FORM TP 2017045

TEST CODE 01207020

MAY/JUNE 2017

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 with 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.**

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





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## SECTION A

**Answer ALL questions in this section.**

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

**1.** (a) In an experiment, some students put corn seeds into each of two test tubes labelled **A** and **B**, as shown in Figure 1.

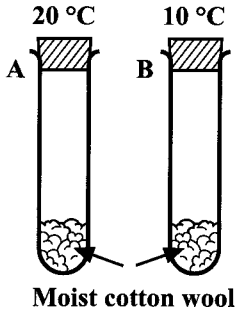


**Figure 1. Apparatus and materials used for experiment**

(i) Write a suitable aim for this experiment.

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**(2 marks)**

(ii) In which of the tubes, **A** or **B**, would germination most likely occur? Give ONE reason for your answer.

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**(2 marks)**

(iii) State TWO roles that the moisture from the cotton wool plays in the process of germination.

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**(2 marks)**

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(b) The corn seedlings which germinated are placed in a pot and exposed to unidirectional light as shown in Figure 2.

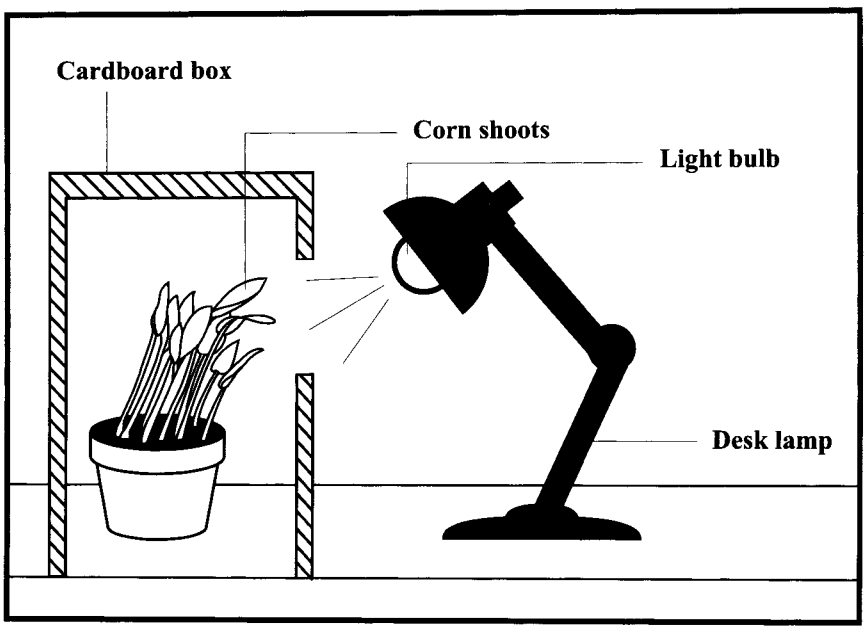


**Figure 2. Corn seedlings exposed to unidirectional light**

(i) What type of movement is shown by the plants in Figure 2?

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**(1 mark)**

(ii) State a hypothesis that the students could test by using the apparatus and materials shown in Figure 2.

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**(2 marks)**

(iii) The students want the seedlings to grow straight towards the ceiling. Suggest how they could manipulate the apparatus to get this result.

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**(1 mark)**

(iv) The seedlings shown in Figure 2 use all the nutrients stored in the cotyledons. Discuss the process by which these plants can make more nutrients.

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**(4 marks)**

(v) Discuss the processes by which the raw materials required for making nutrients reach the leaves of the plant.

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**(4 marks)**

(c) (i) Starch is the most common carbohydrate that is found in the leaves of green plants. Describe a test that the students could do in the laboratory to investigate whether starch is present in the leaves of the seedlings.

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**(4 marks)**

(ii) Name ONE plant organ, other than leaves, where starch may be found.

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**(1 mark)**

(iii) Instead of starch, animals store complex carbohydrates such as glycogen. Name TWO organs in an animal's body which store glycogen.

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**(2 marks)**

**Total 25 marks**

**2.** Figure 3 represents the Whittaker Five-Kingdom Classification of living organisms.

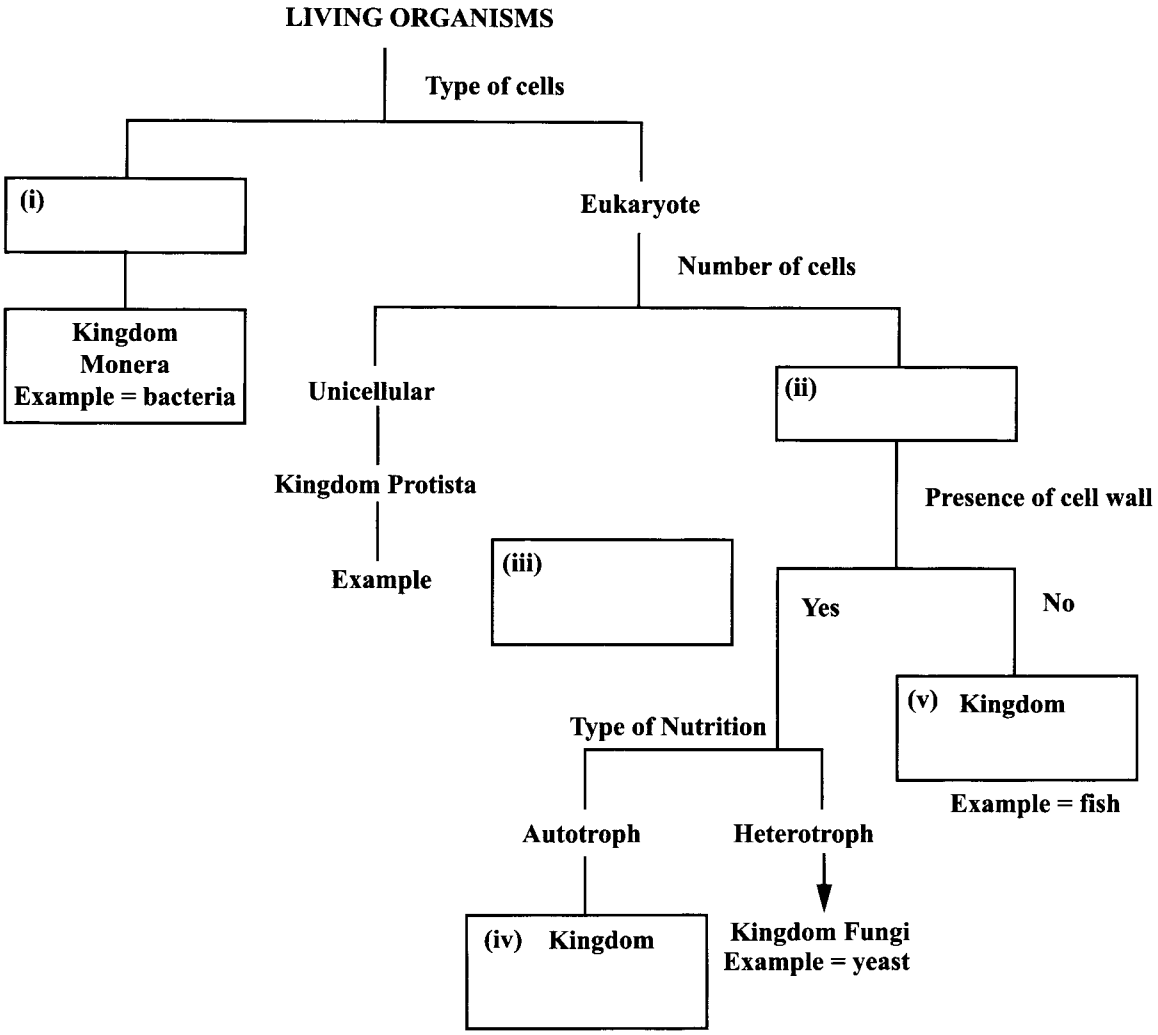


**Figure 3. Whittaker Five-Kingdom Classification of living organisms**

(a) Complete the classification by writing the correct answers at (i), (ii), (iii), (iv) and (v) in Figure 3. **(5 marks)**

(b) Each kingdom is further subdivided into taxa with the lowest rank being the level of species.

(i) Define the term 'species'.

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**(2 marks)**

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(ii) Using the human species as an example, explain why physical appearance or morphology is NOT always useful for identifying organisms belonging to the same species.

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**(2 marks)**

(iii) Suggest ONE reason why biologists use the biological concept of species instead of physical characteristics to classify organisms.

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**(2 marks)**

(c) Some lizards were washed away on a log during a hurricane and landed on a remote island. Several years later, they were classified as a new species.

(i) Using the biological concept of a species, state TWO reasons why they were reclassified.

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**(2 marks)**

(ii) The new species of lizards living in the mountainous region of the island were found to be smaller than those living on the lowlands. Suggest TWO reasons for this variation.

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**(2 marks)**

**Total 15 marks**

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3. (a) Figure 4 illustrates the events that take place during the human menstrual cycle.

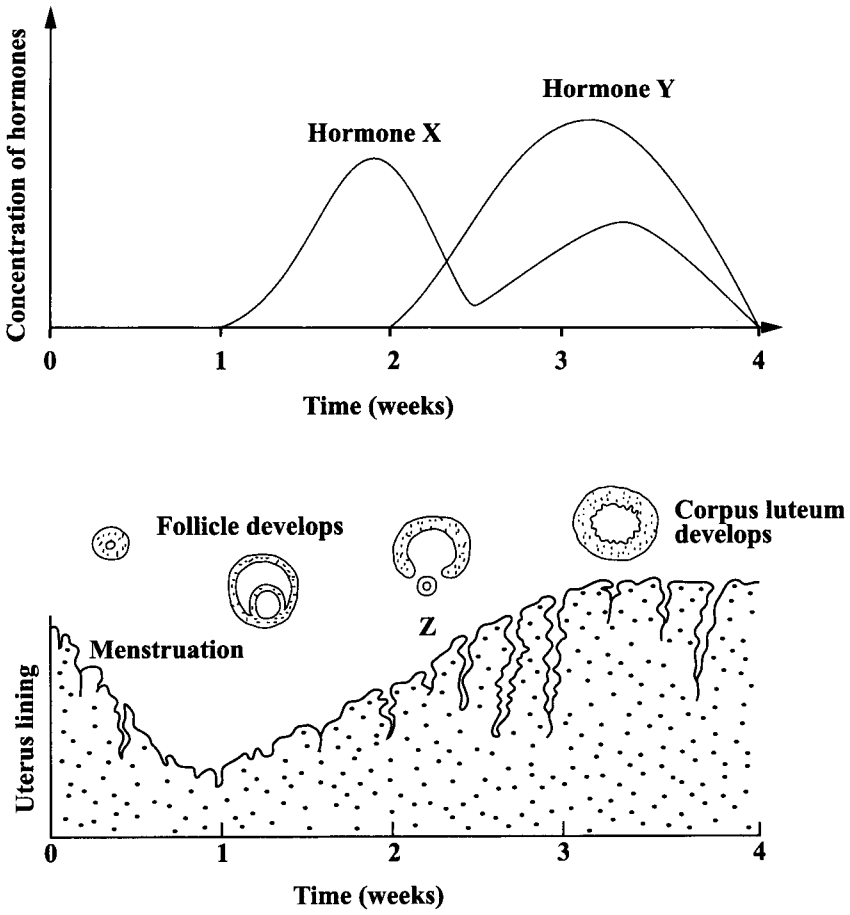


**Figure 4. Human menstrual cycle**

(i) Identify Hormones X and Y and the event occurring at Z.

X .....

Y .....

Z .....

**(3 marks)**

(ii) What is the role of EACH hormone in the menstrual cycle?

X .....

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Y .....

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**(2 marks)**

GO ON TO THE NEXT PAGE

(iii) Name the organ that produces Hormones X and Y.

X .....

Y .....

**(2 marks)**

(iv) Discuss the fate of the following structures shown in Figure 4 if **fertilization** of the ovum occurs.

Corpus luteum .....

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Uterus lining .....

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**(4 marks)**

(b) Some contraceptive pills contain hormones. Suggest how this may prevent pregnancy.

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**(1 mark)**

(c) A drug company is developing a **male** contraceptive pill. Suggest THREE ways in which this could prevent pregnancy.

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**(3 marks)**

**Total 15 marks**

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## SECTION B

**Answer ALL questions in this section.**

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

**4.** (a) (i) Explain how structures in the human eye control the amount of light that enters the eye.

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**(4 marks)**

(ii) Jenny enters a dimly lit room and cannot see the colours of the furniture until the lights are switched on. Explain how Jenny is able to discern objects in the dimly lit room but cannot see the colours until the lights are switched on.

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**(5 marks)**

(b) A certain form of colour-blindness is inherited as a recessive allele carried on the X chromosome. It is thus said to be 'X-linked' or 'sex-linked'. A woman with normal colour vision, whose father is colour-blind, mates with a colour-blind man. What is the chance of them having colour-blind children? Use a genetics diagram to explain your answer.

Use **B** for the allele for normal vision and **b** for the allele for colour-blindness.

**(6 marks)**

**Total 15 marks**

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**5.** (a) Describe the chemical digestion of carbohydrates, fats and proteins from the mouth until they are absorbed in the small intestines.

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**(6 marks)**

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(b) (i) Describe how the body systems work together to assimilate glucose molecules.

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**(4 marks)**

(ii) Explain how the assimilation of glucose by a non-diabetic person differs from that of a person suffering from diabetes.

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**(5 marks)**

**Total 15 marks**

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**6.** (a) Using a suitable example of EACH, distinguish between a predator–prey relationship and parasitism.

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**(6 marks)**

(b) Some environmentalists encourage the practice of introducing predators to an ecosystem to control a population of pests rather than the use of agricultural chemicals.

(i) Outline THREE advantages and THREE disadvantages of this method of biological control compared to the use of chemicals.

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**(6 marks)**

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(ii) Explain how biological control may contribute to biological evolution through natural selection in an ecosystem.

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**(3 marks)**

**Total 15 marks**

**END OF TEST**

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