FORM TP 2017082

TEST CODE **01230020**

MAY/JUNE 2017

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. Answer ALL questions.
2. 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 questions.

1. (a) Sandra lives on the island of Montserrat. Her father buys an electronic weather station which he installs and connects to the computer in the air-conditioned computer room. There is a small sensor which has been hung on a nail in the backyard shed. It collects weather data (temperature, pressure and humidity) and sends the data to the main unit which attempts to predict the weather.

(i) What kind of weather would most likely be predicted when the sky is full of dark grey nimbus clouds?

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(1 mark)

(ii) What kind of weather is most likely expected when the atmospheric pressure is rising?

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(1 mark)

(iii) The weather station indicates a forecast of rain and the news announces that the hurricane watch has been upgraded to a hurricane warning. State THREE appropriate activities that Sandra's family should undertake to prepare for the hurricane.

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(3 marks)

(iv) Explain how a hurricane develops.

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(3 marks)

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(b) In 1995, the Soufriere Hills volcano erupted.

(i) Identify TWO hazardous materials produced by the volcano and for EACH material, suggest ONE effect on Sandra's community. Write your answer in the following table.

Hazardous Material	Effect
1.	
2.	

(4 marks)

(ii) Kick-em-Jenny is a live submarine volcano located near northern Grenada. Suggest ONE effect of an eruption of Kick-em-Jenny on the **ecology** of the coast of Grenada.

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(2 marks)

(c) Sandra has accessed the data in Table 1 from the weather station.

TABLE 1: ATMOSPHERIC TEMPERATURE FROM SATURDAY MORNING TO MIDMORNING SUNDAY

Time	6 a.m.	10 a.m.	2 p.m.	6 p.m.	10 p.m.	2 a.m.	6 a.m.	10 a.m.
Atmospheric Temperature (°C)	22.6	29.8	34.6	31.7	24.6	19.7	22.5	32.0

(i) On the grid provided **on page 7**, plot the data presented in Table 1. **(4 marks)**

(ii) Draw the best curved line to show the trend. **(2 marks)**

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

(iv) State an appropriate title for the graph.

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(1 mark)

(v) From the graph, determine the maximum temperature over the entire time by drawing dotted lines to read its value.

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(1 mark)

(vi) From the graph, determine the temperature at 4 a.m. by drawing dotted lines to read its value.

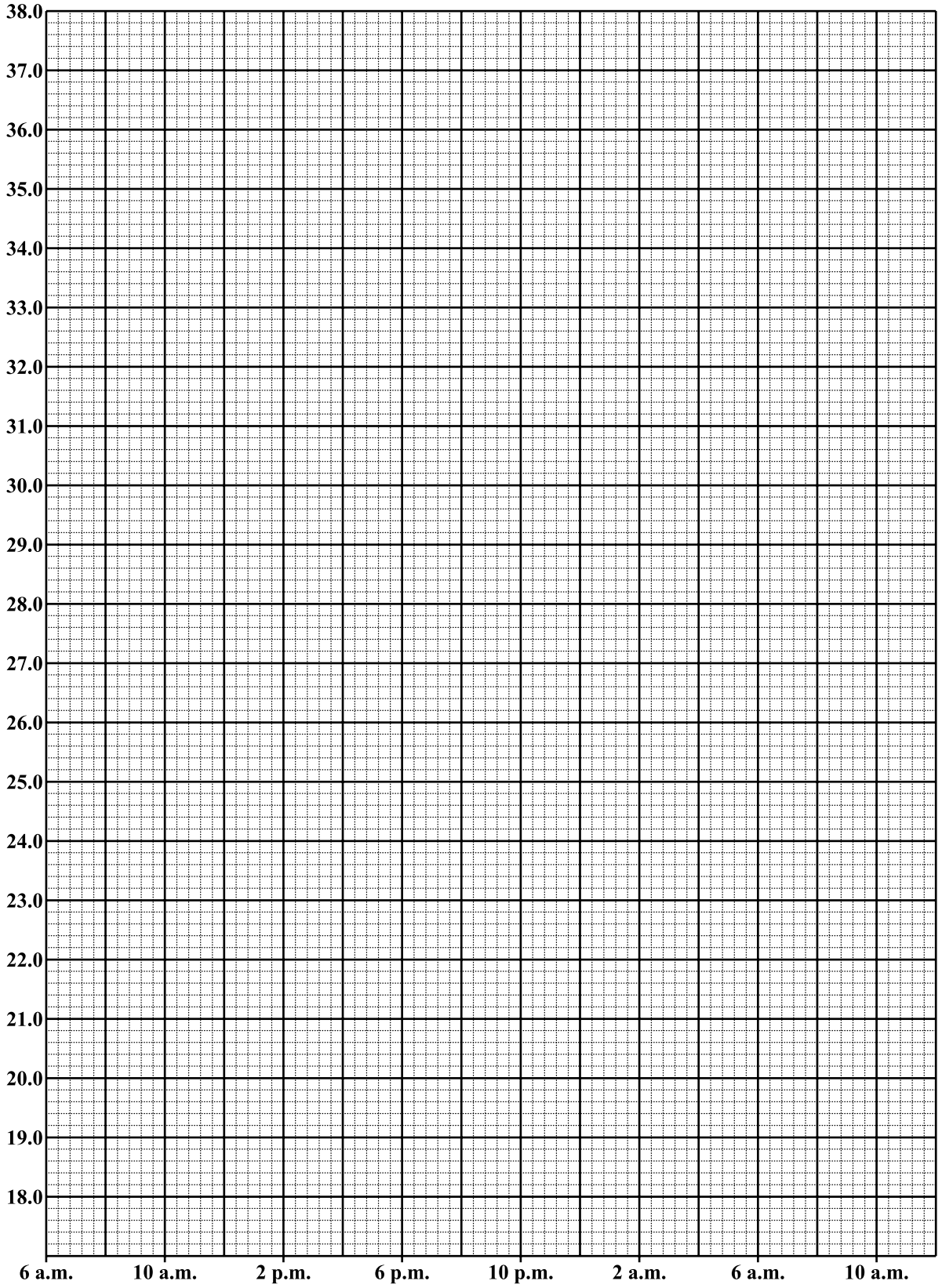
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(1 mark)

Total 25 marks

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2. (a) (i) State the name and function of ONE major blood vessel.

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(2 marks)

(ii) State ONE feature of the blood vessel named in (a) (i) above.

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(1 mark)

(b) A student wants to determine the effect of exercise on pulse rate. She records the pulse rate of five athletes, then asks them to jog around the track for two minutes, and immediately records their pulse rates again. She allows them to rest for five minutes and records their pulse rate again. She obtains the results shown in Table 2.

TABLE 2: EFFECT OF EXERCISE ON PULSE RATE

Athlete	Pulse Rate (bpm)		
	Before Jogging	**Immediately After Jogging**	**Five Minutes After Jogging**
A	60	150	75
B	62	145	74
C	65	155	80
D	58	145	58
E	61	155	85

(i) Define the term 'pulse rate'.

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(2 marks)

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(ii) Name TWO variables that are held constant in this experiment.

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(2 marks)

(c) From the data provided in Table 2, describe the effect of jogging on pulse rate

(i) immediately after jogging

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(1 mark)

(ii) five minutes after jogging.

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(1 mark)

(d) Use the information from Table 2 to determine the athlete who appears to be the MOST fit, and the athlete who appears to be the LEAST fit. Give a reason for your answer.

MOST fit

Athlete .....

Reason .....

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(2 marks)

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LEAST fit

Athlete .....

Reason .....

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(2 marks)

(e) Suggest TWO factors **other than** exercise that may have an effect on pulse rate.

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(2 marks)

Total 15 marks

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3. (a) Table 3 shows some properties of metallic and nonmetallic elements, A, B, C and D.

TABLE 3: PROPERTIES OF METALLIC AND NONMETALLIC ELEMENTS

Element	Electrical Conductivity	Melting Point	Density
A	Conductor	High	High
B	Nonconductor	Low	Low
C	Conductor	High	High
D	Semiconductor	High	High

(i) Suggest, with a reason, ONE element in Table 3 that is a metal.

Element .....

Reason .....

.....

(2 marks)

(ii) Suggest TWO uses of Element A and TWO uses of Element B, **other than** for making cooking pots.

Element A .....

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Element B .....

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(4 marks)

(b) Explain ONE advantage of using the following to make cooking pots:

Plastic .....

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Aluminium .....

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(4 marks)

(c) List THREE factors that can affect the rate of rusting of metal fixtures in houses located near to the sea or industrial plants.

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(3 marks)

(d) John makes iron burglar bars for the windows in his home. Suggest TWO ways by which he could prevent the bars from rusting.

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(2 marks)

Total 15 marks

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4. Many environmentalists are calling on Caribbean countries to be less dependent on fossil fuels as a source of energy, and to move towards the use of alternative sources of energy.

(a) (i) Define the term 'fossil fuel' and state TWO examples of fossil fuels.

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(3 marks)

(ii) Suggest FOUR environmental problems that can occur as a result of the use of fossil fuels in the Caribbean.

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(4 marks)

(b) (i) Identify TWO alternative energy sources to fossil fuel, **other than** solar energy, that can be used in the Caribbean.

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(2 marks)

(ii) Discuss TWO advantages and ONE disadvantage of using solar energy to satisfy the national energy needs of a country.

Advantages.....

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Disadvantage.....

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(6 marks)

Total 15 marks

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SECTION B

Answer ALL questions.

5. (a) (i) In the space below, draw a circuit to test if a material is a conductor. The circuit should consist of a switch, bulb, cell and connecting wires. Use circuit symbols in your drawings.

(3 marks)

(ii) Give ONE example of a good conductor of electricity, and ONE example of a good insulator of electricity.

Good conductor .....

Good insulator .....

(2 marks)

(iii) Name ONE safety device used in circuits to prevent overloading, and state how the device works.

Device: .....

How it works: .....

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(2 marks)

(b) Jenna's kitchen is flooded by a broken water line and her blender's electrical cord is frayed (exposed) as shown in Figure 1.

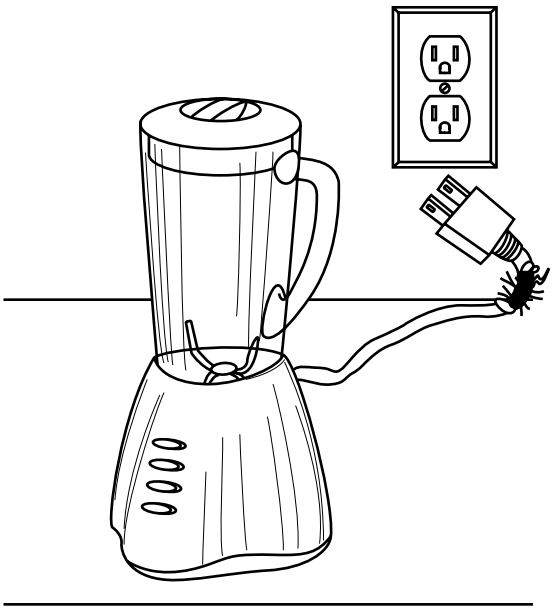


Figure 1. Diagram showing blender with frayed electrical cord

(i) Suggest TWO hazards that may occur if Jenna attempts to connect the blender to the electrical outlet.

Hazard 1 .....

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Hazard 2 .....

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(2 marks)

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(ii) Figure 2 shows the frayed electrical cord of the blender plugged into the electrical outlet.

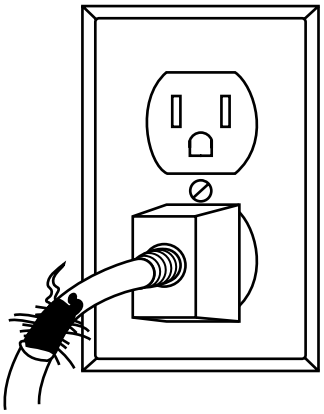


Figure 2. Frayed electrical cord plugged into the electrical outlet

Suggest THREE pieces of protective gear (wear) which Jenna should use before attempting to remove the frayed cord.

Gear 1 .....

Gear 2 .....

Gear 3 .....

(3 marks)

(iii) Jenna notices that the three wires in the cord are blue, brown and green. To which part of the circuit should she connect EACH wire when rewiring the plug? Write your answer in the following table.

Wire	Part of Circuit
Blue	
Brown	
Green	

(3 marks)

Total 15 marks

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6. (a) State THREE differences between the nervous system and the endocrine system.

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(3 marks)

(b) Seeta is cooking while talking on the phone. She accidentally picks up a hot pot and, without thinking, immediately drops it. Outline the activities occurring in the nervous system which cause Seeta to drop the hot pot.

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(4 marks)

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(c) Lee has difficulty seeing the board when he sits at the back of the class. The doctor tells him that he is short-sighted and requires spectacles (glasses). With the aid of diagrams, explain what is meant by 'short-sightedness' and how spectacles are used to correct this problem.

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Space for diagram showing short-sightedness	Space for diagram showing correction of short-sightedness

(8 marks)

Total 15 marks

END OF TEST

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