

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE[®]
EXAMINATION

21 JANUARY 2020 (a.m.)



FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

TEST CODE

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SUBJECT BIOLOGY – Paper 032

PROFICIENCY GENERAL

REGISTRATION NUMBER

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SCHOOL/CENTRE NUMBER

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NAME OF SCHOOL/CENTRE

CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)

DATE OF BIRTH

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SIGNATURE _____



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JANUARY 2020

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE[®]
EXAMINATION

BIOLOGY

Paper 032 – General Proficiency

ALTERNATIVE TO SCHOOL-BASED ASSESSMENT

2 hours 10 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. Answer ALL questions.
2. Use this answer booklet when responding to the questions. For EACH question, write your answer in the space provided and return the answer booklet at the end of the examination.
3. DO NOT write in the margins.
4. You are advised to take some time to read through the paper and plan your answers.
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.**

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

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Answer ALL questions.

Write your answers in the spaces provided in this booklet.

1. (a) You are provided with the following:

- A sample of (mashed, crushed or blended) cooked potatoes labelled A
- A sample of powdered full cream milk labelled B
- 8–10 ml of the test reagents: Biuret reagent, potassium iodide solution, alcohol or Sudan III solution

Using the THREE testing reagents provided, conduct food tests on both food samples. Complete Table 1 by:

- describing the observations for Sample A in Column 2
- describing the observations for Sample B in Column 3
- stating the deductions/inferences in Column 4

TABLE 1: RESULTS OF FOOD TESTS

Food Test Procedure	Observation (Sample A)	Observation (Sample B)	Deduction/Inference
(i) Place a spatula full of the sample on a petri dish/test tube. Add a few drops of Biuret reagent.			
(ii) Place a spatula full of the sample on a petri dish/test tube. Add a few drops of potassium iodide solution.			
(iii) Place a spatula full of the sample on a petri dish/test tube. Add a few drops of alcohol or Sudan III solution.			

(12 marks)

GO ON TO THE NEXT PAGE



- (b) (i) You are provided with a leaf. In the space provided below, draw and label a large diagram of the leaf.

(6 marks)

- (ii) Calculate the magnification of your drawing.

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(2 marks)

Total 20 marks

GO ON TO THE NEXT PAGE



2. (a) A farmer obtains some broccoli seeds and wants to find out which of three temperature conditions is best for germination, so that she can decide where to plant the seeds. The three temperature conditions are field temperature (32–34 °C), room temperature (25 °C) and greenhouse temperature (15 °C).

Plan and design an experiment which will allow you to advise the farmer of the best temperature for planting the broccoli seeds. Use the following sections to guide you.

Hypothesis

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(2 marks)

Procedure

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(9 marks)



Expected results

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(1 mark)

(b) State TWO possible sources of error in the experiment designed in (a).

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(2 marks)

(c) Suggest THREE reasons why water is essential for seeds to germinate.

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(3 marks)

Total 17 marks



3. Observe the organisms in Figure 1 which were collected by a biologist from his home garden.

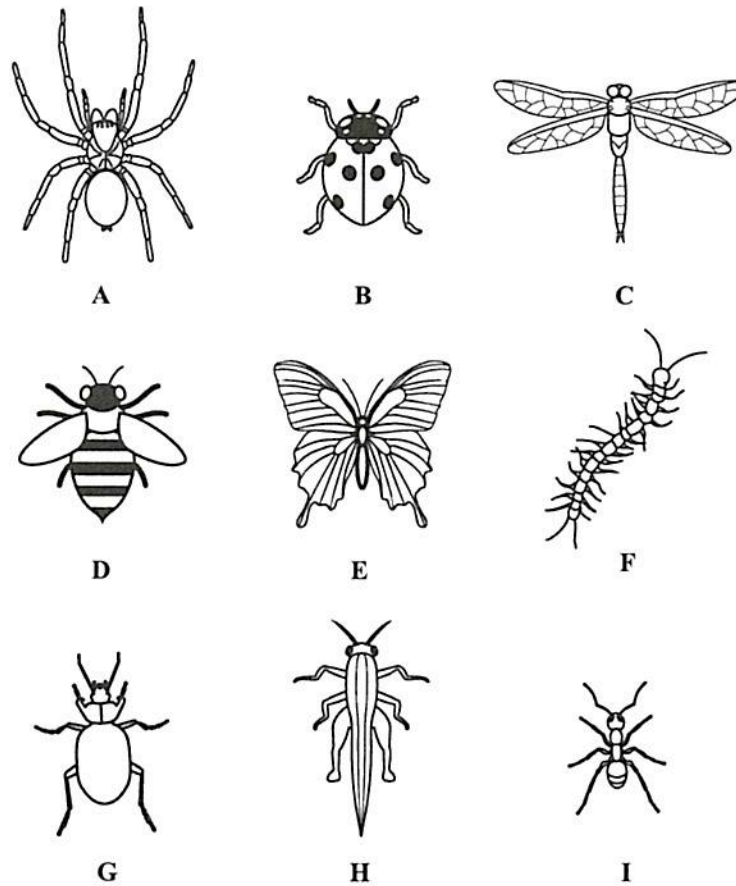


Figure 1. Organisms collected from a home garden

- (a) State THREE visible characteristics that can be used to classify these organisms into two groups.

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(3 marks)



- (b) Using one of the characteristics identified in (a), complete Table 2 below to show how the organisms may be classified into two groups.

TABLE 2: CLASSIFYING OF ORGANISMS

Group A Characteristic	Group B Characteristic
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.....
Organisms (list by letter)	Organisms (list by letter)
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(6 marks)

- (c) (i) Name an instrument that the biologist could have used to collect the organisms, in Figure 1 on page 8.

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(1 mark)

- (ii) Briefly describe how the instrument named in (c) (i) is used.

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(1 mark)

GO ON TO THE NEXT PAGE



- (d) State TWO precautions that the biologist should have taken when collecting the organisms in Figure 1 on page 8.

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.....
(2 marks)

- (e) A biologist wants to estimate the size of the butterfly population. On his first visit to the garden he captured 15 butterflies, then marked each of them with paint on its wings. A week later, he returned to the garden and captured 20 butterflies. Five of these butterflies had paint on their wings.

Calculate the number of butterflies in the population using the following formula:

$$\begin{array}{l} \text{Number of organisms} \\ \text{in the population} \end{array} = \frac{\begin{array}{l} \text{Number of organisms} \\ \text{captured on second visit} \end{array} \times \begin{array}{l} \text{Number of organisms} \\ \text{marked on the first visit} \end{array}}{\begin{array}{l} \text{Number of recaptured animals that were marked} \end{array}}$$

(2 marks)

GO ON TO THE NEXT PAGE



- (f) Of the 15 butterflies captured on his first visit, the biologist noticed that those of the same species had either blue wings only, red wings with blue stripes only or red wings only. He concluded that the colour of the butterflies' wings is determined by codominant alleles.

- (i) Using the symbols R for red and B for blue, use a genetic diagram to explain why the biologist would conclude that the alleles are codominant.

(6 marks)



- (ii) Predict the phenotypic ratio of the population if two of the butterflies with striped wings are crossed.

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(2 marks)

Total 23 marks

END OF TEST

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

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If you use this extra page, you MUST write the question number clearly in the box provided.

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CANDIDATE'S RECEIPT

INSTRUCTIONS TO CANDIDATE:

1. Fill in all the information requested clearly in capital letters.

TEST CODE:

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SUBJECT: BIOLOGY – Paper 032

PROFICIENCY: GENERAL

REGISTRATION NUMBER:

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FULL NAME: _____
(BLOCK LETTERS)

Signature: _____

Date: _____

2. Ensure that this slip is detached by the Supervisor or Invigilator and given to you when you hand in this booklet.
3. Keep it in a safe place until you have received your results.

INSTRUCTION TO SUPERVISOR/INVIGILATOR:

Sign the declaration below, detach this slip and hand it to the candidate as his/her receipt for this booklet collected by you.

I hereby acknowledge receipt of the candidate's booklet for the examination stated above.

Signature: _____
Supervisor/Invigilator

Date: _____

