FORM TP 2022091

TEST CODE 01230020

MAY/JUNE 2022

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INTEGRATED SCIENCE

Paper 02 – General Proficiency

2 hours 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections.
2. Section A consists of FOUR questions. Answer ALL questions. Write your answers in the spaces provided in this answer booklet.
3. Section B consists of TWO questions. Answer ALL questions. Write your answers on the pages provided at the end of each question.
4. Do NOT write in the margins.
5. You may use a silent, non-programmable calculator to answer questions.
6. 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.**
7. **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 FOUR questions.

1. (a) The improper disposal of garbage and human waste has resulted in the pollution of the world's water bodies.

(i) List THREE methods that can be used to purify water for drinking.

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(3 marks)

(ii) Describe any ONE of the three methods listed in (a) (i).

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(2 marks)

(b) Discarded plastic waste items have formed large islands made out of garbage in the ocean.

(i) Explain ONE way in which plastics may negatively impact aquatic life.

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(3 marks)

(ii) Suggest THREE measures that countries could utilize to ensure that they do not contribute to the formation of garbage islands.

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(3 marks)

(c) The Government of Country Y developed a mega farm close to the mouth of a river. Explain how establishing the farm near the river may negatively impact aquatic life.

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(3 marks)

(d) Company X accidentally released effluents into a nearby river. A quality monitoring exercise was carried out by the company to determine the impact of the effluents released on the amount of dissolved oxygen in the river. The monitoring exercise showed that the oxygen level present before the river was polluted was 6.5 ppm. Table 1 shows the results of the monitoring exercise.

TABLE 1: RESULTS OF WATER QUALITY MONITORING EXERCISE

Distance Away From the Source of Pollution (M)	Dissolved Oxygen (ppm)
10	1
20	2
30	3
40	4
50	5
60	6

(i) On the axis provided **on page 7**, plot a graph of distance away from the source of pollution (m) against dissolved oxygen to represent the data in Table 1. Draw a line of best fit through the points. **(6 marks)**

(ii) Label the axes on the graph. **(2 marks)**

(iii) Using the graph **on page 7**, determine the distance at which the river returned to the oxygen level that was present before it was polluted (6.5 ppm).
(1 mark)

(iv) Describe the trend in the amount of dissolved oxygen in the water as the distance away from the source of pollution increases.

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(1 mark)

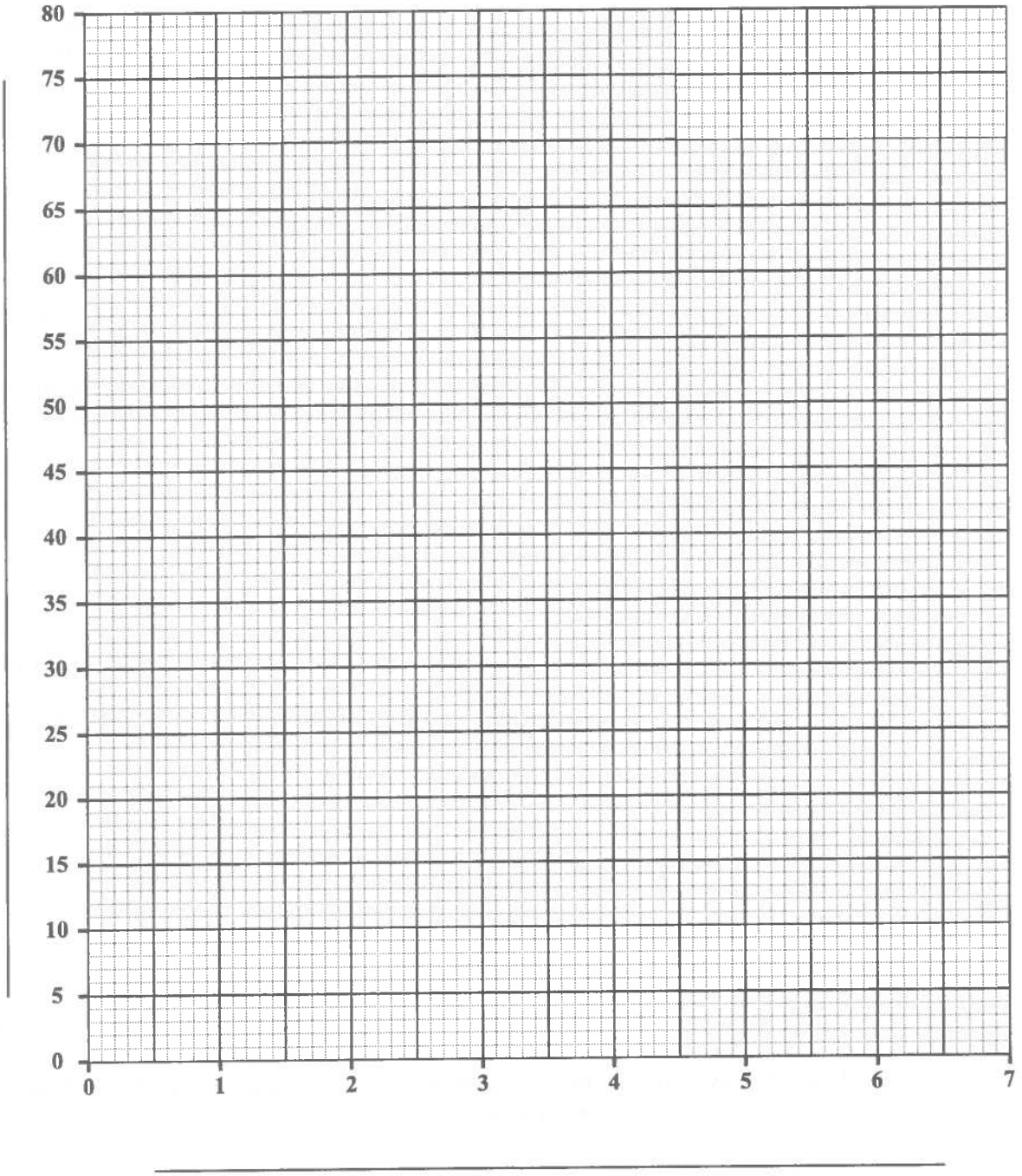
(v) State ONE conclusion that can be made about the impact of the effluents released on the amount of dissolved oxygen in the river.

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(1 mark)

Total 25 marks

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80
75
70
65
60
55
50
45
40
35
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25
20
15
10
5
0
0
1
2
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4
5
6
7

2. (a) The electricity company is about to install overhead power lines in your area.

(i) Using the formula $P = I \times V$, calculate the power in the lines when the voltage is 6400 V and the current flow/flow of current is 800 A. Show your working.

(2 marks)

(ii) Using the formula energy consumption = power × time, calculate the amount of energy consumed in the lines as they supply power to 100 houses for 16 hours.

(1 mark)

(iii) Use the power calculated in (a) (i) to determine the energy produced, in kWh, after four hours. Show your working.

(2 marks)

(b) Mrs Eckles believes that the fuse in her toaster tends to stop working often and she wants to try to fix it before purchasing a new one.

(i) Define the term 'fuse'.

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(1 mark)

(ii) Explain how a fuse protects an appliance such as a toaster.

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(3 marks)

(c) (i) Complete Table 2 by providing labels to identify the colour codes for EACH of the wires used in wiring a house.

TABLE 2: COLOUR CODES FOR WIRES USED IN WIRING A HOUSE

Type of Wire	Colour Code
Live wire (L)	
Neutral wire (N)	
Earth wire (E)	

(3 marks)

(ii) List THREE first-aid strategies that could be employed to help a victim who received an electric shock.

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(3 marks)

Total 15 marks

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3. (a) Define the term 'energy' and state the unit in which it is measured.

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(2 marks)

(b) Complete the flow chart in Figure 1 below by describing the energy changes that take place in the internal combustion engine of a car.

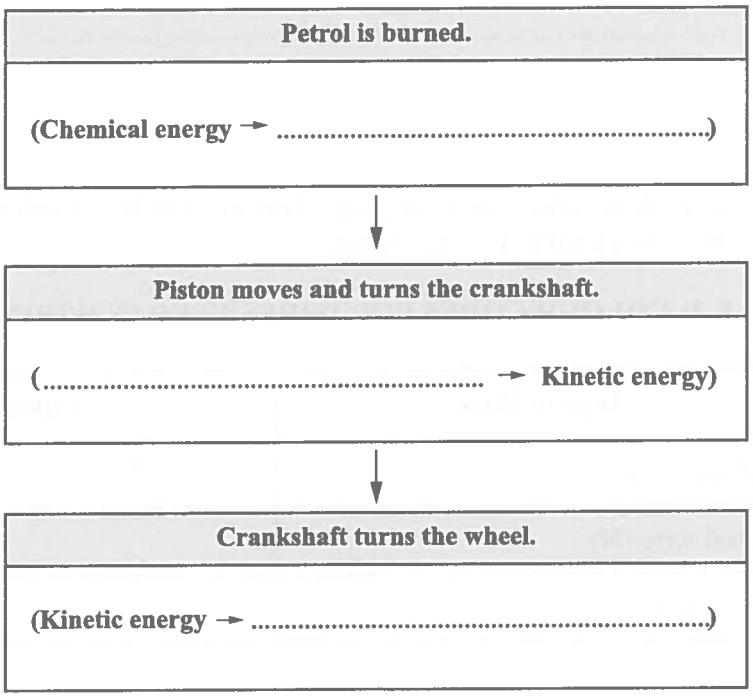


Figure 1. Flow chart of energy changes in an internal combustion engine

(3 marks)

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(c) The law of conservation of energy states that energy cannot be made or destroyed. Explain what happens to energy when it is used.

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(3 marks)

(d) Pollution from the use of fossil fuels is known to cause environmental damage.

(i) Explain ONE negative impact of the use of fossil fuels on the environment.

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(3 marks)

(ii) Recommend TWO ways in which individuals could reduce the negative impacts of the usage of fossil fuels. Give ONE reason for EACH recommendation.

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(4 marks)

Total 15 marks

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4. (a) Complete Figure 2 by identifying EACH of the layers of a soil profile labelled A, B, C, D and E.

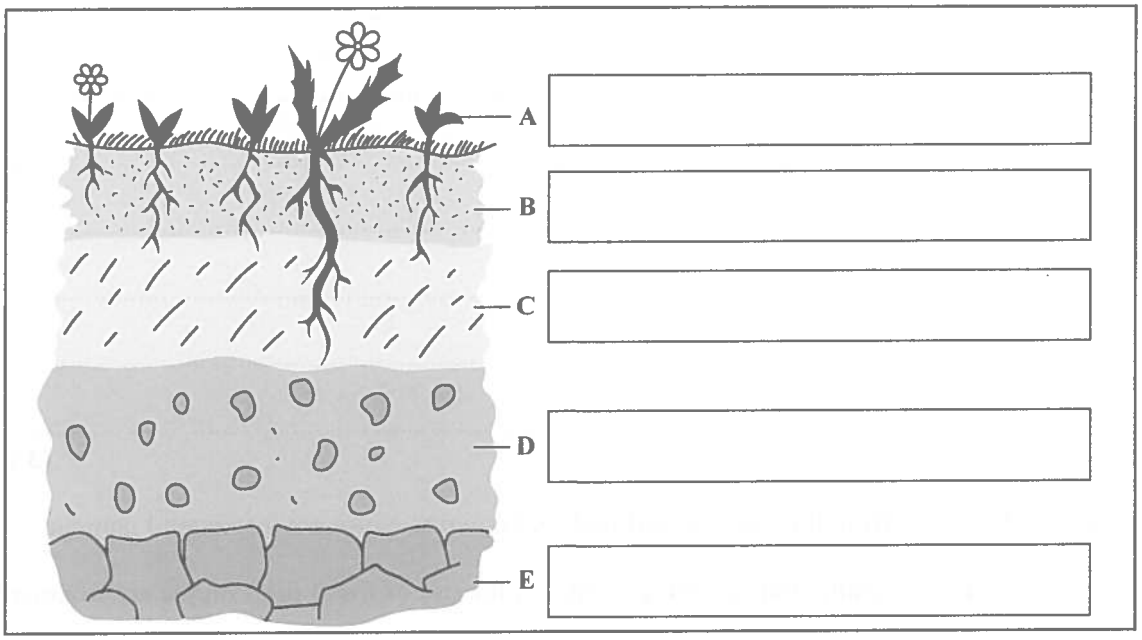


Figure 2. Diagram of a soil profile

(5 marks)

(b) The pH of Layer C is 5.5. Based on the pH value, classify Layer C as either acidic, basic or neutral.

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(1 mark)

(c) Mr Thomas has started a kitchen garden in his backyard. However, the plants are not growing as well as expected.

Explain how the pH of the soil could be impacting soil fertility.

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(3 marks)

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(d) Explain the importance of EACH of the following components of soil.

(i) Humus

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(3 marks)

(ii) Air

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(3 marks)

Total 15 marks

SECTION B

Answer BOTH questions.

5. (a) Define the term 'biodegradable'.

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(1 mark)

(b) Shipping vessels usually dock at ports with a number of waste items on board. Classify EACH of the following waste items found on a ship as either biodegradable or non-biodegradable.

(i) Expired food .....

(ii) Plastic food containers .....

(iii) Glass beverage bottles .....

(iv) Styrofoam cups .....

(4 marks)

(c) Explain why proper waste management is important.

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(3 marks)

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(d) Small rodent droppings were noticed around a vessel that docked at a port. Recommend TWO sanitary measures that may be used to eliminate the rodents. Give ONE reason for EACH sanitary measure recommended.

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(4 marks)

(e) Explain how biogas production could assist with waste management on the vessels.

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(3 marks)

Total 15 marks

6. (a) Describe the following methods of fishing that are used in the Caribbean.

(i) Harpoon

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(2 marks)

(ii) Trapping (use of fishing pots)

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(2 marks)

(b) List THREE methods of fishing, other than harpoon fishing and trapping (use of fishing pots), that are practised in the Caribbean.

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(3 marks)

Some fishermen would like to use metal fishing pots. However, they are concerned about rusting.

(c) Discuss how the environment in which the fishermen work could contribute to the rusting of the fishing pots.

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(4 marks)

(d) Discuss ONE method that could be used to prevent rusting of the fishing pots.

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(4 marks)

Total 15 marks

END OF TEST

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