FORM TP 2022046

TEST CODE **01202030**

MAY/JUNE 2022

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

AGRICULTURAL SCIENCE (Double Award)

Paper 03 – 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: Entrepreneurship and Communication

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

1. (a) Define the term 'entrepreneur'.

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(2 marks)

(b) Charlie is a new entrepreneur. He wants to set up an aquaponics operation on lands leased from his neighbour but does not have the start-up capital. He used his car as collateral to secure a large loan from the bank to establish his operation. Charlie intends to use his training as an agricultural engineer to design and build a state-of-the-art aquaponics system, which would be the only one in the country. He wants to sell the produce and fish to a local supermarket using his own brand and packaging.

From the scenario above, identify TWO characteristics of an entrepreneur that are displayed by Charlie.

Provide evidence from the scenario to support EACH response.

Characteristic .....

Explanation .....

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Characteristic .....

Explanation .....

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(4 marks)

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(c) Santana is the marketing manager of a meat processing company. She wants to use product demonstrations at supermarkets to persuade consumers to buy the meat products.

(i) State ONE advantage and ONE disadvantage of Santana's use of product demonstrations to persuade consumers to buy the company's meat products.

Advantage .....

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Disadvantage .....

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(2 marks)

(ii) Identify TWO other communication tools that Santana can use to market meats processed by her company.

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(2 marks)

Total 10 marks

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2. (a) State TWO characteristics of a sole trader.

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(2 marks)

(b) Rachel produces sweet potatoes on a one-hectare farm. She lives in a farming community, where the farmers mainly produce sweet potatoes for sale to one middleman.

Rachel has no experience in cultivating sweet potatoes, so she mainly relies on her workers' knowledge and experience. Recently, her friend, who is a graduate of an agricultural college visited the farm and observed that the yields were very low. In response, Rachel complained that she could not afford to purchase the required fertilizer and other farm inputs because she does not have enough money. She is unable to sell most of her tubers to the middleman because they are damaged during harvest.

Rachel does not know what is her expenditure. She only knows her income because the middleman pays her when he receives the produce.

Rachel wants your advice on how to transform her failing farm enterprise into a success.

Identify THREE problems that are contributing to the failure of Rachel's farm enterprise and suggest ONE solution to EACH of the problems identified.

Problem .....

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Solution .....

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Problem .....

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Solution .....

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Problem .....

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Solution .....

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(6 marks)

(c) Marcus operates a tractor service for farmers in his community. His only tractor recently broke down and he wants to purchase the parts from another country. He heard that the internet is a good communication tool for finding potential suppliers. He has found the names of three potential suppliers for his tractor. He wants to contact them by email.

Advise Marcus of ONE advantage and ONE disadvantage of using emails to communicate with potential suppliers.

Advantage .....

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Disadvantage .....

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(2 marks)

Total 10 marks

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SECTION II: Crop Management Technologies

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

3. (a) Some farmers in your area who grow vegetables under rain-fed conditions attended a workshop on crop production. The extension officer advised the farmers that using irrigation in the dry season can be very beneficial. The farmers were trained in the use of different irrigation methods and the factors that would influence the use of the various types of irrigation systems.

(i) Suggest THREE methods of irrigation that farmers can use during the dry season to cultivate vegetable crops.

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(3 marks)

(ii) Describe TWO factors that a farmer would need to consider in determining the MOST suitable irrigation system for his farm.

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(4 marks)

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(b) Farmer John recently planted a crop of tomatoes on a one-hectare plot. He wants to use NPK fertilizer with a ratio of 20:10:10 to fertilize his tomato crop. It is recommended that the tomato crop be fertilized with 150 kg of nitrogen per hectare during the vegetative stage.

Calculate the quantity of NPK fertilizer needed to fertilize the one-hectare plot of tomatoes. Show all working.

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(3 marks)

Total 10 marks

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4. (a) Raj is a landscaper and has many residential clients in a nearby town. He maintains all his clients' lawns and is responsible for disposing of the plant waste and any other waste materials he encounters while working.

His friend Judy suggests that instead of transporting the waste plant material to the Central City Dump he should consider making compost which he can sell to his clients.

Identify TWO types of materials that should NOT be composted, giving ONE reason for each choice.

Material .....

Reason .....

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Material .....

Reason .....

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(4 marks)

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(b) Raj and Judy attended a training session on compost making at the Farmers' Training Centre. The extension officer told them that the compost should be kept moist and turned regularly.

(i) Explain ONE reason for each of these recommendations.

Keeping the compost moist .....

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Turning the compost .....

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(2 marks)

(ii) The following tools, A and B, are used for turning a compost heap.



A



B

Judy has a compost heap in her backyard. Which of the tools, A or B, is MOST suitable for her to use to turn the compost heap?

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(1 mark)

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(c) Raj purchased a batch of heliconia plants from Arielle's plant nursery. When he received the plants he observed that they were infected with root rot. The plant pathologist told Raj that Arielle did not use sterilized potting medium when she transplanted the plantlets.

(i) Suggest ONE reason for sterilizing potting soil medium.

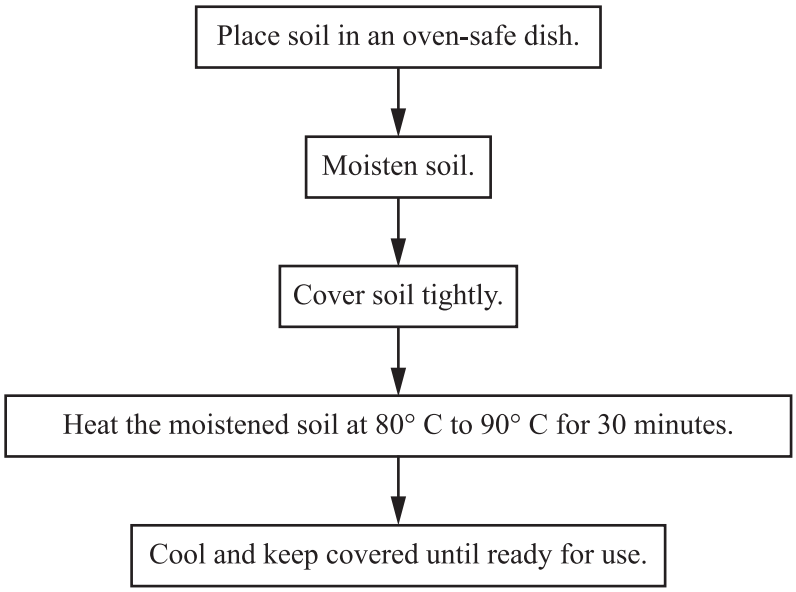
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(1 mark)

(ii) The diagram below outlines the steps required to sterilize a batch of soil.



Explain TWO reasons why the moistened soil is heated at 80 °C to 90 °C for 30 minutes.

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(2 marks)

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SECTION III: Animal Management Technologies

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

5. (a) Farmer Amy recently purchased a ten-hectare farm with the intention of supplying a large supermarket chain with pork on a weekly basis. The extension officer advised her that she would need to construct a new piggery for housing her pigs if she wants to rear pigs on a commercial basis.

(i) Advise Farmer Amy on the types of materials she should consider for the floor and roof of her piggery and give ONE advantage of using each type of material selected.

Floor

Material .....

Advantage .....

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Roof

Material .....

Advantage .....

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(4 marks)

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(ii) On a recent visit to the Pig Research Station, Amy learnt that care must be taken to ensure that the length of the building is properly oriented in the correct direction.

Advise Farmer Amy on the recommended orientation for the piggery and give ONE reason for your recommendation.

Orientation .....

Reason .....

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(2 marks)

(b) Joel is a dairy farmer who sells milk to a milk processing plant. Recently, the milk processing plant rejected his milk. Further investigations revealed that his milking machine was not being properly maintained, which resulted in many of his cows contracting mastitis. This affected the quality of his milk.

Advise Farmer Joel on FOUR steps he should take to care for and maintain his milking machine in order to prevent an outbreak of mastitis on his farm.

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(4 marks)

Total 10 marks

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6. (a) Farmer Rene has a reputation for providing quality piglets at a premium price to farmers. Farmer Bruce prefers to buy his piglets from Farmer Rene because he believes the management practices used in caring for and handling the piglets contribute to Farmer Rene producing high quality piglets for sale.

Explain TWO piglet management practices used on Farmer Rene's farm that contribute to the production of high quality piglets. Give details to show how EACH management practice leads to the production of high quality piglets.

Management practice .....

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Explanation .....

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Management practice .....

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Explanation .....

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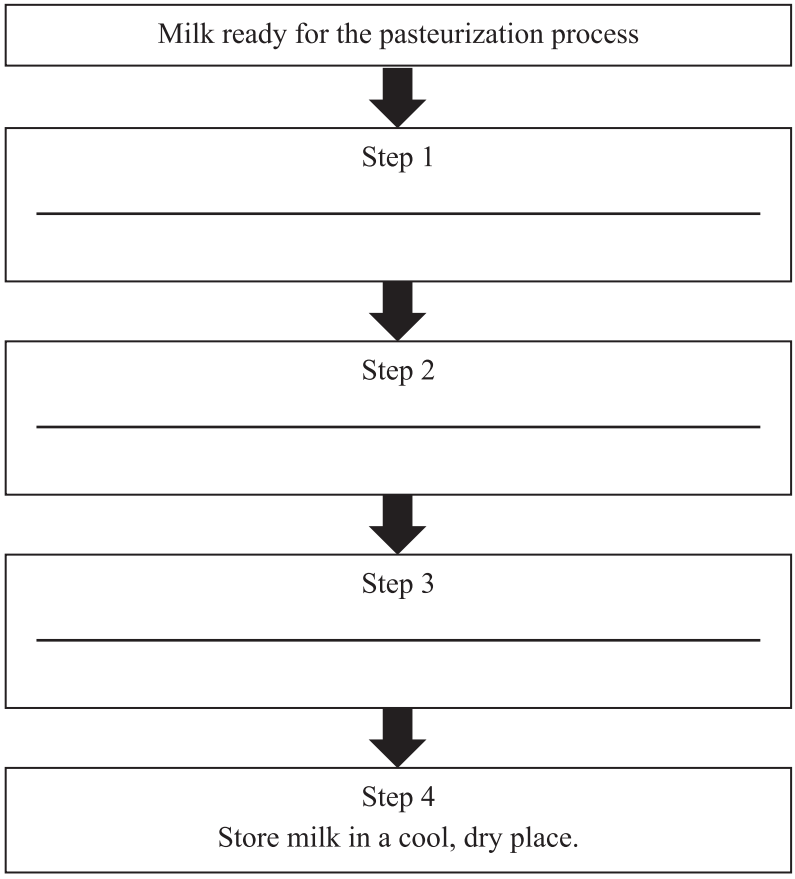
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(4 marks)

(b) Animal products are an important source of nutrients for humans but due to their high perishability, several different processes are used to prevent food spoilage. Pasteurization is one way of treating milk to prevent spoilage.

(i) Complete the diagram below by inserting the THREE missing steps in the pasteurization of milk.



(3 marks)

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(ii) On a recent visit to the supermarket, Kelly noticed that there was a wide array of pasteurized juices for sale. She saw comments on social media indicating that pasteurized juices should not be consumed.

Suggest TWO advantages and ONE disadvantage of pasteurization as a method of preserving food.

Advantages .....

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(2 marks)

Disadvantage .....

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(1 mark)

Total 10 marks

END OF TEST

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

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