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CARIBBEAN SECONDARY EDUCATION CERTIFICATE®  
EXAMINATION

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14 JANUARY 2019 (p.m.)

FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

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SUBJECT BIOLOGY – Paper 02

PROFICIENCY GENERAL

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SCHOOL/CENTRE NUMBER  

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NAME OF SCHOOL/CENTRE  

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

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JANUARY 2019

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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**SECTION A**

**Answer ALL questions.**

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

1. (a) A sample of a meal was tested for the presence of reducing sugar and protein. Outline the procedure used to **prepare** the sample for carrying out the food tests.

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**(2 marks)**

- (b) Complete Table 1 by describing the procedure that is used to test for the presence of EACH food nutrient in the meal and the expected results if the food nutrient is present.

**TABLE 1: DESCRIPTION AND RESULTS OF THE REDUCING SUGAR AND PROTEIN FOOD TESTS**

<b>Food Nutrient</b>	<b>Test</b>	<b>Expected Results if the Food Nutrient is Present</b>
Reducing sugar	(i)	(iii)
Protein	(ii)	(iv)

**(6 marks)**

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(c) Another meal rich in carbohydrates and protein was prepared and given to a sick child recovering from an illness.

(i) Name ONE enzyme involved in the chemical digestion of carbohydrates and ONE enzyme involved in the chemical digestion of proteins in the alimentary canal.

Enzyme which digests carbohydrates .....

Enzyme which digests proteins .....

**(2 marks)**

(ii) Suggest ONE reason why it is important for the recovering child to eat adequate amounts of carbohydrates and THREE reasons why it is important for the recovering child to eat adequate amounts of proteins.

Carbohydrate .....

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Proteins .....

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**(4 marks)**

(d) Green plants produce and store carbohydrates.

(i) Suggest TWO ways in which the type of nutrition carried out by green plants differs from that carried out by humans.

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**(2 marks)**

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- (ii) Describe the procedure to test for the presence of starch in a leaf taken from a green plant.

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**(3 marks)**

- (iii) Explain why plants store most carbohydrates in the form of starch instead of in the form of a reducing sugar.

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**(2 marks)**

- (iv) Suggest TWO reasons why it is important for plants to store starch.

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**(4 marks)**

**Total 25 marks**

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- 2. (a) (i) Name TWO biotic factors and ONE abiotic factor that may account for the extinction of a species.

Biotic factors .....

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**(2 marks)**

Abiotic factor .....

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**(1 mark)**

- (ii) State TWO activities of humans which may have a negative impact on species diversity and TWO measures that may be taken to reduce the impact of these activities.

Activities .....

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Measures .....

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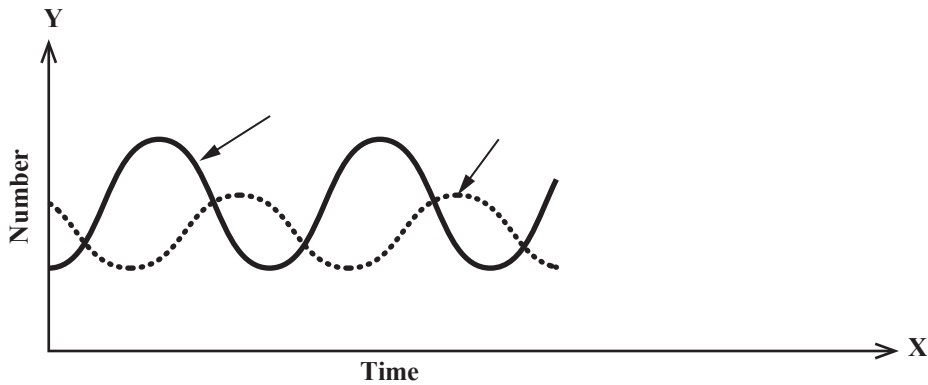
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**(4 marks)**

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- (b) The graph in Figure 1 shows the growth of two populations of spider mites: one which feeds on plants and one which is carnivorous and preys on the plant-eating spider mites.



**Figure 1. Fluctuations in predator and prey populations**

- (i) Label on the graph the curve which represents the predator, using the letter A. **(1 mark)**
- (ii) Use the number of organisms and the shape of the curves to state TWO reasons for your answer in (b) (i). **(2 marks)**
- .....
- .....
- .....
- .....
- (iii) Assuming that the population of the predator drops to zero, extend the curve of the prey population on the graph. (Assume that no other changes have occurred in this community.) **(1 mark)**
- (iv) Assuming that the population of the prey drops to zero, extend the curve of the predator population on the graph. (Assume that no other changes have occurred in this community.) **(1 mark)**

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- (c) A farmer planted 50 seeds of corn on a plot of land and 100 seeds from the same batch on a neighbouring plot of the same size, hoping to reap twice the yield of corn. He gave both plots the same amount of fertilizer and water. However, the yield of corn obtained from the plot with 100 seeds was much less than that of the plot with only 50 seeds. Suggest THREE possible reasons for the lower yield obtained in the plot with the larger number of seeds.

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**(3 marks)**

**Total 15 marks**

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3. (a) (i) What is the effect on the expression of phenotype for continuous and discontinuous variation?

Continuous variation .....

Discontinuous variation .....

(2 marks)

(ii) State how the data for continuous variation should be presented graphically.

.....

(1 mark)

(b) State ONE characteristic of human beings that shows

(i) continuous variation .....

.....

(ii) discontinuous variation. ....

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(2 marks)

(c) State TWO cellular components of blood.

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(2 marks)

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(d) A couple with blood groups A and B has a son with blood group O. Complete the genetic diagram below to show how this is possible.

(i) Parents' phenotypes: Blood group A × Blood group B

Parents' genotypes: \_\_\_\_\_ × \_\_\_\_\_

Parents' gametes: \_\_\_\_\_ × \_\_\_\_\_

Fertilization cross

Gametes		

(4 marks)

(ii) What is the genotype of the child with blood group O?

.....

(1 mark)

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- (e) Two sisters, ages 15 and 16, have the same biological parents and were brought up under the same conditions in the same home. The 15-year-old is much taller than the 16-year-old. Suggest THREE events which take place during sexual reproduction which may have led to the variation in the height of the two sisters.

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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) (i) With the aid of a labelled diagram, describe how the mammalian heart pumps deoxygenated blood from the cells in the body to the lungs to become oxygenated.



**Pumping of deoxygenated blood from the body to the lungs**

Description .....

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**(6 marks)**

- (ii) The structure of arteries and veins differ from each other. Explain how TWO of these differences allow these blood vessels to carry out their functions.

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**(4 marks)**

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(b) Green plants also have specialized vessels such as xylem to transport water to their various tissues and organs.

(i) State ONE similarity and ONE difference between the structure of a blood capillary and the structure of a xylem vessel found in the stem of a green plant.

Similarity .....

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Difference .....

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**(3 marks)**

(ii) Suggest TWO reasons why green plants do not need to depend on xylem for transporting oxygen to their cells.

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**(2 marks)**

**Total 15 marks**

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- (ii) Compare the treatment method normally used for a viral disease with the treatment method normally used for diabetes **and** compare ONE preventative measure normally used for a viral disease with ONE preventative measure normally used for diabetes.

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**(4 marks)**

- (c) Outline TWO methods used to control the mosquito vector and for EACH method state the stage in the life cycle that is targeted.

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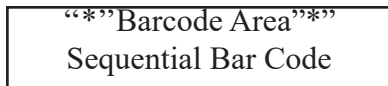
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**(4 marks)**

**Total 15 marks**

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6. (a) Outline ONE major function of EACH of the following parts of the human brain:

Cerebrum

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Cerebellum

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Medulla

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(3 marks)

(b) A motorcyclist crashed into a wall on his way home from a party at which he drank five beers. After determining that he was alive, the paramedic at the scene of the collision checked the motorcyclist's pupil reflex. Complete the flow diagram in the following box to show the sequence of events involved in the pupil reflex.

<p>Pupil reflex impulse pathway</p> <p>Light stimulus → receptor cells in retina → _____</p> <p>→ _____ → motor neurons in _____ nerve</p> <p>→ _____ muscles contract → pupil _____</p>
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(3 marks)

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- (c) Suggest THREE conclusions that the paramedic may make if the accident victim is alive but shows no response to the pupil reflex test.

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(3 marks)

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