

FORM TP 2012045



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CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE
EXAMINATION

BIOLOGY

Paper 02 – General Proficiency

2 hours 30 minutes

REFERENCE

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 by diagrams.

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SECTION A

Answer ALL questions. Write your answers in the spaces provided in this booklet.

1. Figure 1 shows the effect of temperature on the rate at which starch is broken down by the enzyme, amylase.

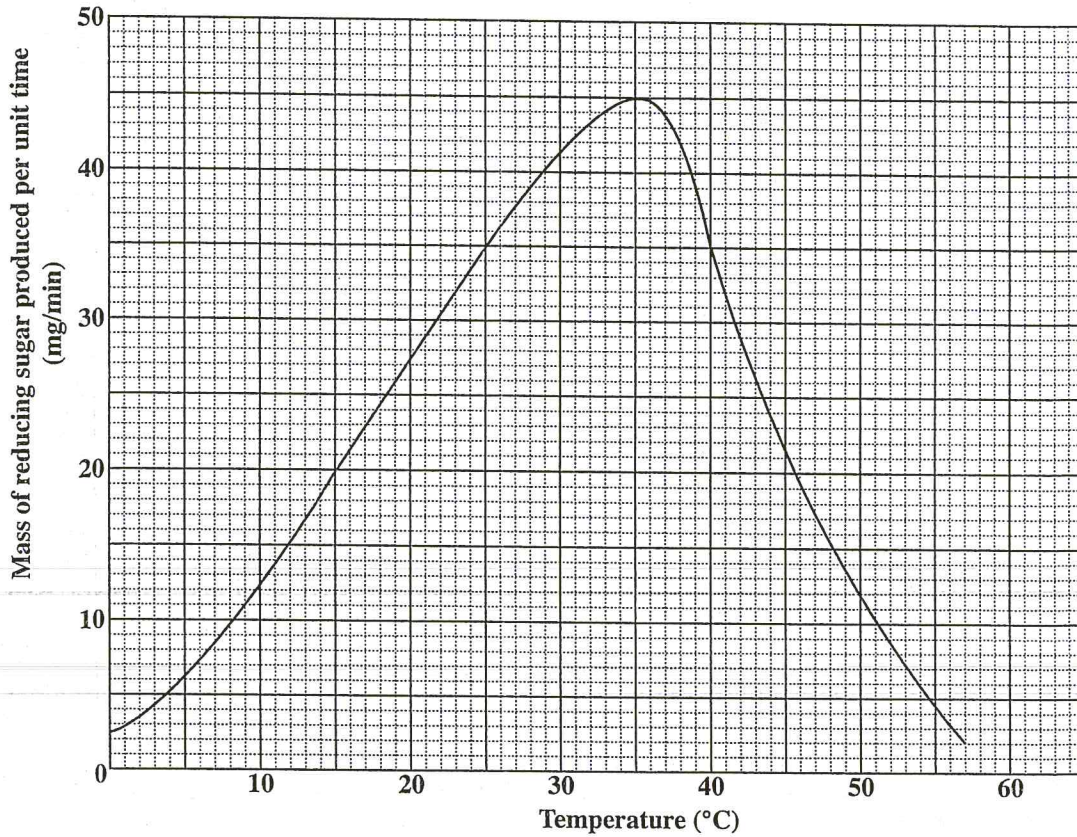


Figure 1. Effect of temperature on rate of amylase activity

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(iii) Give ONE benefit of the storage of starch in plants.

Starch is a good source of energy for plants.
(1 mark)

Total 25 marks

2. Figure 2 is a diagram of a hinge joint found at the elbow in a human body.

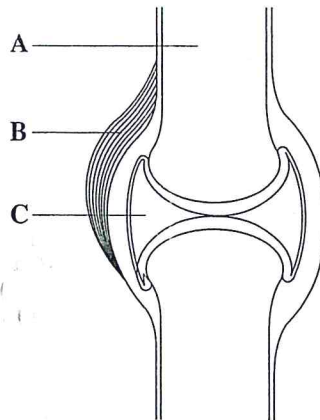


Figure 2. Diagram of a hinge joint

(a) (i) State the name of the structures labelled A, B and C in Figure 2, and give ONE function of EACH structure.

Name of A: Ligament

Function: to hold the bones together

Name of B: Joint capsule

Function: to prevent the bones from moving in the wrong direction

Name of C: Synovial membrane

Function: to secrete synovial fluid

(6 marks)

(ii) Use a line and the letter D to show the cartilage in the joint in Figure 2.

(1 mark)

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- (b) Arthritis, a degenerative disease, may cause the wearing away of the cartilage of joints. Explain how this will affect joints.

(2 marks)

- (c) Explain how the muscles of the upper arm bring about the raising and lowering of the lower arm.

(4 marks)

- (d) Suggest why the treatment of some blood diseases may involve a bone marrow transplant.

(2 marks)

Total 15 marks

3. (a) The diagram shown in Figure 3 represents a typical plant cell.

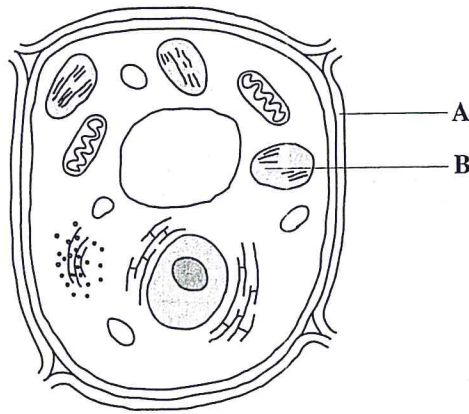


Figure 3. Diagram of a typical plant cell

Identify the parts labelled A and B and state the function of EACH part.

A: _____

Function of A: _____

B: _____

Function of B: _____

(4 marks)

- (b) The cell in Figure 3 was left in a concentrated salt solution for one hour.
In the space below, draw an **annotated** diagram to show the appearance of this plant cell after one hour.

(6 marks)

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- (c) If all the cells in a plant appear like the one drawn in (b) on page 7, the plant's ability to photosynthesize will be reduced. Explain why photosynthesis will be reduced.

(2 marks)

- (d) Complete the table below to show THREE differences between plant and animal cells.

| | Feature | Plant Cell | Animal Cell |
|-------|-------------|----------------|-------------------|
| (i) | Vacuole | has a vacuole | doesn't have any. |
| (ii) | Chloroplast | | |
| (iii) | Cell wall | layer is thick | layer is thin |

(3 marks)

Total 15 marks

SECTION B

Answer ALL questions.

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

4. (a) Distinguish between the following pairs of terms:
- (i) Allele and gene
 - (ii) Phenotype and genotype
 - (iii) Dominant and recessive **(6 marks)**
- (b) Black fur colour is controlled by a dominant allele, **B**, and brown fur colour by its recessive allele, **b**. This characteristic is NOT sex-linked. Give the genotypes of the parents and offspring of a cross between a black male and a brown female that produces $\frac{1}{2}$ black offspring and $\frac{1}{2}$ brown offspring. Show all the steps in the working of this problem. **(5 marks)**
- (c) Haemophilia is caused by an X-linked recessive gene. Two parents with the normal phenotype have a haemophiliac child. Use a genetic diagram to show how this is possible. (**X^H = normal; X^h = gene for haemophilia**) **(4 marks)**

Total 15 marks

Lined writing area consisting of multiple horizontal lines for text entry.

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5. Insect vectors are involved in the spread of some pathogenic diseases.

(a) Describe the life cycle of a **named** insect vector. (4 marks)

(b) Distinguish between the transmission of a **named** pathogenic disease and a **named** physiological (lifestyle) disease. (4 marks)

(c) Explain how the treatment and control measures for a **named** pathogenic disease will differ from those of a **named** physiological disease. (4 marks)

(d) Evaluate the socio-economic impact of AIDS on the Caribbean population. (3 marks)

Total 15 marks

A series of 20 horizontal lines for writing, spaced evenly down the page.

6. (a) With the aid of a **labelled** diagram, describe the structure of the human male reproductive system. Indicate on the diagram the structure that produces gametes, and the structures that transport the gametes to allow reproduction to take place. (6 marks)

(b) Name ONE method of contraception that works by preventing

(i) fertilization

(ii) ovulation.

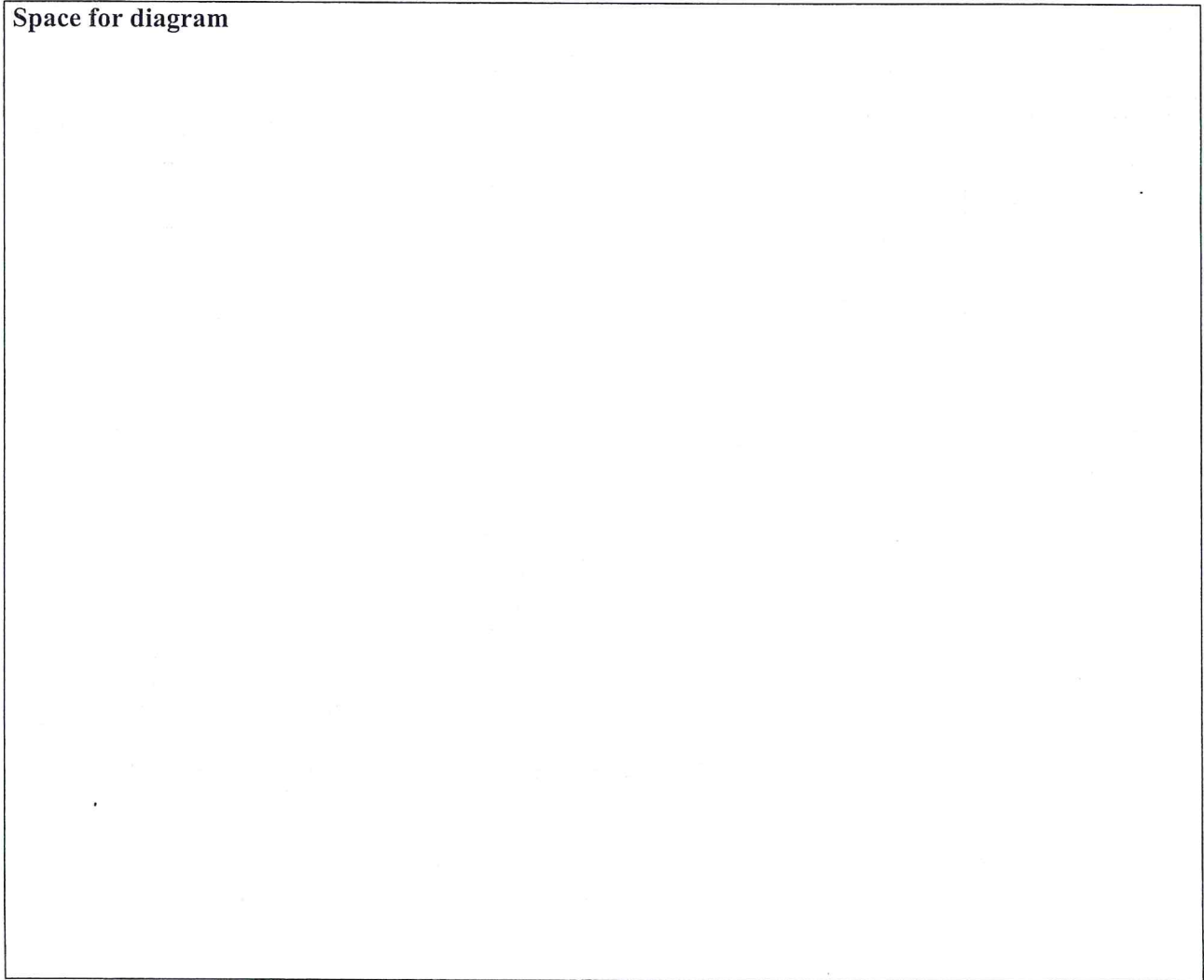
Explain how EACH of the methods named above functions to prevent pregnancy.

(4 marks)

(c) Compare the means by which the gametes are brought together in flowering plants with the means by which the gametes are brought together in humans. (5 marks)

Total 15 marks

Space for diagram



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