

FORM TP 02025002



TEST CODE 01207020

JANUARY 2025

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®

EXAMINATION

BIOLOGY

Paper 02 – General Proficiency

2 hours 30 minutes

400

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in two sections. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. DO NOT write in the margins.
4. Where appropriate, answers should be illustrated by diagrams.
5. 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.
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.

A000

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

Copyright © 2023 Caribbean Examinations Council
All rights reserved.

01207020/J/CSEC 2025



0 1 2 0 7 0 2 0 0 3



SECTION A

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

1. Your friend has just returned from a tour of South America and brought you a bag of Jumo, a powdered food item. She told you that Jumo's ingredients include starch, reducing sugar and fat, but you would like to verify this by performing some food tests on the powdered item.

Complete Table 1 below to show the following.

- A description of how the test is performed. Include ALL reagents and suitable apparatus.
- What you expect to **observe** if the food substance is present in Jumo.
- What you expect to **observe** if the food substance is **not** present in Jumo.

An example has been provided for you.

400

A000

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



**TABLE 1: FOOD TESTS FOR REDUCING SUGAR, STARCH
AND FAT CARRIED OUT ON JOMO**

Food Nutrient	How the Test is Performed (including all reagents and suitable apparatus)	Expected Observation if the Food Substance is Present in Jumo	Expected Observation if the Food Substance is not Present in Jumo
Reducing sugar	<ol style="list-style-type: none"> 1. Mix Jumo with water and place the mixture in a test tube. 2. Add an equal volume of Benedict's (or Fehling's A and B) solution to the test tube. 3. Mix thoroughly. 4. Boil gently. 	The mixture turns green OR yellow OR brick red OR orange precipitate.	The mixture remains blue.
(a) Starch	(i)	(ii)	(iii)
(b) Fat	(i)	(ii)	(iii)

(6 marks)

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- (c) State THREE precautions that should be taken while conducting the food tests on Jumo.

.....

.....

.....

.....

.....

(3 marks)

- (d) Name TWO diseases that a person may develop if Jumo is consumed in excess over a long period of time.

.....

.....

(2 marks)

400

A000

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- (e) Figure 1 shows a simple diagram of a villus in the digestive system.

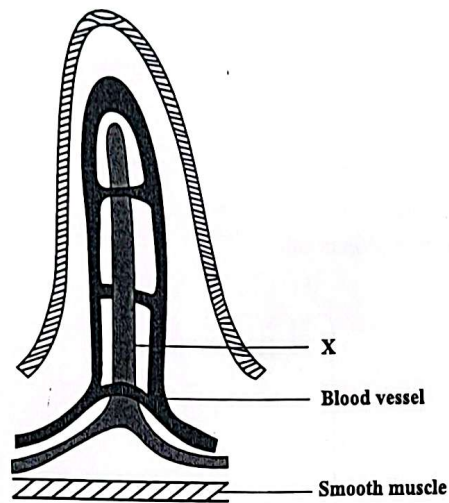


Figure 1. Diagram of a villus

- (i) Name the organ in which the villus is located.
.....
(1 mark)
- (ii) State the function of the villus.
.....
.....
(1 mark)
- (iii) Name the structure labelled X in Figure 1.
.....
(1 mark)
- (iv) Jon discovered that the structure labelled X in his digestive system is not working properly. Suggest ONE adjustment that he should make to his diet because of this malfunction.
.....
.....
(1 mark)

GO ON TO THE NEXT PAGE

01207020/J/CSEC 2025



- (v) Give ONE reason for your answer in (e) (iv).

.....
.....
.....

(1 mark)

- (f) Figure 2 shows an epithelial cell of the villus in the digestive system.

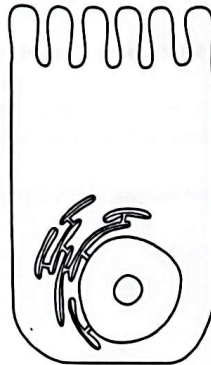


Figure 2. Epithelial cell of the villus

- (i) Outline ONE way in which the epithelial cell of the villus differs from a typical animal cell.

.....
.....
.....
.....
.....

(2 marks)

- (ii) Name the structure in Figure 2 which carries genetic information in the form of DNA.

.....

(1 mark)

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- (g) Figure 3 shows the effect of temperature on the rate of an enzyme-catalyzed reaction.

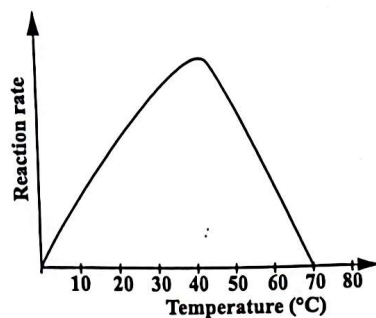


Figure 3. Effect of temperature on an enzyme-catalysed reaction

- (i) Indicate, by placing the letter A, on the graph in Figure 3, the point where the optimal temperature of this enzyme-catalysed reaction occurs. (1 mark)
- (ii) State the optimal temperature of the enzyme.

.....
(1 mark)

GO ON TO THE NEXT PAGE

01207020/J/CSEC 2025



012070202009



- (iii) Explain the shape of the graph between 0 and 25 °C and between 50 and 70 °C.

Between 0 and 25 °C

.....

.....

.....

.....

.....

Between 50 and 70 °C

.....

.....

.....

.....

.....

(4 marks)

Total 25 marks

01207020/J/CSEC 2025



0120702010

GO ON TO THE NEXT PAGE

2. (a) Two scientists visited a rain forest and noticed orchids growing on a large healthy tree.

(i) Name the type of relationship that exists between the orchid and the large tree.

.....
(1 mark)

(ii) Outline TWO reasons for your answer in (a) (i).

.....
.....
.....
.....
.....
(2 marks)

(iii) Name TWO animals that are involved in the type of relationship named in (a) (i).

.....
.....
(2 marks)

A000

01207020/J/CSEC 2025



GO ON TO THE NEXT PAGE

- (b) The scientists later found an unknown organism in a body of water. They were undecided about whether it was an amphibian or a fish. Suggest how the structural features of the organism may be used by the scientists to determine its identity. Your answer should include TWO comparisons.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

- (c) (i) Define the term 'decomposer'.

.....

.....

.....

(2 marks)

- (ii) State TWO functions of decomposers.

.....

.....

.....

.....

.....

(2 marks)

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- (iii) Outline ONE way in which fungi can be beneficial to a homeowner or a builder of wooden homes and ONE way in which they can be destructive.

.....

.....

.....

.....

.....

.....

(2 marks)

Total 15 marks

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

400

A000

GO ON TO THE NEXT PAGE

01207020/J/CSEC 2025



3. (a) Write the balanced chemical equation for photosynthesis and include the conditions.

.....
.....
.....

(3 marks)

- (b) State FOUR ways in which a leaf is adapted for the process of photosynthesis.

.....
.....
.....
.....
.....

(4 marks)

400

A000

GO ON TO THE NEXT PAGE

01207020/J/CSEC 2025



- (iii) Plants do not photosynthesize when left in a completely dark environment. In the greenhouse, the farmer notices that the shaded plants are taller and have smaller leaves than the plants located in sunny locations. Explain why the plants left in the shade did not die immediately.

.....

.....

.....

.....

.....

.....

(2 marks)

Total 15 marks

400

A000

GO ON TO THE NEXT PAGE

01207020/J/CSEC 2025



0 1 2 0 7 0 2 0 1 6



SECTION B

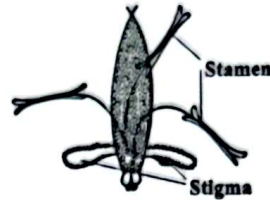
Answer ALL questions.

Write your answers in the spaces provided in this booklet.

4. Figures 5 and 6 are images of flowers obtained from two different species of plants. Carefully examine the figures and answer the questions that follow.



Plant A
Figure 5



Plant B
Figure 6

- (a) Complete the table below by comparing the structures associated with the flowers of Plants A and B.

TABLE 2: COMPARISON OF FLOWERS OF PLANT A AND PLANT B

Structure	Plant A	Plant B
Stigma		
Stamen		
Pollen grain		

(6 marks)

- (b) Indicate the MOST likely agent of pollination for EACH flower.

Plant A

Plant B

(2 marks)

GO ON TO THE NEXT PAGE

01207020/J/CSEC 2025



- (c) Figure 7 is a diagram of whole and half pieces of coconut. Carefully examine Figure 7 and answer the questions that follow.

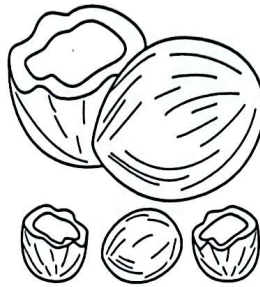


Figure 7. Diagram of coconuts

- (i) Use the diagram to identify the method by which the seeds of coconuts are dispersed.

.....
(1 mark)

- (ii) Suggest TWO ways in which the seeds of coconut are adapted for the method of dispersal identified in (c) (i).

.....
.....
.....
(2 marks)

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



0 1 2 0 7 0 2 0 1 8



4UU

[illegible]

A000

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- 20 -

5. (a) Define the term 'genetic engineering'.

.....
.....
.....
.....
(2 marks)

- (b) (i) The first genetically engineered, synthetic 'human' insulin was produced from bacteria. State the name of the medical condition which is managed with insulin therapy.

.....
(1 mark)

- (ii) There are FOUR broad categories of diseases. A pathogenic disease is an example of one of these categories. List the THREE other categories of diseases.

.....
.....
.....
(3 marks)

- (iii) Which of the four categories of diseases is the medical condition named in (b) (i) an example of?

.....
(1 mark)

- (iv) Explain how insulin therapy is used to manage the medical condition named in (b) (i).

.....
.....
.....
.....
(2 marks)

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



0 1 2 0 7 0 2 0 2 0



- [illegible]

Total 15 marks

01207020/J/CSEC 2025



6. Jacob experienced headaches and eye strain while reading. He visited an optometrist and discovered that he was long-sighted.

(a) Define the term 'long-sighted'.

.....

.....

.....

(1 mark)

- (b) Jacob received glasses and no longer experiences headaches or eye strain while reading. Figures 8 and 9 show his vision before and after receiving corrective lens.

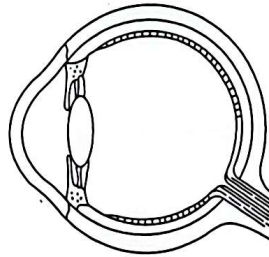


Figure 8. Vision before receiving corrective lens

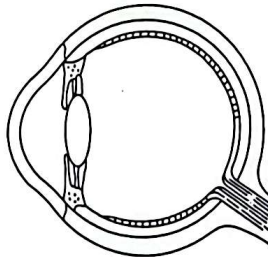


Figure 9. Vision after receiving corrective lens

- (i) Draw appropriate lines

- on Figure 8 to show Jacob's vision before receiving the corrective lens (2 marks)
- on Figure 9 to show what occurs after the use of corrective lens. Ensure that you draw the corrective lens. (3 marks)

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- (ii) Explain how the use of the corrective lens drawn in (b) (i) on page 22 corrects Jacob's long-sightedness. In your answer state the type of lens used.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

DO NOT WRITE IN THIS AREA

400

4000

01207020/J/CSEC 2025

GO ON TO THE NEXT PAGE



- (c) (i) Colour blindness is a sex-linked disease. Jacob is not affected; however, his wife, while not affected, is a carrier for this disease. Using a genetic diagram, show the cross between Jacob and his wife.

Define the alleles.

Parents' phenotype

Parents' genotype

Cross

(5 marks)

- (ii) Based on the results of the cross in (c) (i), state the probability of Jacob and his wife having a boy who is colour blind.

(1 mark)

Total 15 marks

END OF TEST

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

01207020/J/CSEC 2025

