

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®  
EXAMINATION

25 JANUARY 2023 (a.m.)



FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

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SUBJECT BIOLOGY – Paper 02

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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JANUARY 2023

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. 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.**

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01207020/J/CSEC 2023





(d) Figure 1 shows the apparatus set-up used to demonstrate a process.

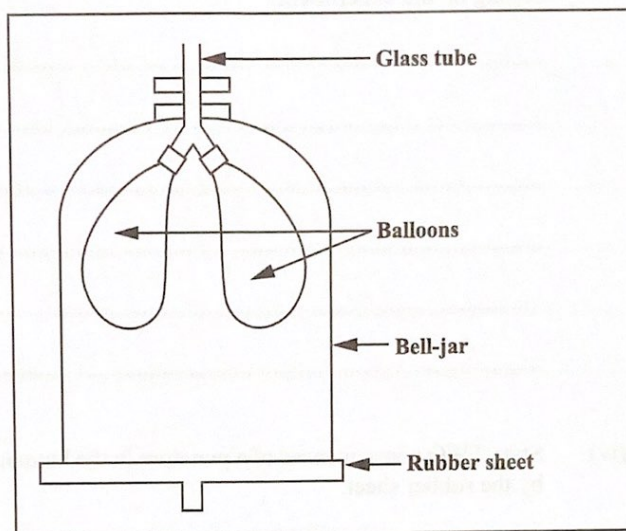


Figure 1: Apparatus set-up

(i) Name the process being demonstrated in Figure 1.

..... (1 mark)

(ii) Name the structures in humans that are represented by the following labels on the apparatus in Figure 1.

Label	Name of corresponding structure
Glass tube (vertical)	
Balloons	
Bell jar	
Rubber sheet	

(4 marks)

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- (iii) Suggest TWO reasons why a glass bell jar was used instead of a plastic bag, in setting up the experiment.

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(2 marks)

- (iv) State TWO consequences of a puncture in the human structure that is represented by the rubber sheet.

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(2 marks)

- (v) During the experiment, a student pulls the rubber sheet downwards. State the expected observation.

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(1 mark)

- (vi) Give TWO reasons for the expected observation stated in (v).

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(2 marks)



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- (e) List THREE precautions that should be taken when setting up the apparatus in Figure 1 on page 5.

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(3 marks)

Total 25 marks

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2. (a) Define the terms 'effector' and 'receptor' and give ONE example of each.

Definition	Example
Effector: ..... .....	
Receptor: ..... .....	

(4 marks)

- (b) Name a specialized cell found in the nervous system.

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(1 mark)

- (c) Define the term 'stimulus'.

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(2 marks)



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(d) Explain how the response to a **named** stimulus is important for the survival of EACH of the following organisms.

(i) **Earthworm**

Stimulus .....

Response .....

How response aids survival .....

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.....

(4 marks)

(ii) **Green plant**

Stimulus .....

Response .....

How response aids survival .....

.....

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(4 marks)

Total 15 marks

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3. (a) An ecologist identified two species with identical niches in an ecosystem.

(i) Define the term 'species'.

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(2 marks)

(ii) Suggest TWO possible outcomes if the two species compete for the same resources.

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(2 marks)

(b) The ecologist observed a food chain which consisted of a plant, a mouse, a cockroach and a bird. Based on the feeding relationship observed, the organisms were described as herbivores, carnivores or omnivores.

(i) Define the following terms:

Carnivore

.....

Omnivore

.....

Herbivore

.....

(3 marks)

(ii) Draw a food chain with the FOUR organisms listed.

(3 marks)



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(iii) Identify the herbivore and carnivore from the food chain.

Herbivore .....

Carnivore .....

(2 marks)

(c) Figure 2 shows how the population density of rabbits and wolves changes in a population.

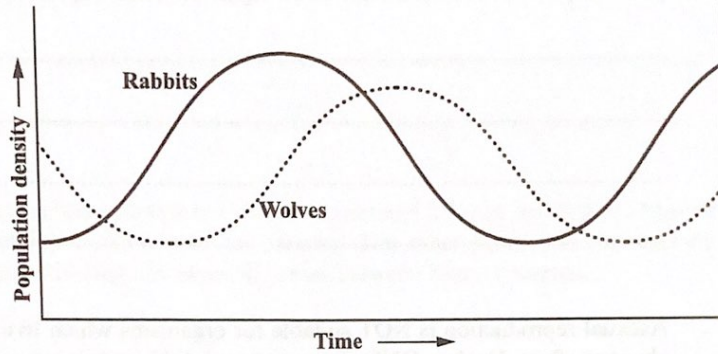


Figure 2: The Population Density of Rabbits and Wolves with Time.

Explain the changes in the population density of the rabbits and wolves with time.

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(3 marks)

Total 15 marks

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**SECTION B**

**Answer ALL questions.**

**Write your answers in the spaces provided in this booklet.**

4. (a) State the name of TWO processes by which organisms reproduce asexually. For EACH process, provide ONE example of an organism which reproduces in this way.

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**(4 marks)**

- (b) Asexual reproduction is NOT suitable for organisms which live in an environment that changes often. Explain ONE reason to support this statement.

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**(2 marks)**



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(c) Define the following terms:

(i) Gene

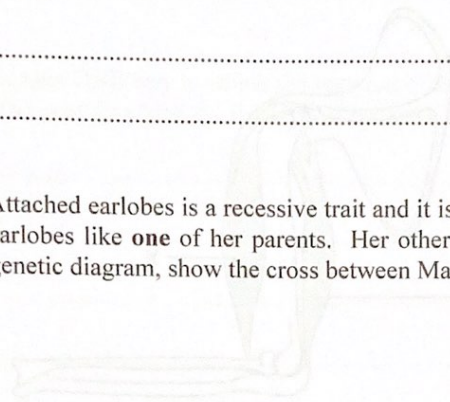
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(ii) Allele

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(2 marks)

(d) (i) Attached earlobes is a recessive trait and it is not sex-linked. Mary has attached earlobes like **one** of her parents. Her other parent has free earlobes. Using a genetic diagram, show the cross between Mary's parents.



(5 marks)

(ii) State Mary's genotype: .....

(1 mark)

(iii) Based on the results of the cross in (d) (i), state the probability of a child having attached earlobes.

.....

(1 mark)

Total 15 marks

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5. (a) State TWO functions of the human skeleton.

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(2 marks)

(b) Figure 3 shows a diagram of a flexed arm of a human being.

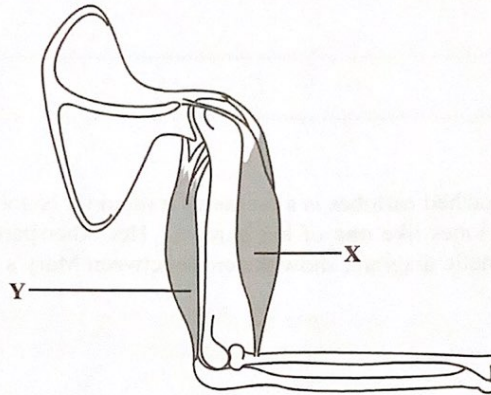


Figure 3: Diagram of a flexed arm of a human being

Name the TWO muscles labelled X and Y.

X: .....

Y: .....

(2 marks)



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(c) A teenager received an injury while participating in a sporting event. The injury resulted in damage to the joint in the knee. However, the teenager did not experience any damage to the joints in the hip.

(i) Name the type of joints found in EACH of the following:

Knee: .....

Hip: .....

(2 marks)

(ii) Explain ONE way in which the function of the knee and hip joints are similar and ONE way in which the function of the knee joint differs from the hip joint.

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(3 marks)

(d) An animal was hit accidentally by a car on the road. It suffered a broken leg but managed to limp to the side of the road. Suggest FOUR ways in which the animal may be affected by the broken limb.

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(4 marks)

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- (e) John received a puppy and a plant for his birthday. After one year, John notices that his plant and puppy are both growing but their growth patterns are somewhat different. Describe ONE way in which the growth of the plant differs from that of the puppy.

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(2 marks)

Total 15 marks



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6. (a) Suggest TWO methods **other** than the use of insecticides that a country could utilize to eradicate mosquitoes. For EACH method suggested, name the stage of the mosquito's life cycle on which the method is effective.

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(4 marks)

- (b) List TWO diseases which would become prominent in a country which has a large mosquito population.

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(2 marks)

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- (c) The results of a study on a mosquito-related disease are presented in Figure 4 below. The figure shows both the distribution of reported disease cases and the proportion of severe cases.

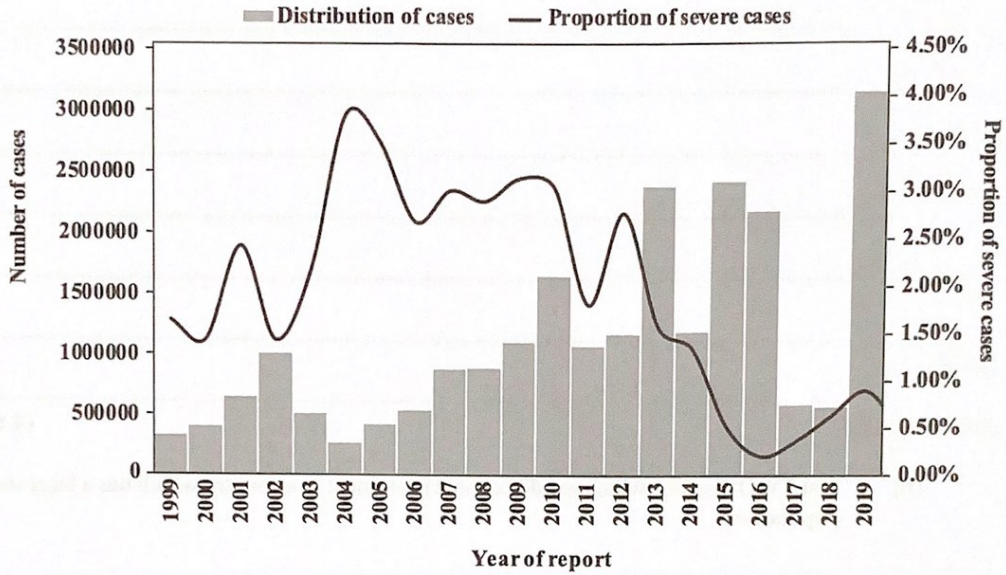


Figure 4. The distribution of reported disease cases and the proportion of severe cases for a mosquito-related disease

State the trend in the number of mosquito-related disease cases between 2017 and 2019 and suggest THREE reasons for this trend.

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(4 marks)

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- (d) DDT, an insecticide, was used to kill the local mosquito population. Over time, with the continued use of DDT, the mosquito population continued to increase. State the name of a process, **other** than reproduction, which may have led to the increase in the mosquito population and explain how this increase occurred despite the use of DDT.

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(5 marks)

Total 15 marks

END OF TEST

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



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## CANDIDATE'S RECEIPT

### INSTRUCTIONS TO CANDIDATE

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

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SUBJECT BIOLOGY – Paper 02

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 \_\_\_\_\_



