FORM TP 2021090

TEST CODE **01230020**

MAY/JUNE 2021

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. Answer ALL questions. Write your answers in the spaces provided in this answer booklet.
3. Do NOT write in the margins.
4. You may use a silent, non-programmable calculator to answer questions.
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 A

Answer ALL FOUR questions.

1. (a) (i) State TWO forms of energy.

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(2 marks)

Figure 1 shows a spring at rest and a spring when stretched.

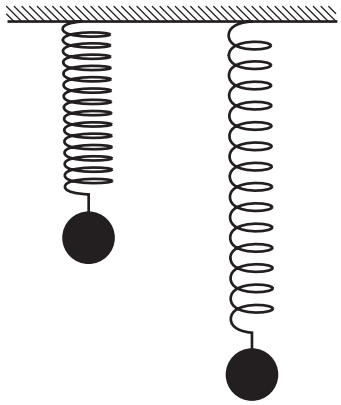


Figure 1. Diagram of a spring at rest and a spring when stretched

(ii) Explain what happens to the energy in a spring when it is stretched.

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(3 marks)

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(b) Figure 2 shows a collision between two cars.



Figure 2. Cars colliding

One of the vehicles of mass 35 000 kg is moving at a velocity of 25 km/h. Using the formula $p = m \times v$, calculate its momentum before it collides with the other vehicle. Show your working.

(2 marks)

(c) Figure 3 shows a simple circuit.

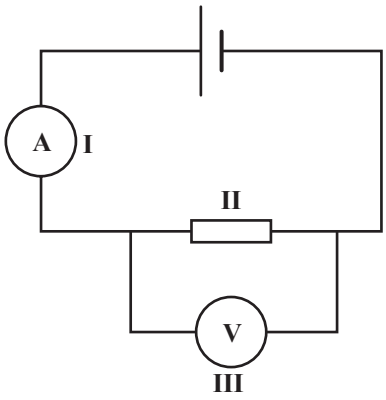


Figure 3. Simple circuit

Name the parts labelled I, II and III on Figure 3.

I .....

II .....

III .....

(3 marks)

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(d) Two resistors are connected in parallel. This combination is then placed in a circuit and the current passing into the combination is measured for various potential differences across the circuit. The results are represented in the table below.

TABLE 1: RESULTS OF POTENTIAL DIFFERENCES ACROSS A CIRCUIT

Potential Difference (Voltage)	1.5	3.0	4.5	6.0	7.5
Current (Ampere)	0.75	1.50	2.25	3.00	3.75
Resistance (Ohms)					

(i) Using the formula R=V/I, complete Table 1 by calculating the total resistance at each interval of voltage and current. **(5 marks)**

(ii) On the grid **on page 7**, plot a graph of current against potential difference to represent the data in Table 1. Draw the line of best fit through the points. **(6 marks)**

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

(iv) Using Table 1 and the graph, describe the trend observed in this circuit as potential difference changes.

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(v) Use the graph **on page 7**, to determine the current passing in the circuit at a voltage of 3.5 V.

..... **(1 mark)**

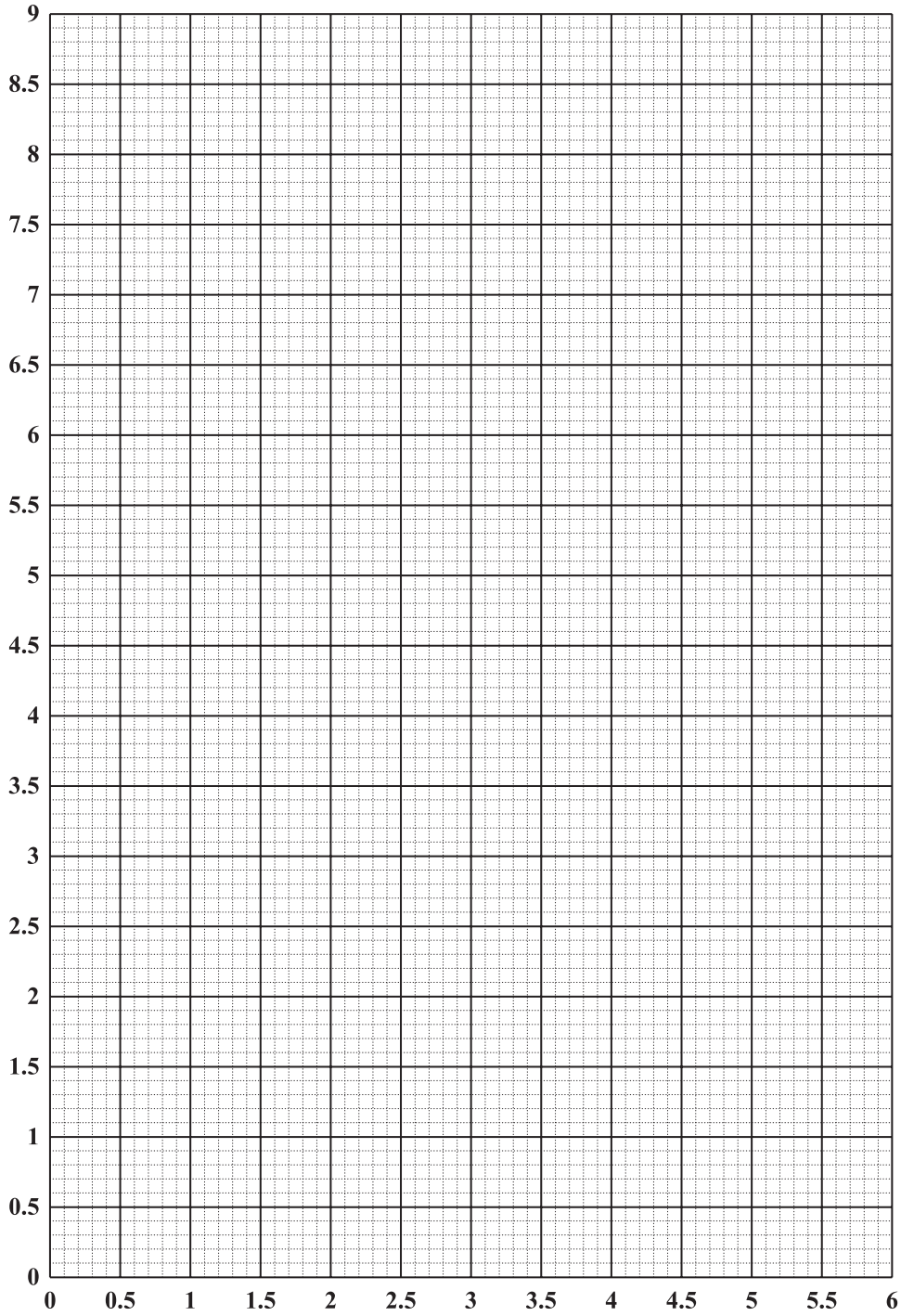
Total 25 marks

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2. (a) (i) Name TWO types of food additives.

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(2 marks)

(ii) State ONE function of EACH type of food additive identified in (a) (i).

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(2 marks)

(b) (i) Define the term 'food preservation'.

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(2 marks)

(ii) Name the method of food preservation used to make raisins.

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(1 mark)

(c) Jill bought a jar of guava jam which she used a few times and then placed in the refrigerator. After three months, Jill found the jar of jam while cleaning the refrigerator. To her surprise, the jam was still edible.

(i) Explain the method of food preservation used in the making of jam.

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(3 marks)

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(ii) Explain how the refrigerator assisted in the preservation of the jam.

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(3 marks)

(d) Mario works in a fast food restaurant. On the door of the food preparation building, there are several flyers reminding staff to wash their hands before handling food. Briefly explain why it is important to wash hands before handling food.

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(2 marks)

Total 15 marks

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3. (a) Sheila spilled wine on her favourite dress at a friend's wedding and really wants the stain removed.

(i) Name ONE chemical that Sheila can use to help remove the stain.

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(1 mark)

(ii) Complete the word equation for the reaction below.

Acid + base → ..... + ...

(2 marks)

(iii) State the colour change that is expected when blue litmus paper is used to test EACH of the following compounds.

- Acid .....
- Base .....

(2 marks)

(b) Mr Allen wants to use muriatic acid, also referred to as hydrochloric acid, to clean his stained toilet bowl.

(i) Suggest TWO possible dangers of using muriatic acid as a household cleaning agent.

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(2 marks)

(ii) Recommend TWO pieces of protective equipment that Mr Allen could use while handling this chemical.

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(2 marks)

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(c) Mr and Mrs Singh recently built a house close to the beach. Within five months, the gate begins to rust. Explain why the gate rusted quickly.

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(3 marks)

(d) The Brown family lives in a community that is near to a number of factories. The children experience frequent respiratory challenges. Based on the location of the home, explain ONE possible reason why the children have experienced respiratory challenges.

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(3 marks)

Total 15 marks

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4. (a) Soil is formed through physical, chemical and biological action.

(i) Name ONE method of physical action in soil formation.

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(1 mark)

(ii) Describe the method of physical action in soil formation named in (a) (i).

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(3 marks)

(iii) Name ONE component of fertile soil.

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(1 mark)

(b) Table 2 shows three soil samples and their associated aeration, moisture content and nutrient content.

TABLE 2: COMPARISON OF THREE SOIL TYPES BY AERATION, MOISTURE CONTENT AND NUTRIENT CONTENT

Soil Samples	Aeration	Moisture Content	Nutrient Content
X	High	Low	Low
Y	Medium	Medium	Medium
Z	Low	High	High

Using the information in Table 2, classify EACH soil sample as ONE of the following soil types:

Clay .....

Sand .....

Loam .....

(3 marks)

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(c) Figure 4 shows a comparison of plant growth after six weeks in two different soil samples.

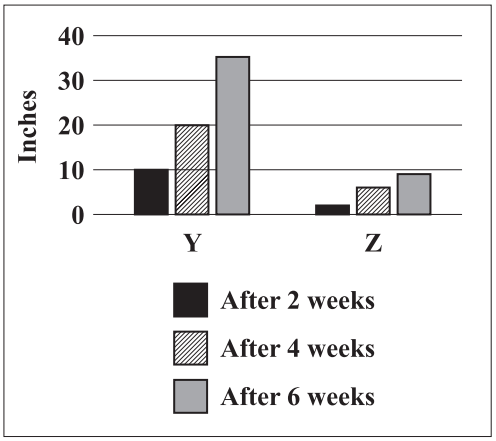


Figure 4. Comparison of plant growth after six weeks in two different soil types

(i) Using the information in Figure 4, describe the trends in plant growth in soil sample Y and soil sample Z.

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(2 marks)

(ii) Using the information in both Figure 4 and Table 2 **on page 12**, explain the difference in the trends of plant growth in soil sample Y and soil sample Z.

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(2 marks)

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(iii) Identify which of the soil samples, Y or Z, could possibly be volcanic soil.

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(1 mark)

(iv) State ONE reason for your answer to (c) (iii).

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(2 marks)

Total 15 marks

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SECTION B

Answer BOTH questions.

5. (a) The air pollution associated with the burning of fossil fuels has long been known to have harmful effects on human health and the environment. One of the harmful activities which results from air pollution is acid rain.

(i) Outline the process of acid rain formation.

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(2 marks)

(ii) Discuss ONE negative effect of acid rain on the environment.

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(4 marks)

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(b) A densely populated city is looking for ideas to help reduce the use of fossil fuel as the main energy source as well as to reduce its overall energy consumption.

(i) List THREE ways in which the city can reduce its consumption of fossil fuel.

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(3 marks)

(ii) Suggest ONE form of alternate energy that would be suitable for the city, given the space limitations for constructing buildings. Justify your suggestion.

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(3 marks)

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(c) During Mary's commute every morning and afternoon, she sits in heavy traffic for approximately two hours. Her eyes get extremely itchy and she finds it difficult to breathe if the windows of the vehicle are down. Explain why Mary may be experiencing this discomfort.

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(3 marks)

Total 15 marks

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6. (a) (i) List THREE ways in which plastic can negatively affect the environment.

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(3 marks)

(ii) Suggest TWO uses of recycled plastics in industry.

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(2 marks)

(b) Ben enjoys going to the pond to feed the fishes. During his last visit he observed that the pond was green and covered with algae.

(i) State TWO physical properties of water.

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(2 marks)

(ii) Define the term 'eutrophication'.

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(2 marks)

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(iii) Explain TWO effects that eutrophication can have on other living organisms in the pond.

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(6 marks)

Total 15 marks

END OF TEST

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

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