TEST CODE **01230020**

FORM TP 2014086

MAY/JUNE 2014

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INTEGRATED SCIENCE
(Single-Award)

Paper 02 – General Proficiency

2 hours 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections: A and B.
2. Section A consists of FOUR questions. Answer ALL questions. Write your answers in the spaces provided in this answer booklet.
   Section A is worth 70 marks.
3. Section B consists of TWO questions. Answer ALL questions. Write your answers on the pages provided at the end of each question.
   Section B is worth 30 marks.
4. You may use a silent, non-programmable calculator to answer questions.
5. Do NOT write in the margins.
6. You are advised to take some time to read through the paper and plan your answers.
7. If you need to rewrite any answer and there is not enough space to do so on the original page, you must request extra lined pages from the invigilator. **Remember to draw a line through your original answer and correctly number your new answer in the box provided**.
8. **If you use extra pages you MUST write your registration number and question number clearly in the boxes provided at the top of EVERY extra page.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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SECTION A

Answer ALL FOUR questions.

1. Amelia is studying the water cycle and she draws the following diagram.

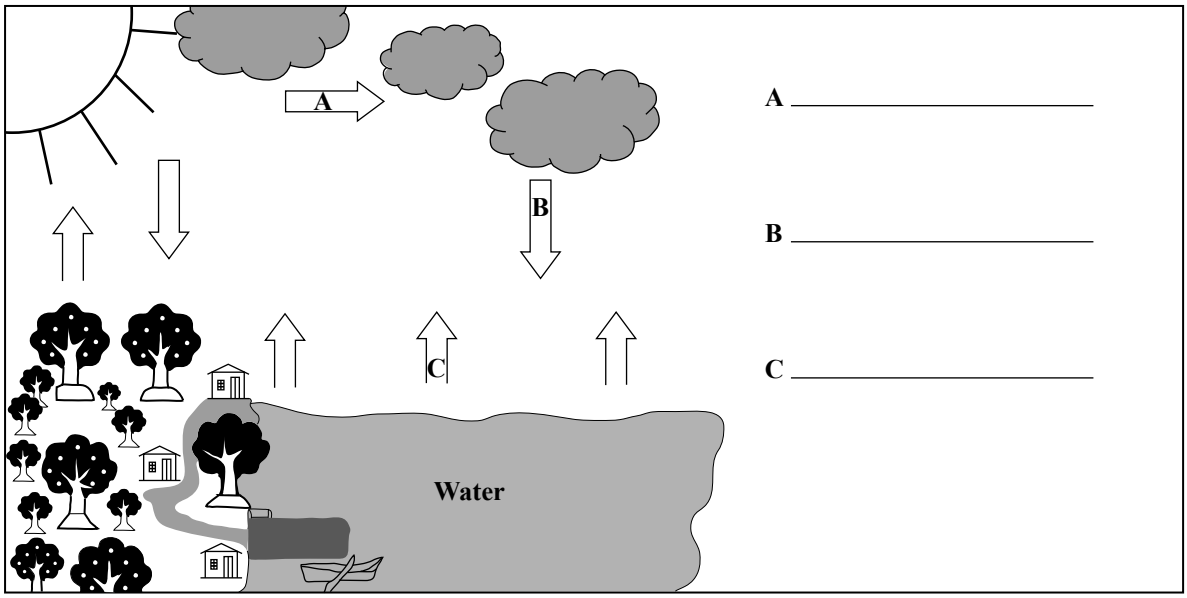


Figure 1. Diagram of the water cycle

(a) (i) Identify the processes represented by the arrows A, B and C.
Write your answers in the spaces provided in Figure 1. **(3 marks)**

(ii) State TWO uses that Amelia may have for water **other** than for drinking.

.....

.....

(2 marks)

(iii) Suggest ONE reason why after drinking untreated river water Amelia's cousin became very sick.

.....

(1 mark)

(iv) Name TWO methods that Amelia's community can use to treat the river water to make it suitable for drinking.

.....

.....

(2 marks)

GO ON TO THE NEXT PAGE

(b) Amelia's community is surrounded by a very large forest. The residents are very concerned about rumours that a logging company plans to cut the forest for lumber and to build factories.

(i) State ONE effect the cutting of the forest will have on the water cycle.

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(1 mark)

(ii) The logging company plans to plant trees which are poisonous to many of the local herbivores, to replace those which were cut down. State ONE way in which this would affect the food webs in the forest.

.....

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(1 mark)

(c) In order to control flooding in the lowlands, the government built a large lake (dam) near Amelia's home. A considerable amount of hydroelectric power is now produced by this dam to replace several diesel-burning power stations.

(i) State ONE benefit to the environment of using hydroelectric power.

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.....

(1 mark)

(ii) Identify ONE **negative** effect on the local environment of building the dam.

.....

(1 mark)

(iii) State ONE way the large lake (dam) may affect the water cycle.

.....

.....

(1 mark)

(iv) To transmit electricity efficiently to communities far away from the dam very high voltages are used. Name ONE material which would be most suitable for making the uninsulated electrical lines that are used to transmit the electricity.

.....

(1 mark)

(v) Identify ONE hazard which can result from these electrical lines.

.....

(1 mark)

(d) A concerned group of people from the capital city spoke at a meeting in Amelia's community about the carbon dioxide that the proposed factories will release into the atmosphere. They presented some data on the amount of carbon dioxide dissolved in the oceans for the period 1850–2000 in Table 1.

TABLE 1: CARBON DIOXIDE DISSOLVED IN THE OCEANS

Year	1850	1875	1900	1925	1950	1975	2000
Dissolved carbon dioxide (ppm)	290	292	295	300	310	330	365

(i) On the grid in Figure 2 on page 5, plot the points to represent the data in Table 1. **(4 marks)**

(ii) Draw on the graph the best smooth curve to show the trend. **(2 marks)**

(iii) Label the axes on the graph. **(1 mark)**

(iv) State an appropriate title for the graph.

.....

(1 mark)

(v) Use the trend shown in the graph to predict the level of carbon dioxide in the ocean in 2025.

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(1 mark)

(vi) Using the trend in the graph, state a conclusion about the level of carbon dioxide in the ocean over the period 1850–2000.

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(1 mark)

Total 25 marks

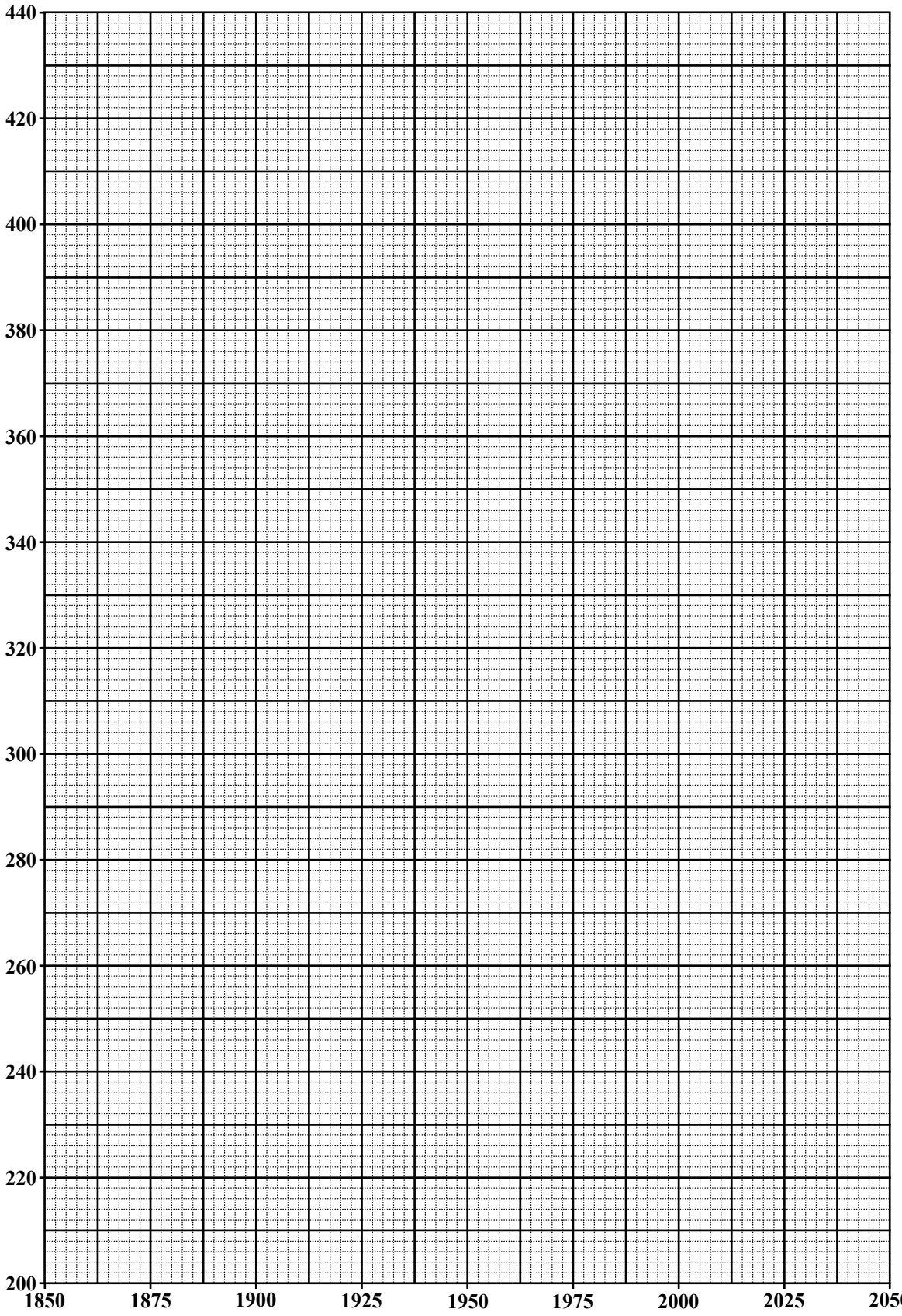

440
420
400
380
360
340
320
300
280
260
240
220
200
1850
1875
1900
1925
1950
1975
2000
2025
2050

Figure 2. _____

2. (a) State TWO properties of acids and TWO properties of bases.

(i) Acids .....

.....

(2 marks)

(ii) Bases .....

.....

(2 marks)

(b) Give ONE example of an acid and ONE example of a base that is used in the digestive system.

(i) Acid .....

(1 mark)

(ii) Base .....

(1 mark)

(c) A student carried out an experiment to determine the pH of various substances and obtained the following information.

TABLE 2: pH OF SUBSTANCES

Substance	pH
Grapefruit juice	5
Club soda	6
Baking soda	8

(i) What does the term pH mean?

.....

.....

(1 mark)

(ii) Which substance in Table 2 is NOT an acid?

.....

(1 mark)

(iii) Which of the two acids shown in Table 2 is stronger?

.....

(1 mark)

GO ON TO THE NEXT PAGE

(d) While painting the inside of her home, Ms Jones got her favourite red dress soiled with paint. Her son, Sam, suggested that she uses bleach to remove the paint from her dress.

(i) Give TWO reasons why bleach is NOT the most appropriate substance for Ms Jones to use.

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(2 marks)

(ii) Suggest a suitable method that Ms Jones could use to remove the paint from her dress and explain how this method works.

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(2 marks)

(e) State TWO safety precautions that can be taken when using the method stated in (d) (ii) above.

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(2 marks)

Total 15 marks

3. (a) Figures 3 and 4 show diagrams of two cells, A and B.

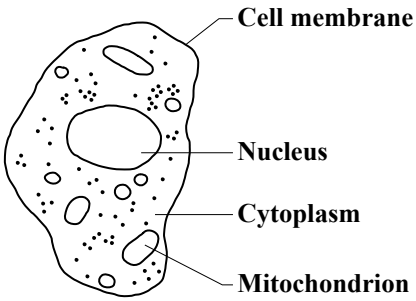


Figure 3: Cell A

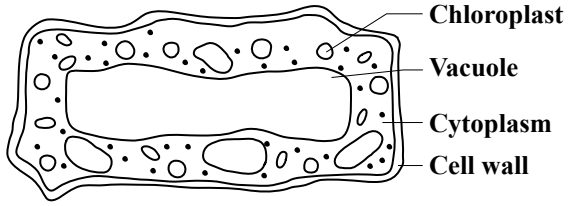


Figure 4: Cell B

(i) State which cell represents a plant cell.

.....

(1 mark)

(ii) Give TWO reasons for your answer in (a) (i) above.

.....

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(2 mark)

(iii) Name the cell structure that is responsible for storing genetic information.

.....

(1 mark)

(iv) Name the type of cell that transports oxygen around the human body.

.....

(1 mark)

(b) On a sunny day at an open market a vendor, Ms Milly, occasionally sprinkles water on her wilting lettuce. During the day Ms Milly's lettuce are firm and ready for sale.

(i) Distinguish between 'diffusion' and 'osmosis'.

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(1 mark)

(ii) Identify the process that resulted in Ms Milly's wilting lettuce becoming firm.

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(1 mark)

(iii) Explain how the process identified in (b) (ii) kept the lettuce firm.

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(2 marks)

(iv) Suggest a suitable method, **other** than sprinkling, that a consumer could use to keep the lettuce firm.

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(1 mark)

(c) The digestive and circulatory systems consist of organs with muscles which are necessary for them to carry out their normal functions. Table 3 shows two organs and the possible effects of muscle damage on the structure and functioning of the organ and the overall effects on the body. Complete the table. **(5 marks)**

TABLE 3: EFFECT OF MUSCLE DAMAGE ON HEART AND STOMACH

Affected Organ	Effect on the Structure of the Organ	Effect on the Function of the Organ	Overall Effect on the Body
Heart	Inability to contract and relax	.....	.....
Stomach	.....	.....	.....

Total 15 marks

4. (a) Distinguish between a conductor and an insulator.

Conductor .....

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Insulator .....

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(2 marks)

(b) State ONE example of how a conductor is used in the kitchen and ONE example of how an insulator is used in the kitchen.

Use of a conductor in the kitchen

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Use of an insulator in the kitchen

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(2 marks)

(c) In a practical activity, Ryan was asked to connect three wires to the Live (L), Earth (E) and Neutral (N) contacts, in a three-pin plug. Complete Table 4 to show the colour of the wire that should be connected to EACH contact. **(3 marks)**

TABLE 4: COLOUR OF WIRE TO BE CONNECTED TO EACH CONTACT

Contact	**Colour of Wire to be Connected**
Live (L)	
Earth (E)	
Neutral (N)	

(d) A housewife wants to determine the weekly cost of using three appliances in her home. If one unit of electricity (kWh) costs 25 cents, calculate the cost when she uses the appliances. **(All calculations are to be shown below.)**

TABLE 5: APPLIANCES AND DAILY QUANTITY OF ELECTRICITY USED

Appliance	**Rating (watts)**	**Rating (kW)**	**Hours used per day**	**Units of Electricity Consumed (kWh) per day**
Stove	1500		5	
Washing machine	1000		2	
Fan	250		10	
			Total	

Total energy for one week (7 days).....

Total weekly cost .....

(6 marks)

(e) State TWO ways in which energy can be conserved in the home.

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(2 marks)

Total 15 marks

SECTION B

Answer BOTH questions.

5. Community A is an agricultural community in a rural area surrounded by sea and mountains, and Community B is near an industrial town with large factories, restaurants and stores.

(a) List THREE components of air. **(3 marks)**

(b) (i) Identify TWO likely pollutants that would be present in EACH of the TWO communities. **(4 marks)**

(ii) For ONE of the pollutants identified in EACH community, describe the source of the pollutant and how it may be distributed in the environment. **(4 marks)**

(iii) Outline TWO effects that the pollutants identified for EACH community would have on organisms in the community. **(4 marks)**

Total 15 marks

Write your answer to Question 5 here.

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Write your answer to Question 5 here.

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6. (a) Identify and describe briefly the THREE methods by which heat energy is transferred from one point to another. **(6 marks)**

(b) Ravi wants to know which colour absorbs sunlight best so he uses five containers, each filled with a different coloured solution and a thermometer. He records the results in Table 6.

TABLE 6: TEMPERATURE CHANGE OF DIFFERENT COLOURED SOLUTIONS

Colour of Solution	Initial Temperature (°C)	Final Temperature (°C)	Temperature Change (°C)
White	30	35	5
Dark red	30	42	12
Silver	30	36	6
Black	30	50	20
Dark green	30	40	10

(c) Outline a procedure that Ravi may have used to get the results in Table 6. **(5 marks)**

(d) Describe TWO problems that may be faced by people who want to use solar energy in the Caribbean. **(4 marks)**

Total 15 marks

Write your answer to Question 6 here.

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Write your answer to Question 6 here.

Write your answer to Question 6 here.

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END OF TEST

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