FORM TP 2016086

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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. Section A is worth 70 marks.
3. Section B consists of TWO questions. Answer ALL questions. Write your answers in the spaces provided in this answer booklet. Section B is worth 30 marks.
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. Vanessa has a farm with orange and mango orchards. She plants corn and beans several times a year on this farm.

(a) (i) State ONE asexual method of reproduction in plants.

.....

(1 mark)

(ii) Name ONE male part of the flower.

.....

(1 mark)

(iii) Name ONE female part of the flower.

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(1 mark)

(iv) State TWO advantages of asexual reproduction.

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(2 marks)

(v) Vanessa has been advised not to use pesticides that will harm the bees in the orchards. Suggest ONE reason why it is important for the bees to visit the flowers.

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(1 mark)

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(b) (i) When Vanessa was pregnant, the scents from the flowers in the orchards made her nauseous, even when she was in the house. Give a scientific explanation of how the scents travel from the flowers to the house.

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(2 marks)

(ii) Vanessa does not want to have another baby and, after discussion with her husband, she has decided to use a surgical method.

State TWO advantages of the surgical method of contraception.

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(2 marks)

State ONE disadvantage of this method compared with other methods.

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(1 mark)

(iii) Explain the importance of the following significant changes that occur in Vanessa's reproductive organs when she is NOT pregnant:

The lining of the uterus (womb) grows and thickens

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Menstruation (the thickened lining of the uterus is shed during the menstrual period)

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(3 marks)

(c) A farm worker measures and calculates the average height of three corn plants over a period of two weeks and records the results in Table 1.

TABLE 1: AVERAGE HEIGHT OF CORN PLANTS OVER A PERIOD OF TWO WEEKS

Time (days)	2	4	6	8	10	12	14
Average Height (cm)	1	1.9	4.0	5.5	7.2	8.6	9.8

(i) Use the grid and scales in Figure 1 **on page 7** to represent the data in Table 1. **(4 marks)**

(ii) On Figure 1, draw the best straight line to show the trend. Extend this line to cut the *x*-axis. **(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) Using the graph, determine the average height of the corn on the 11th day.

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(1 mark)

(vi) How long after planting did the corn plants emerge from the soil?

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(1 mark)

Total 25 marks

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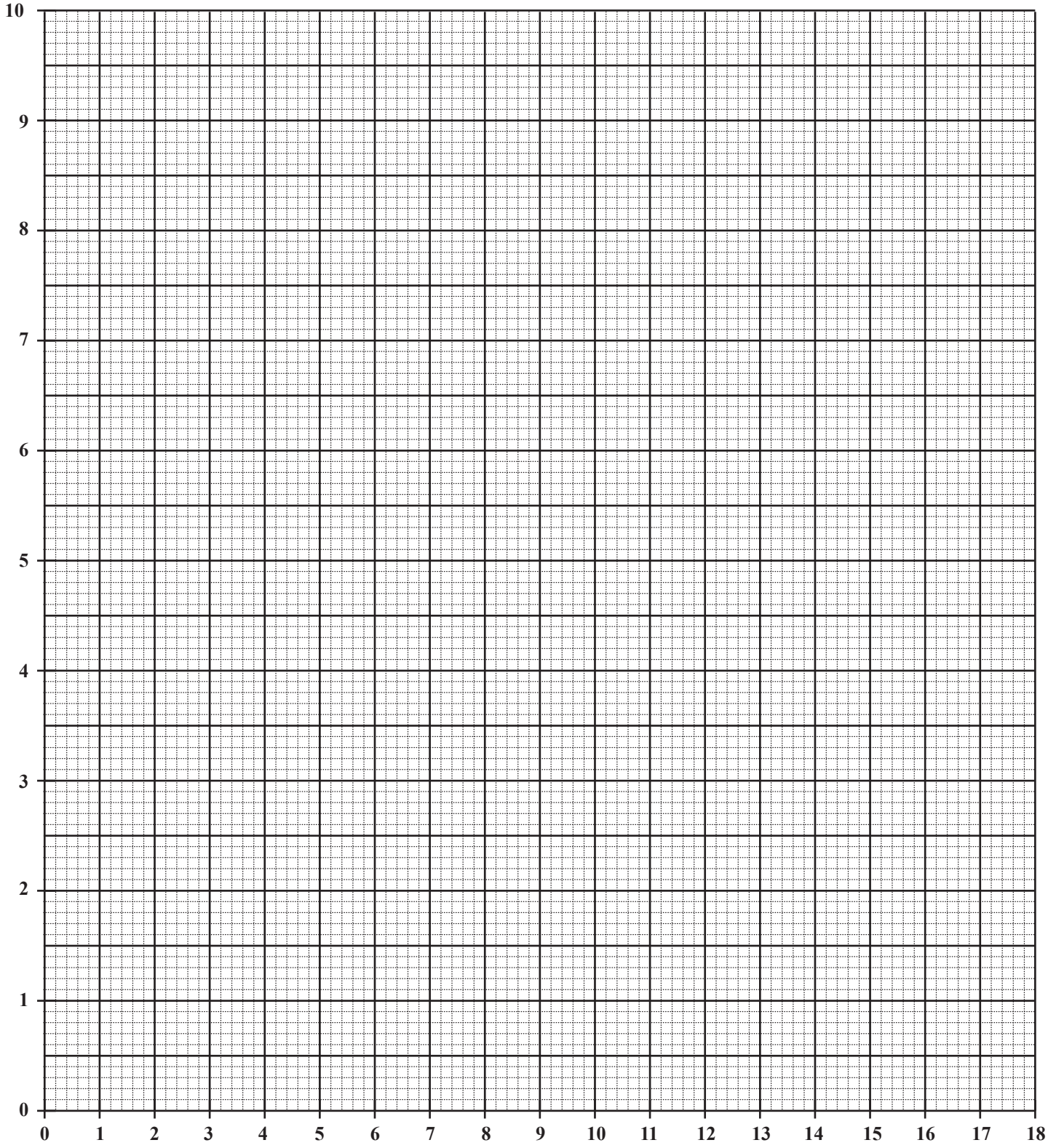


Figure 1.

2. Tropical islands experience alternating periods of sunshine and rain. Figure 2 shows a tourist at a recreational poolside. The arrows at I, II and III represent processes in the water cycle, while the box at IV represents a state of water.

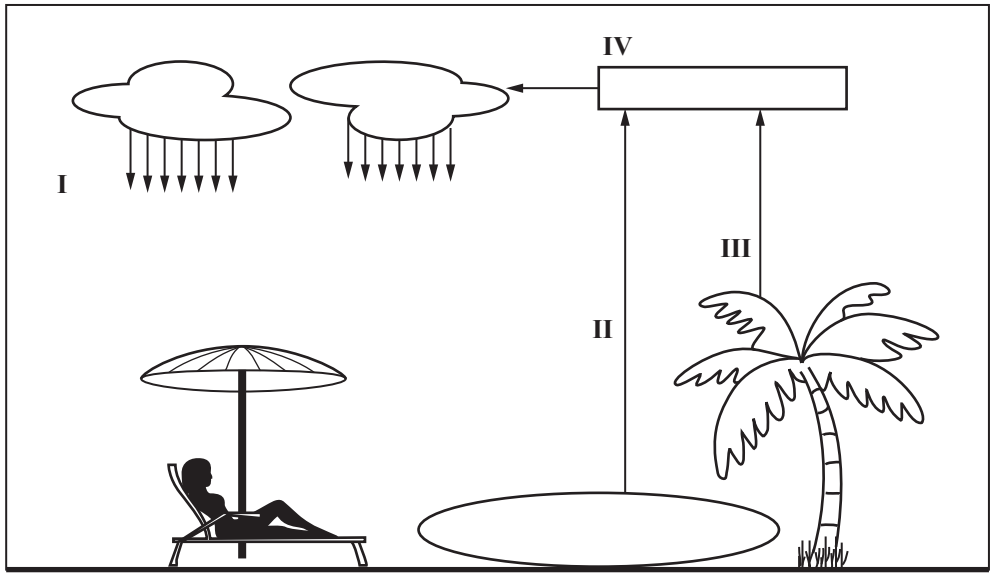


Figure 2. Recreational poolside facility

(a) (i) Identify the processes at I, II and III.

I .....

II .....

III .....

(3 marks)

(ii) Name the state of water at IV.

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(1 mark)

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(b) During sunny periods, the owner of the poolside facility notices that his plants look wilted especially at noon. Suggest ONE way by which he could prevent his potted plants from wilting throughout the day. Give a reason for your answer.

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(3 marks)

(c) (i) State TWO reasons for adding chlorine to the water in the pool.

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(2 marks)

(ii) Suggest TWO ways in which the owner of the facility can use the water when he empties his pool.

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(2 marks)

(iii) State ONE safety precaution that must be taken when the pool is being chlorinated.

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(1 mark)

(d) The poolside facility is located close to the sea. The following organisms were observed in the sea: seeaweeds, kingfish, herring, aquatic insects.

(i) In the box provided below, draw a food chain to show the feeding relationships among these organisms.

(2 marks)

(ii) Name the source of energy in the food chain.

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(1 mark)

Total 15 marks

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NOTHING HAS BEEN OMITTED.

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3. (a) It is necessary to brush your teeth with toothpaste after meals. If this is not done, the pH level in the mouth may fall below 5.5, and this may damage the enamel in your teeth resulting in cavities.

Joan and Cindy are identical twins. The dentist finds that Cindy has fewer cavities than Joan. Suggest THREE habits, **other** than brushing regularly, that may have resulted in Cindy having fewer cavities.

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(3 marks)

(b) Frank performs pH tests on four different brands of toothpaste, A, B, C, D, and obtains the following results as indicated in Table 2.

TABLE 2: pH OF FOUR BRANDS OF TOOTHPASTE

Brand	**A**	**B**	**C**	**D**
pH	8.5	9.0	8.0	5.0

(i) Name a substance that can be used to measure the pH of the toothpaste.

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(1 mark)

(ii) Arrange the four brands of toothpaste in **descending** order of acidity (most acidic first) using the letters of the brand.

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(2 marks)

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(iii) Frank's teacher suggested that one of his results in Table 2 is incorrect. Identify the brand of toothpaste with the incorrect pH and give a reason for your answer.

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(2 marks)

(iv) State a possible reason that may have caused Frank to get the incorrect result.

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.....

(1 mark)

(v) State ONE component of toothpaste which helps to strengthen teeth.

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(1 mark)

(c) (i) Name ONE acidic and ONE alkaline substance present in the digestive system of humans.

Acidic .....

Alkaline .....

(2 marks)

(ii) Name ONE enzyme in the digestive system that functions best in an alkaline environment.

.....

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(1 mark)

(iii) Antacids are substances normally used to treat digestion problems. Explain the scientific principle by which the antacids treat these problems.

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(2 marks)
Total 15 marks

4. (a) Advances in technology have led to the manufacture of solar powered vehicles.

(i) State ONE advantage and ONE disadvantage of using solar powered vehicles.

Advantage .....

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Disadvantage .....

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(2 marks)

(ii) Suggest TWO energy conversions that may occur in a moving solar powered car.

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(2 marks)

(b) Carson performs an experiment to determine the effect of friction on the distance travelled by a toy car. He first places a toy car on a smooth surface, applies a force of 10 N, and records the distance travelled. He then places the toy car on a rough surface, again applies a force of 10 N, and observes the distance travelled. The results are shown in Table 3.

TABLE 3: RESULTS OF EXPERIMENT TO DETERMINE THE EFFECTS OF FRICTION ON THE DISTANCE TRAVELLED BY A TOY CAR

Type of Surface	Force Applied (N)	Distance Travelled (m)
Smooth	10	10
Rough	10	5

(i) Identify the following variables:

The manipulated variable .....

The responding variable .....

Two variables held constant .....

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(4 marks)

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(ii) State the formula used to calculate the energy that is converted when cars move.

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(1 mark)

(iii) Calculate the energy conversion of the car on the

smooth surface

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rough surface.

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(2 marks)

(c) (i) State what is meant by the term 'inefficiencies of machines'.

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(1 mark)

(ii) Use your calculations in (b) (iii) to determine on which of the two surfaces the toy car is more efficient. Give a reason for your answer.

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(2 marks)

(iii) State ONE factor, **other than** friction, that contributes to the inefficiencies of machines.

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(1 mark)

Total 15 marks

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SECTION B

Answer BOTH questions.

5. (a) Name TWO structures in the respiratory system and THREE structures in the circulatory system.

Respiratory system: .....

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Circulatory system: .....

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(5 marks)

(b) Mr Lan is a heavy cigarette smoker. He has been smoking cigarettes for the past 20 years. Explain THREE effects of this long-term smoking on his respiratory system.

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(6 marks)

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(c) On a very hot evening, Mr Lan sits in his car leaving the engine running as he enjoys the coolness of the car's air conditioning. This causes a build-up of air pollutants in the garage. Discuss TWO ways in which the garage can be designed to reduce this increased amount of pollution.

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(4 marks)

Total 15 marks

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6. Abiola is using a portable pump to inflate her car tyre. After she plugs it in, it makes an attempt to start but immediately stops working. She looks at the label and reads the following information: Voltage: 12 V, Current 18 A.

(a) The fuses in her car come with ratings of 10 A, 15 A and 20 A. On checking, she notices that the 15 A fuse in the car burned out. State the function of the fuse and give ONE reason why Abiola should not attempt to replace it with aluminium foil.

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(2 marks)

(b) Calculate the power of the pump. Include the unit of power in the answer.

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(4 marks)

(c) Name TWO suitable materials from which the conducting wire can be made.

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(2 marks)

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(d) Abiola notices that the headlamps of her car give off a white light. With the aid of a diagram, describe how she can break up this white light from her headlamps into its component colours.

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(7 marks)

Total 15 marks

END OF TEST

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