FORM TP 2022048

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MAY/JUNE 2022

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

AGRICULTURAL SCIENCE
(Single Award)

Paper 02 – General Proficiency

2 hours

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.**

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. Figure 1 shows a hydroponics system.

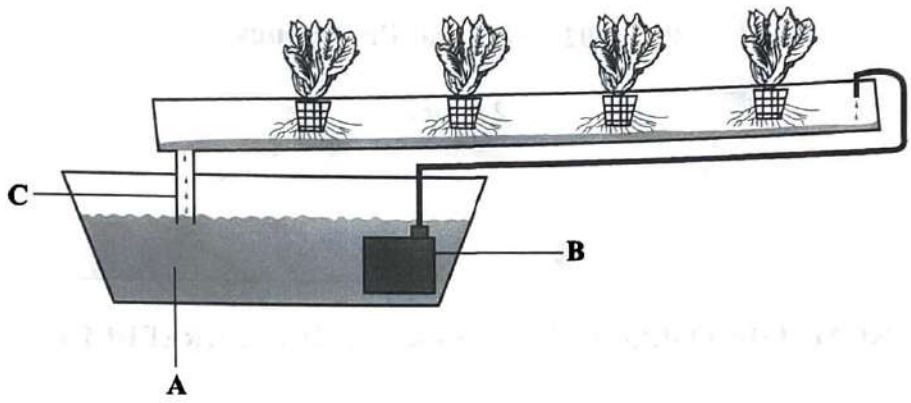


Figure 1. Hydroponics system

(a) (i) Name the components in the hydroponics system labelled A and B in Figure1.

A .....

B .....

(2 marks)

(ii) State the name of the process that takes place at the part labelled C in Figure 1.

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(1 mark)

(b) Sasha lives in an apartment complex in the city. She wants to grow vegetables at her apartment using a hydroponics system but the water supply is not reliable.

Suggest TWO advantages and ONE disadvantage of using a hydroponics system to grow vegetables.

Advantages

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(2 marks)

Disadvantage

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(1 mark)

(c) The farmers in Linstead village complained to their extension officer that they had been advertising for farm workers, but were not successful in obtaining the required number. However, they noticed that there was an increase in youth unemployment in the village.

(i) Suggest TWO reasons for the problem outlined in the scenario above.

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(2 marks)

(ii) Suggest TWO possible solutions to address this problem.

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(2 marks)

Total 10 marks

2. (a) Farmer Vickram cultivates tomatoes. An extension officer advises Farmer Vickram that using fertilizer will improve the yield of his tomatoes. Figure 2 shows the effect of fertilizer application on the yield of tomatoes on Vickram's farm.

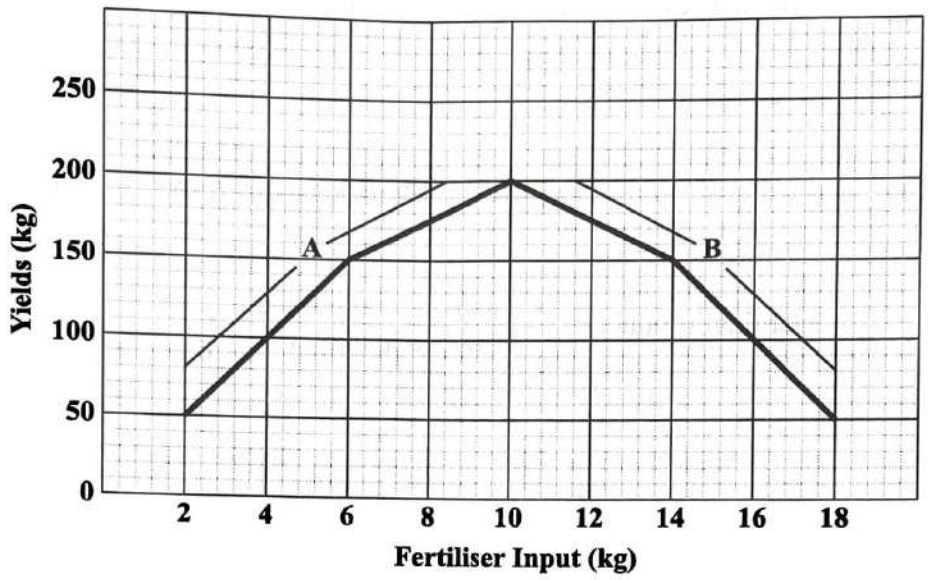


Figure 2. Effect of fertiliser application on yield of tomatoes

(i) Explain the effect of the use of fertilizer on the yield of tomatoes at points A and B on the graph.

A .....

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B .....

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(2 marks)

(ii) Using the information in Figure 2, advise Farmer Vickram of the following:

a) Maximum yield that can be obtained by adding fertilizer to his tomato crop.

.....

b) Maximum amount of fertilizer that should be used in his tomato crop.

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(2 marks)

(iii) The graph in Figure 2, **on page 7**, illustrates an economic law that is referred to during the production process.

State the name of the law that this graph depicts.

.....

(1 mark)

(iv) Calculate the marginal product when the farmer moves from using 4 kg of fertilizer to 6 kg of fertilizer.

$$\text{Marginal Product} = \frac{\text{Change in total product}}{\text{Change in output}}$$

.....

(2 marks)

(b) Sanya is a poultry farmer. She went to the Agricultural Credit Bank in her country to obtain a loan. Sanya gave her labour records to the loan officer with her loan application. The loan officer told Sanya that she needed to present other types of records to help him determine if she would qualify for the loan.

(i) State ONE reason why the labour records alone would not help Sanya to obtain a loan.

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(1 mark)

(ii) Suggest TWO other records that Sanya must provide to the loan officer to be considered for a bank loan.

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(2 marks)

Total 10 marks

SECTION II

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

3. (a) On a recent field trip to an agricultural research station, it was explained that the soil profile plays a key role in determining the suitability of an area for agricultural production.

Figure 3 represents a typical soil profile of the area.

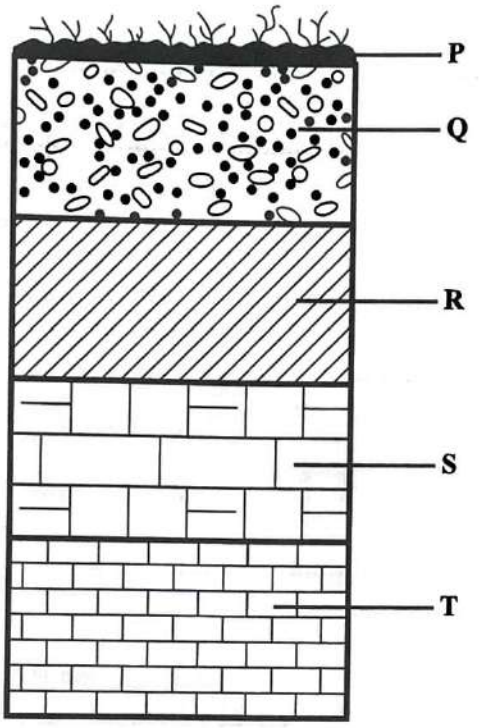


Figure 3. A typical soil profile

(i) State the name of the layers labelled Q and R.

Q.....

R.....

(2 marks)

(ii) Which layer in the soil profile is responsible for influencing the mineral content of the soil?

.....

(1 mark)

GO ON TO THE NEXT PAGE

(iii) Farmer Sam cultivates vegetables intensively on his 1-hectare farm in the area. The extension officer told him that in the soil profile, layer P is the litter layer and on his farm this layer was too thin.

Advise Farmer Sam on TWO cultural practices he can use to improve the thickness of layer P in the soil on his farm.

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(2 marks)

(b) At the research station, an experiment was conducted to determine water retention in three different soil types, A, B and C. Three funnels were lined with filter paper and each of them was placed over a measuring cylinder. One hundred grams of each type of soil, A, B and C, which was air dried, was placed in the three funnels and 100 ml of water was poured over the soil in each. The water draining from the soil (filtrate) was collected in each case in the measuring cylinder. The experiment lasted for 30 minutes. Figure 4 shows the results for each of the soil samples.

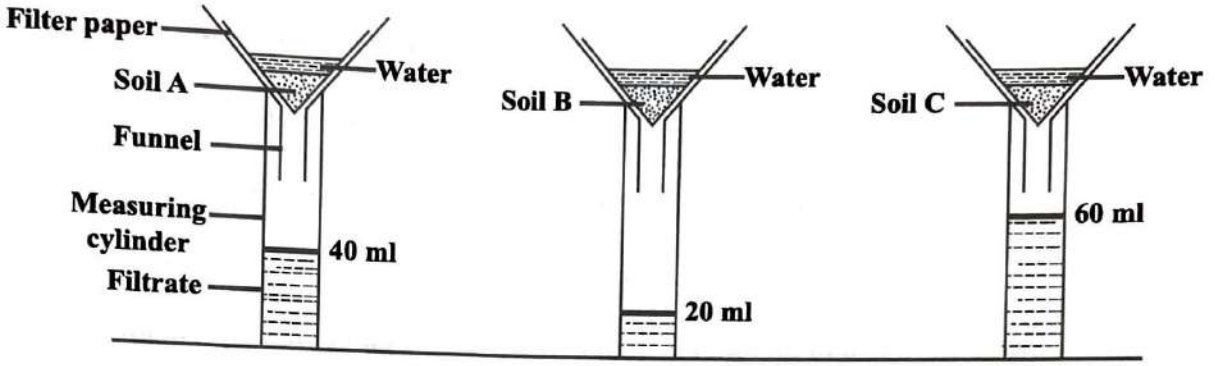


Figure 4. Results of water retention in soil experiment

(i) Identify the soil types which are MOST likely to produce the results in B and C.

B .....

C .....

(2 marks)

(ii) Soil Sample B was obtained from Farmer Indar's Vegetable Farm. Identify ONE problem he may encounter in his soil during the rainy season.

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(1 mark)

(iii) Suggest TWO methods that Farmer Indar can use to alleviate the problem identified in (b) (ii).

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(2 marks)

Total 10 marks

4. (a) On a recent visit to Joel's tomato plot, it was observed that most of the tomatoes were lying on the ground and rotting. Joel was advised that there are several methods available that he can use to preserve his crop.

(i) State ONE advantage of preserving crops.

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(1 mark)

(ii) Suggest ONE method that can be used to preserve tomatoes.

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(1 mark)

(b) (i) After speaking with Joel you realized that he is not sure about when to harvest his tomato crop. Advise Joel on ONE sign he can look for to determine if his tomato fruits are ready for harvesting.

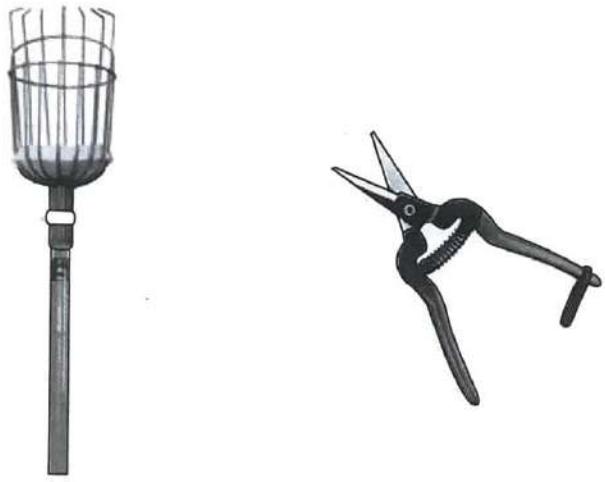
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(1 mark)

(ii) Figure 5 shows two tools that can be used to harvest crops.



X **Y**

Figure 5. Two harvesting tools

Which of the tools, X or Y, is MORE appropriate for Joel to use to harvest his tomato fruits? Give ONE reason to support your answer.

Tool .....

Reason .....

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(2 marks)

(iii) Outline THREE main steps Joel should follow when harvesting his tomato fruits that are at the correct stage of maturity.

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(3 marks)

(iv) Farmer Amy advised Joel that he needs to sanitize his harvesting knife with a sanitizing agent after harvesting each row of plants.

State TWO reasons why harvesting tools should be regularly sanitized during harvesting.

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(2 marks)

Total 10 marks

SECTION III

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

5. (a) Figure 6 shows a breed of goat found in the Caribbean.

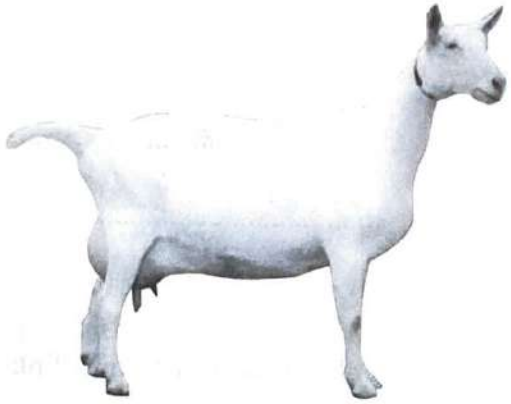


Figure 6. Breed of goat found in the Caribbean

(i) Identify the breed of goat shown in Figure 6.

.....

(1 mark)

(ii) State TWO purposes for which this breed of goat is reared.

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(2 marks)

(b) Farmer Jeff produces broiler birds. He noticed that his current batch of birds looked droopy and had diarrhoea with blood streaks in their droppings.

(i) Identify the disease that is affecting this batch of boiler birds and state the agent that caused this disease.

Disease .....

(1 mark)

Agent .....

(1 mark)

(ii) Suggest THREE ways Farmer Jeff can control this disease on his farm.

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(3 marks)

(iii) Advise Farmer Jeff on TWO recommendations that he should adopt as part of a total disease management programme on his broiler farm.

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(2 marks)

Total 10 marks

6. (a) The diagram in Figure 7 shows the digestive system of poultry.

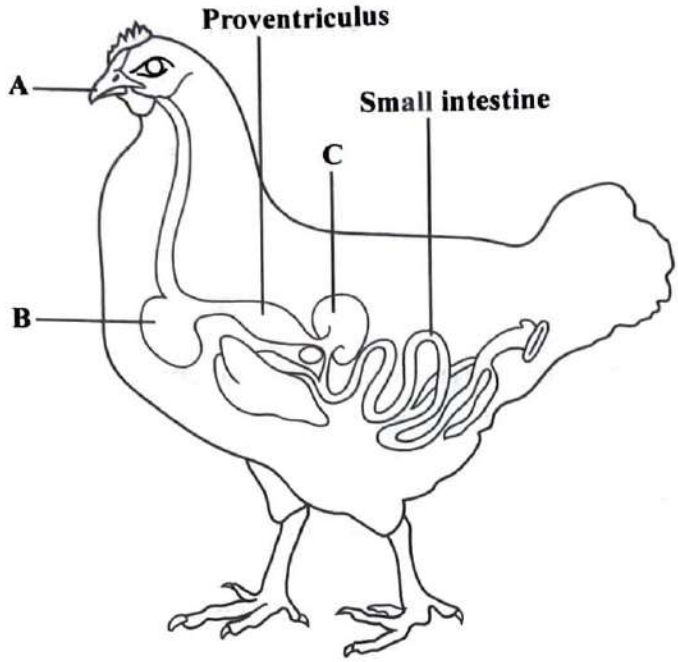


Figure 7. Digestive system in poultry

(i) Name the parts labelled A, B and C in Figure 7.

A .....

B .....

C .....

(3 marks)

(ii) Explain ONE similarity and ONE difference in function between the proventriculus and the small intestine.

Similarity .....

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(1 mark)

Difference .....

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(2 marks)

(b) On a recent field trip to a mixed livestock farm, it was observed that the farmer was feeding concentrates to the mature pigs and a mixture of concentrates and herbage to the mature goats.

For EACH class of animal, provide TWO reasons why the different types of feeding materials were fed.

Pigs .....

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(2 marks)

Goats .....

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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.