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C A R I B B E A N E X A M I N A T I O N S C O U N C I L

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

AGRICULTURAL SCIENCE
(Single-Award)

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. There are nine questions in this booklet, six in Section I and three in Section II. Answer **ALL** questions.

2. Each question in Section I carries 4 marks. Each question in Section II carries 12 marks.

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

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) State TWO factors that may affect food security in the Caribbean.

_____

_____

(2 marks)

(b) Belair Hotel Chain requires high quality eggs that are safe to consume. Suggest TWO good agricultural practices that farmers should follow to supply eggs to the hotel.

_____

_____

(2 marks)

Total 4 marks

2. (a) A farmer wants to harvest a 25-hectare plot of corn (*Zea mays*). He cannot harvest manually by himself.

State TWO possible ways to overcome this problem.

_____

_____

(2 marks)

(b) Figure 1 is a graph showing the effect of adding various quantities of fertilizer to a crop of corn.

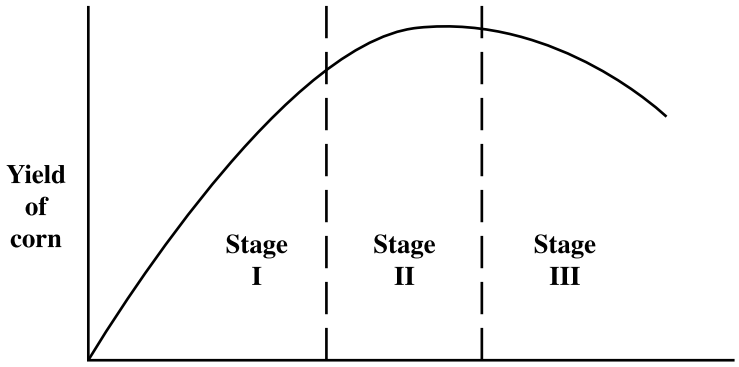


Figure 1. Effect of adding various quantities of fertilizer to a crop of corn

Describe the effect of fertilizer on yield of corn, during Stages I and II of the production cycle.

_____

_____

_____

(2 marks)

Total 4 marks

3. Figures 2a and 2b represent the soil profile of two different soils. Study the soil profiles and answer the questions which follow.

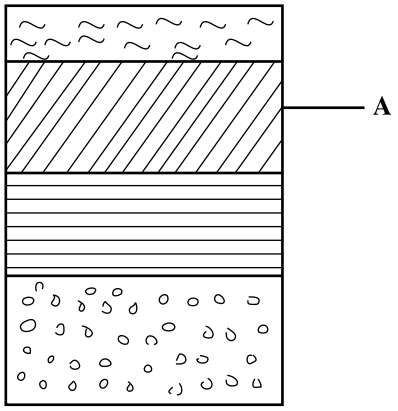


Figure 2a. Soil profile of Soil X

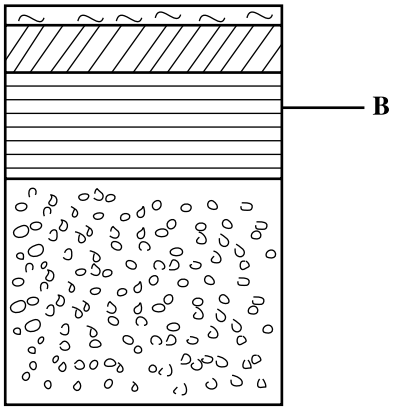


Figure 2b. Soil profile of Soil Y

(a) Identify the layers labelled A and B.

A _____

B _____

(2 marks)

(b) Which of the two soils, X or Y, is likely to be **more** fertile? Give ONE reason for your answer.

More fertile soil _____

Reason _____

_____

_____

(2 marks)

Total 4 marks

4. (a) State TWO pieces of protective clothing to be worn when using a knapsack sprayer.

_____

_____

(2 marks)

(b) Figure 3 is a graph showing rainfall from December to June for a Caribbean country in which Farmer Joe plants sweet peppers.

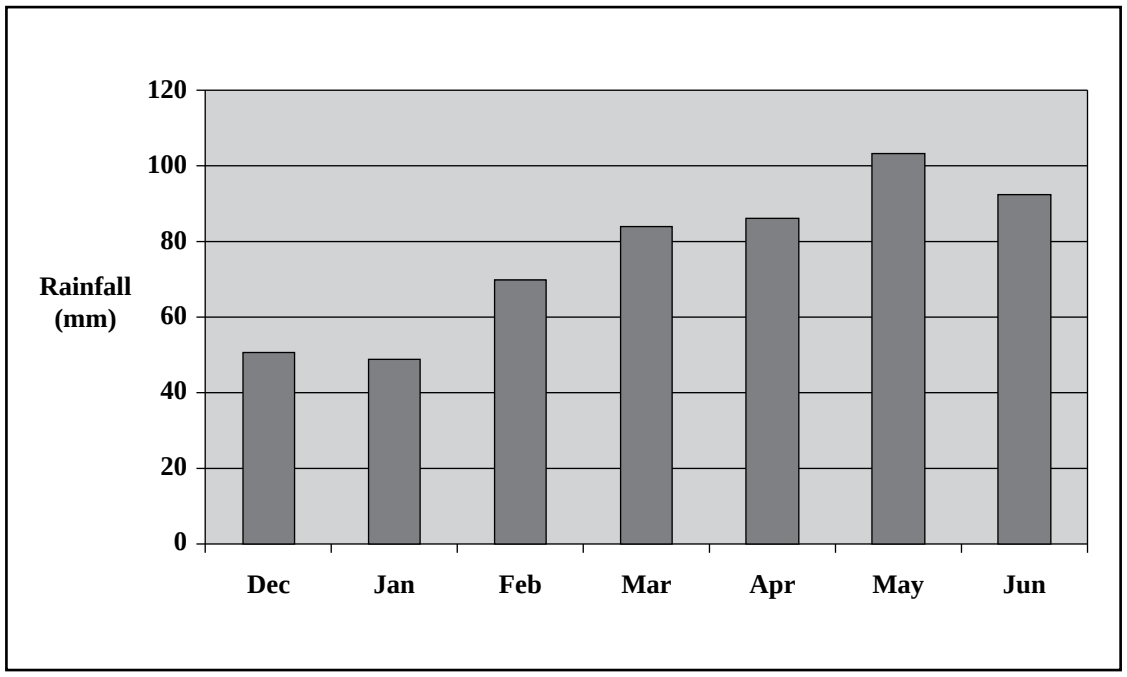


Figure 3. Rainfall from December to June

(i) Farmer Joe observes wilting throughout his field of sweet peppers. In which month is this MOST likely to occur?

_____

(1 mark)

(ii) Suggest ONE way in which wilting affects the yield of the crop.

_____

(1 mark)

Total 4 marks

5. Figure 4 is a drawing showing a technique used in rearing cows.

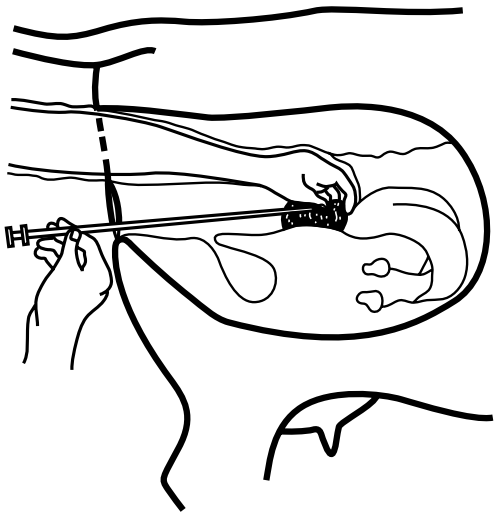


Figure 4. Technique used in rearing cows

(a) Identify the technique shown in Figure 4.

_____

(1 mark)

(b) Describe this technique.

_____

_____

(1 mark)

(c) Suggest TWO reasons why this technique is highly recommended.

_____

_____

(2 marks)

Total 4 marks

6. (a) What is meant by the term 'balanced ration'?

_____

_____

(2 marks)

(b) A farmer has two rations, one containing 16% crude protein and the other, 20% crude protein. Suggest which crude protein level is MOST likely present in a starter ration. Give ONE reason for your answer.

Crude protein level: _____

Reason: _____

_____

(2 marks)

Total 4 marks

SECTION II

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

7. (a) The rising price of wheat on the world market has led to increases in the price of flour in a Caribbean island. The government has decided to substitute 20% of wheat flour with cassava flour.

State THREE subsidies or incentives that the government could provide to farmers to encourage the expansion of cassava production.

_____

_____

_____

(3 marks)

(b) Farmer Mary has prepared a complete budget for producing sweet potato on 10 hectares of land. She decides to purchase a tractor to assist in the clearing of land, instead of using a hired tractor service which costs $110 per hectare.

Table 1 shows Mary's projections for the tractor.

TABLE 1: BUDGET PROJECTIONS FOR A TRACTOR

Items	**$**
Purchase of tractor	12 000
Net disposable value of tractor (after five years)	3 000
Additional Costs:	
Annual depreciation	?
Repairs	200
Fuel	400
Interest on tractor loan	1 000
Insurance on tractor	100
Labour (to drive tractor)	300

(i) What type of budget should Mary do for the change in her plans, that is, to buy a tractor instead of hiring a tractor?

_____

(1 mark)

(ii) Identify TWO fixed costs and TWO variable costs in Table 1.

Fixed costs _____

Variable costs _____

(3 marks)

(iii) Calculate the annual depreciation on the tractor, using the following formula:

$$\frac{\text{Cost of tractor} - \text{net disposable value of tractor}}{5} = \text{Depreciation}$$

(1 mark)

(iv) Mary also decides that she will rent her tractor at a cost of $100 per hectare to the other farmers in her district, who farm on a total of 50 hectares. Calculate the additional income that Mary will gain from renting the tractor to the other farmers. (**Show your working**.)

(2 marks)

(v) Calculate net change in profit or loss, using the following formula:

Net change in profit/loss = Additional Income calculated in (iv) – Additional Costs (shown in Table 1)

(2 marks)

Total 12 marks

GO ON TO THE NEXT PAGE

8. (a) IPM means Integrated Pest Management.

(i) Explain the concept of IPM.

_____

_____

_____

(2 marks)

(ii) State ONE advantage of IPM.

_____

_____

(1 mark)

(b) Mr Singh is a cabbage farmer who practises monocropping on a one-hectare plot of land. Lately his cabbage crop is not growing well because of high levels of weed infestation.

(i) Suggest THREE different IPM measures (other than chemical) which Mr Singh could use to control the weeds **and** for EACH measure, explain how it will lead to a reduction in weed infestation.

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6 marks)

(ii) Suggest a cropping system, other than monocropping, that will lead to a reduction in weed infestation in Mr Singh's cabbage plot **and** briefly explain how it will lead to a reduction in weed growth.

_____

_____

_____

_____

(3 marks)

Total 12 marks

GO ON TO THE NEXT PAGE

9. (a) Farmer Stacy is a successful bee farmer. Briefly state THREE daily or weekly practices that Farmer Stacy must carry out at her apiary.

_____

_____

_____

(3 marks)

(b) An aquaculture farmer decided to compare the grow-out period of hand-sexed male tilapia with that of hormone-treated males.

Table 2 shows the growth of male tilapia using the two methods of sexing of the males.

TABLE 2: DATA ON GROWTH OF TILAPIA

Treatment	Weight at Grow-Out Period			Feed Conversion Ratio (FCR)
	3 months (kg)	4 months (kg)	6 months (kg)	
Hand-sexed males	1	3	3	2.5
Hormone-treated males	2	2	6	1.5

(i) Compare hand-sexed males and hormone-treated males with respect to:

Growth _____

_____

_____

_____

FCR _____

_____

(3 marks)

(ii) After successive grow-out periods of using male and female tilapia species, the farmer noticed that the fish at harvest was stunted in growth. Suggest THREE reasons for the poor growth of the tilapia.

_____

_____

_____

(3 marks)

(c) Aquaculture farmers in a Caribbean country are facing several problems in the marketing of their produce.

Suggest THREE possible ways that the farmers themselves and government agencies can assist in the marketing of tilapia.

_____

_____

_____

_____

_____

_____

(3 marks)

Total 12 marks

END OF TEST

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