



CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

*2 hours***READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**

1. This paper consists of SIX questions in TWO sections.
2. Answer ALL questions.
3. Do NOT write in the margins.
4. Write your answers in the spaces provided in this booklet.
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.

1. (a) State TWO similarities between the biological filter method and the activated sludge method for the treatment of sewage.

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(2 marks)

- (b) (i) Identify TWO **improper** methods for the disposal of domestic waste.

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(2 marks)

- (ii) State TWO negative effects of the improper disposal of domestic waste.

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(2 marks)



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- (c) Most solid waste in the Caribbean ends up in landfills. When a landfill becomes full, it is relocated. This is an expensive task and, for most Caribbean countries, land space is limited.

Table 1 shows types of trash commonly found in a landfill and the estimated length of time each should take to degrade.

TABLE 1: TYPES OF TRASH AND ESTIMATED TIME TO DEGRADE

Type of Trash	Estimated Time to Degrade
Vegetable matter	5 days to 1 month
Paper bag	1 month
Cotton tee-shirt	6 months
Nylon fabric	30 to 40 years
Cigarette butt	2 to 5 years
Tin can	80 to 100 years
Plastic 6-pack ring	450 years
Styrofoam cup	Unknown
Glass bottle	Unknown
Plastic bag	Unknown

- (i) State the MAIN characteristic common to ALL types of trash in Table 1.

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(1 mark)

- (ii) Identify, from Table 1, TWO types of trash that could be classified as biodegradable.

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(2 marks)

- (iii) Identify, from Table 1, TWO types of trash that could be classified as non-biodegradable.

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(2 marks)

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- (iv) Based on the data in Table 1, how long will the landfill be in use?

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(1 mark)

- (v) Based on the data in Table 1, suggest THREE ways in which the amount of solid waste sent to the landfill can be reduced.

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(3 marks)

Total 15 marks



2. In the human body, cells divide by mitosis or meiosis.

(a) State the number of chromosomes in EACH of the following human cells.

(i) A sperm cell

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(1 mark)

(ii) A cell from the pancreas

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(1 mark)

(b) Figure 1 shows numbered images representing four stages involved in the process of mitosis.

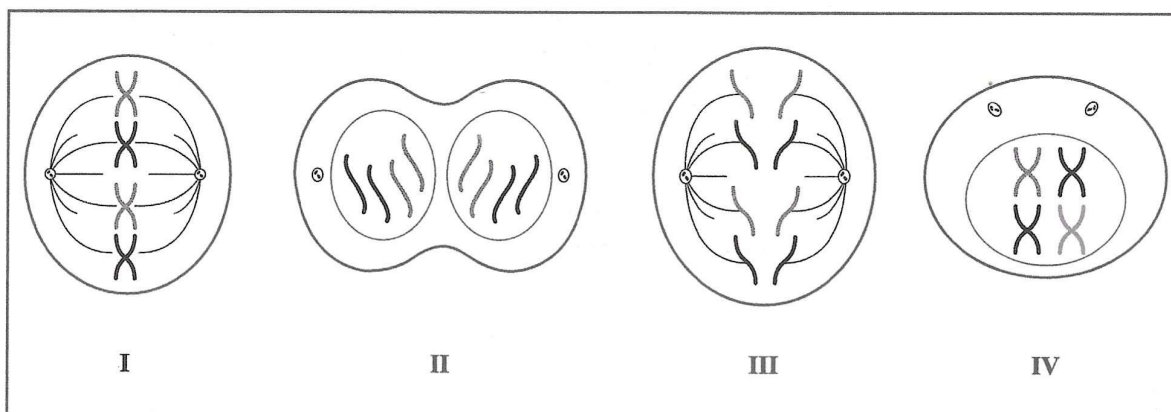


Figure 1. Stages of mitosis

Using the numbers I, II, III and IV associated with each image above, list the stages in the correct order in which they occur.

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(2 marks)

- (c) Outline ONE difference between mitosis and meiosis.

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(2 marks)

- (d) Prostate cancer is one of the more prevalent cancers which occurs in males. Figure 2 shows a comparison between a normal prostate gland and a cancerous prostate gland.

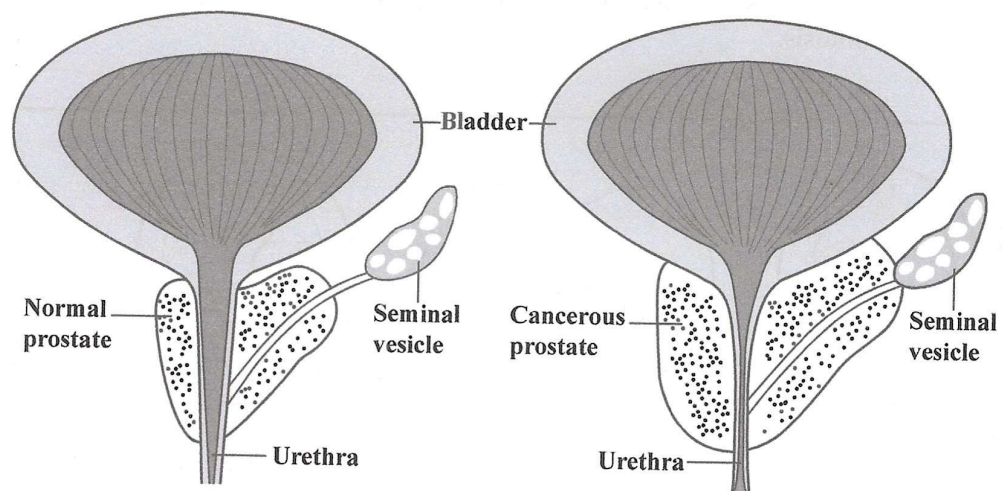


Figure 2. A normal prostate gland versus a cancerous prostate gland

Using Figure 2, explain how prostate cancer could affect male fertility.

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(4 marks)



- (e) As a result of untreated chlamydia, Mary-Jo has blocked fallopian tubes. She now finds it difficult to conceive.

- (i) Explain why Mary-Jo would have difficulty conceiving as a result of blocked fallopian tubes.

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(3 marks)

- (ii) Suggest TWO **other** causes of female infertility.

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(2 marks)

Total 15 marks



3. Figure 3 shows the upper half of a set of human adult teeth.

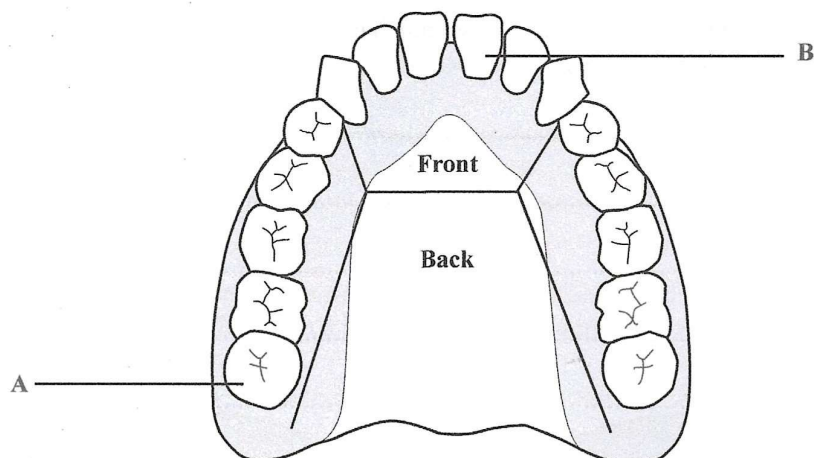


Figure 3. Upper half of a set of human adult teeth

- (a) Identify EACH tooth labelled A and B and state its function.

(i) Tooth A

Function

(2 marks)

(ii) Tooth B

Function

(2 marks)

- (b) Complete EACH of the following equations that describe the process of tooth decay.

(i) bacteria + = acids

(1 mark)

(ii) acids + teeth =

(1 mark)



(c) Figure 4 and Figure 5 show two decaying teeth, X and Y.

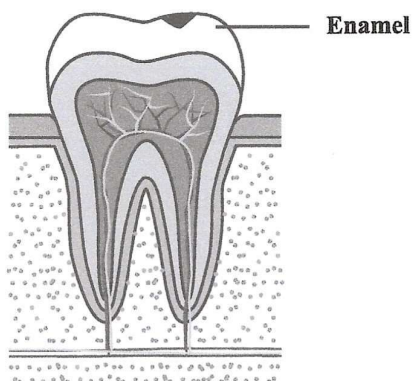


Figure 4. Decaying Tooth X

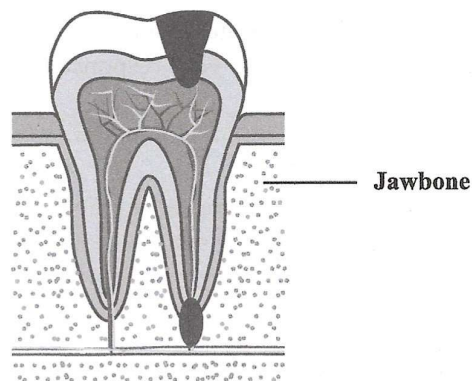


Figure 5. Decaying Tooth Y

State which tooth is likely to be painful, giving TWO reasons for your response.

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(3 marks)

- (d) Dave likes to have fruit, nuts or crunchy vegetables for snacks while Marie prefers to snack on pastries, candy bars and potato chips.

- (i) State who is MORE likely, Dave or Marie, to develop cavities. Give ONE reason for your response.

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(2 marks)

- (ii) Explain TWO ways in which Marie or Dave could prevent cavities.

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(4 marks)

Total 15 marks

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4. (a) (i) Name ONE reactant, other than solar energy, and ONE product in the process of photosynthesis.

Reactant

Product

(2 marks)

- (ii) Identify the pigment responsible for trapping solar energy during photosynthesis and state the organelle of the plant cell in which this process occurs.

Pigment

Organelle

(2 marks)

- (iii) State TWO transport processes necessary for photosynthesis to occur.

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(2 marks)

- (b) Three leaves are laid out on the laboratory counter. Leaf A is yellow, Leaf B is green and Leaf C is yellow and green. A student was asked to test EACH leaf to determine which of them contains starch.

- (i) Predict which TWO leaves will test positive for starch.

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(2 marks)

- (ii) Provide an explanation for your response in (b) (i).

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(2 marks)



- (c) Rakeeb owns a piece of land and wants to prepare it for agriculture. He begins by cutting down trees and removing the underbrush by burning it. He later tills the soil with his tractor and carries the tree logs to a sawmill some distance away to be made into lumber.

- (i) Suggest THREE ways in which Rakeeb's activities could impact the carbon cycle.

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(3 marks)

- (ii) Rakeeb added nitrogen-fixing bacteria to the soil. Explain how this action will be beneficial to his crops.

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(2 marks)

Total 15 marks



SECTION B

Answer ALL questions.

5. (a) Define EACH of the following terms.

(i) Antibody

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(2 marks)

(ii) Antigen

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(2 marks)

(b) State TWO methods that may be used to control the growth of microorganisms.

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(2 marks)



- (c) During the rainy season, both houseflies and mosquitoes, which cause diseases, can pose problems in communities. The increase in rainfall provides the perfect environment for increased breeding of mosquitoes and houseflies.

- (i) Using your knowledge of the life cycle of the mosquito, suggest the stage of its development at which it would be easiest to eradicate its presence in the community, explaining why this is the BEST stage.

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(3 marks)

- (ii) Explain why it would be more beneficial to the community to eradicate the housefly and the mosquito rather than trying to eliminate the pathogens that cause diseases.

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(3 marks)



- (iii) Suggest THREE ways in which the residents in a community could reduce the breeding sites for mosquitoes and houseflies after heavy rains.

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(3 marks)

Total 15 marks



6. (a) Outline ONE difference between a vein and an artery.

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(2 marks)

- (b) Describe how the heart functions as a double pump.

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(4 marks)

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- (c) Country X is the highest seller of Caribbean Fried Chicken (CFC) throughout the Caribbean. The country also has the highest incidence of heart disease and obesity.

- (i) Explain how consuming excessive amounts of CFC contributes to the development of obesity and heart disease.

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(6 marks)

