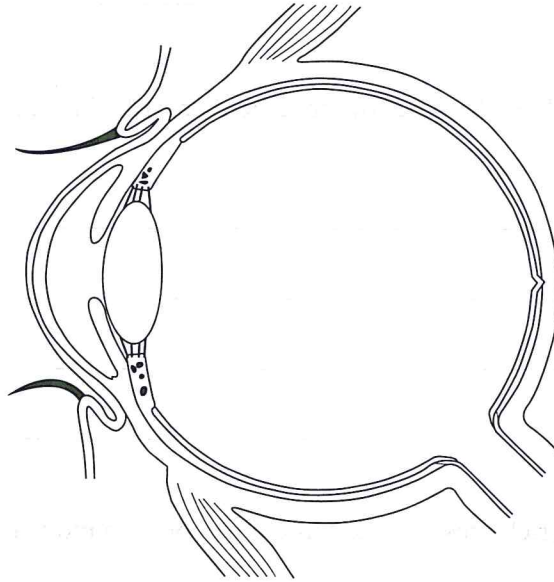


Figure 2. A section through the human eye

On Figure 2, write the name of the part and use a label line to identify EACH of the following parts of the eye:

- (i) The light sensitive layer
- (ii) The jelly-like substance that keeps the eye in shape
- (iii) Carries nerve impulses to the brain
- (iv) Controls the shape of the lens

(4 marks)

(b) Statements A and B below describe two different examples of plant movement.

- A. The roots of seedlings grow downwards in the soil.
 - B. The shoots of cucumber seedlings grow towards light coming through an open window.
- (i) Name the stimulus for EACH set of seedlings.

Seedlings in A: _____

Seedlings in B: _____

(2 marks)

- (ii) Name the hormone responsible for the response of the cucumber seedlings in B.

(1 mark)

- (iii) Suggest how the types of movement described in A and B may be useful to the seedlings.

A: _____

B: _____

(2 marks)

- (c) Certain soil invertebrates show a marked response to moisture.

Describe ONE similarity and ONE difference between the response of soil invertebrates and the response of the cucumber seedlings in B.

Similarity: _____

Difference: _____

(4 marks)

- (d) Outline TWO ways in which the nervous system functions differently from the endocrine system in humans.

(2 marks)

Total 15 marks

3. (a) Name TWO metabolic waste products excreted by plants.

(2 marks)

(b) Figure 3 shows a side view of the human male reproductive system.

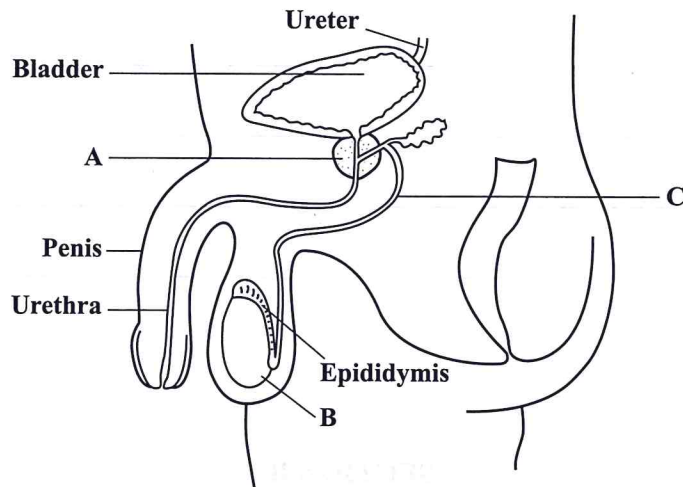


Figure 3. The human male reproductive system

(i) Name the parts labelled A, B and C in Figure 3.

A: _____

B: _____

C: _____

(3 marks)

(ii) The kidneys excrete urea and water in the form of urine. Use arrows on the diagram in Figure 3 to show the pathway taken by urine on its way out of the male's body.

(2 marks)

(c) (i) Contraceptive methods may be temporary or permanent. Explain how ONE structure in Figure 3 can be manipulated to achieve permanent sterility in males.

(2 marks)

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(ii) Explain how tubal ligation results in sterility in **females**.

(2 marks)

(d) New shoots can grow from the buds or 'eyes' of a potato tuber. Explain TWO ways in which this method of reproduction is different from reproduction in humans.

(4 marks)

Total 15 marks

SECTION B

Answer ALL questions.

Write your answers in the spaces provided at the end of each question.

4. The human body comes into contact with many pathogens. Some of these pathogens are spread by vectors.

(a) Name TWO ways by which the human body prevents itself from becoming infected. (2 marks)

(b) (i) Describe the life cycle of a **named** insect vector.

(ii) Explain how knowledge of the life cycle of this insect vector can be used to prevent the transmission of a named pathogenic disease. (6 marks)

(c) A student is about to travel to a country where yellow fever is rampant.

(i) Explain how a vaccine can provide the student with active acquired immunity against this disease.

(ii) Discuss why a vaccine that provides passive acquired immunity is NOT suitable for this student.

(7 marks)

Total 15 marks

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5. Mangrove swamps are found along the coasts of many Caribbean countries. Mangrove trees are the dominant type of vegetation adapted for survival in waterlogged brackish soil. Animals usually found in this area include: tree snakes, frogs, crabs, worms, blue herons (birds), termites, and anteaters.

(a) Define EACH of the following terms with reference to the mangrove swamp ecosystem:

- Population
 - Physical (abiotic) factors
 - Habitat
- (6 marks)**

(b) Some investors want to remove the mangrove swamp in an area near your home, to develop the land for housing. Propose ONE argument to support this plan and TWO arguments against it. **(6 marks)**

(c) Explain the effect on the carbon cycle of cutting and burning large areas of mangrove trees across the Caribbean. **(3 marks)**

Total 15 marks

Write your answer to Question 5 here.

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Write your answer to Question 5 here.

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Write your answer to Question 5 here.

Lined writing area for the student's answer to Question 5.

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6. (a) (i) Sketch an outline of the human body and show the location of the pancreas and the pituitary gland in the outline.
- (ii) Name ONE hormone secreted from EACH of the endocrine glands in (a) (i) above.
- (iii) The pancreas also produces enzymes that are important in digestion. Name TWO factors that may affect the activity of these enzymes.
- (b) Explain how hormones secreted from the pancreas work together with the liver to regulate blood sugar levels.
- (c) If you were lost on a desert island for two days, how would a hormone secreted from your pituitary gland work to prevent you from becoming completely dehydrated?

(6 marks)

(5 marks)

(4 marks)

Total 15 marks

Space for diagram

