FORM TP 2024052

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MAY/JUNE 2024

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

AGRICULTURAL SCIENCE
(Single Award)

Paper 02 – General Proficiency

2 hours

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READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in three sections. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. You may use a silent, non-programmable calculator.
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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DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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SECTION I

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) Define the term 'marketing' as it relates to agricultural production.

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(2 marks)

(b) Mary produces vegetables on her 1-hectare farm. She gathers information from the Ministry of Agriculture's website regarding the demand and selling prices for vegetables in the main market segments in her country. Table 1 shows the quantity demanded and retail prices for each market segment.

TABLE 1: RETAIL PRICES AND QUANTITY DEMANDED FOR MAJOR MARKET SEGMENTS

Market Segment	Quantity Demanded	Retail Price
Hotels	100 kg	$20 per kg
Restaurants	300 kg	$10 per kg
Supermarkets	150 kg	$10 per kg
Greengrocers	200 kg	$6 per kg

(i) Suggest the best market segment to which Mary can supply her vegetables.

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(1 mark)

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(ii) State ONE benefit of having different market segments for agricultural products.

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(1 mark)

(c) James wants to grow tomatoes to sell to different market segments in his country. He is not sure how to go about marketing his produce so he seeks advice from the extension officer.

As the extension officer, outline THREE steps in the marketing process that James can take when marketing his tomatoes. You MUST provide **one** reason for EACH step.

Marketing step .....

Reason .....

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Marketing step .....

Reason .....

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Marketing step .....

Reason .....

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(6 marks)

Total 10 marks

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2. (a) Differentiate between gross margin and net profit.

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(2 marks)

(b) Table 2 shows the income and expenditure of Kushi's poultry farm.

TABLE 2: INCOME AND EXPENDITURE FOR KUSHI'S POULTRY FARM

Income	$
Sale of broilers	1 500
Sale of eggs	1 000
Total income	2 500
Expenses	
Taxes	200
Fuel for machinery	500
Feed	400
Depreciation on machinery	300
Farm labour	1 000
Interest on loan	700
Medicines for bird	600
Insurance	200
Repairs to equipment	300
Total expenses	4 200
Gross margin	–300
Net profit	–1 700

(i) State ONE purpose of preparing income and expenditure statements for a farm enterprise.

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(1 mark)

(ii) From the information in Table 2, identify TWO fixed costs.

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(2 marks)

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(iii) From the information in Table 2, state TWO variable costs.

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(2 marks)

(c) (i) Kushi wants to take a loan from the bank to expand her farm. Using the information from Table 2 **on page 6**, suggest TWO reasons why Kushi would MOST likely be unable to obtain a loan for her farm.

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(2 marks)

(ii) Kushi still wants to be able to obtain a loan from the bank to expand her poultry farm. Suggest ONE action that she would need to undertake to be able to obtain a loan from the bank in the future.

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(1 mark)

Total 10 marks

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SECTION II

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

3. (a) On a recent visit to Timothy's Hillside Farm in a hilly area in your country, Farmer Timothy told your class that topography is a key factor affecting soil fertility in the area.

(i) Define the term 'soil fertility'.

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(2 marks)

(ii) Describe TWO effects of topography on the fertility of the soil on Timothy's Hillside Farm.

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(2 marks)

(iii) Other than topography, state ONE factor that affects soil fertility.

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(1 mark)

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(b) Farmer Timothy is a progressive farmer and wants to ensure that he uses the correct cropping systems to improve and/or maintain the soil fertility on his farm.

(i) Describe TWO possible cropping systems that Farmer Timothy can use to maintain soil fertility on his farm.

Cropping system .....

Description .....

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Cropping system .....

Description .....

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(4 marks)

(ii) Other than using cropping systems, identify ONE additional method that Farmer Timothy can adopt to improve and/or maintain the soil fertility on his farm.

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(1 mark)

Total 10 marks

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4. (a) Figure 1 shows the diagram of a typical plant cell.

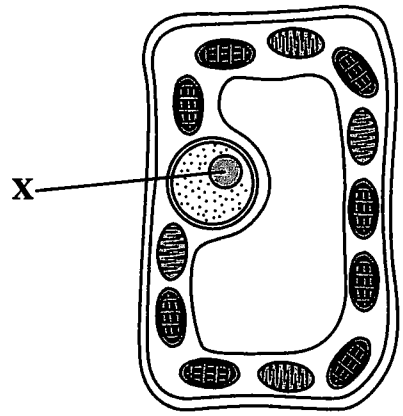


Figure 1. Diagram of a typical plant cell

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(i) State the name of the part labelled X in Figure 1.

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(1 mark)

(ii) State ONE main function of the part labelled X.

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(1 mark)

(iii) State the type of cell division that occurs in the reproductive organs in plants.

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(1 mark)

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(b) Many thin-skin tropical crops cannot be easily exported because they are damaged during handling and shipping. As a result, the Regional Agricultural Research and Development Institute has been working with farmers to develop a new variety of hot pepper for export.

The plant breeder crossed a pure-bred, thick-skin hot pepper with a pure-bred, thin-skin pepper, where **T** represents the allele for thick-skin and **t** represents the allele for thin-skin.

(i) State the genotypes of the parents.

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(2 marks)

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(ii) State the genotypes of the offspring of this cross. Show all working.

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(2 marks)

(iii) Determine how many of the offspring will have a thin-skin phenotype and how many will have a thick-skin phenotype.

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(2 marks)

(c) Some vegetable seeds that are sold in agricultural shops have been produced by commercial seed-producing companies using genetic engineering.

Suggest ONE benefit farmers may get from growing genetically engineered crops.

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(1 mark)

Total 10 marks

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SECTION III

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

5. At a workshop on broiler production, an extension officer showed the information in Table 3 for broiler birds produced by two broiler farmers. He stated that the broiler birds are first slaughtered and dressed before they are sold to the consumer. He further explained that the dressing percentages of the broiler flocks are of economic importance to the two farmers.

TABLE 3: INFORMATION ON BROILER BIRDS PRODUCED BY TWO FARMERS

	Live Weight	Dressed Weight
Farmer A	2 kg	1.5 kg
Farmer B	2 kg	1.6 kg

(a) State the **three** MAIN steps to be followed when dressing a broiler bird.

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(3 marks)

(b) Suggest ONE way in which dressing percentage is of economic importance to the farmers.

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(1 mark)

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(c) Calculate the dressing percentage for the broiler flock of

(i) Farmer A

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(ii) Farmer B.

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(4 marks)

(d) Using your calculations for Farmer A and Farmer B in part (c), identify the farmer who would have earned more money from the sale of his broilers. Give ONE reason for your answer.

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(2 marks)

Total 10 marks

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6. Farmer Ben inherited five hectares of land in the countryside and wants to set up an apiary to produce honey for sale.

(a) Suggest THREE factors Farmer Ben must consider when siting an apiary for his bees if he wants to maximize honey production.

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(3 marks)

(b) Farmer Ben wants to increase his honey production. He was informed that worker bees are a critical part of the honey production process.

Describe TWO ways in which the social activities of the worker bees would contribute to increased honey production in Farmer Ben's hives.

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(4 marks)

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(c) Farmer Ben sells his honey to a large supermarket chain but there are complaints about the poor quality of the honey.

(i) Suggest ONE cause for the poor quality of the honey produced by Farmer Ben.

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(1 mark)

(ii) Suggest TWO management practices Farmer Ben can implement to prevent the production of poor quality honey.

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(2 marks)

Total 10 marks

END OF TEST

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

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