FORM TP 2012090

TEST CODE **01230032**

MAY/JUNE 2012

CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE EXAMINATION

INTEGRATED SCIENCE
(Single Award)

Paper 032 – Alternative to SBA

General Proficiency

2 hours 10 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. Answer ALL questions.
2. Use this answer booklet when responding to the questions. For EACH question, write your answers in the spaces provided and return the answer booklet at the end of the examination.
3. You may use a silent, non-programmable calculator.
4. You are advised to take some time to read through the paper and plan your answer.

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

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1. Two uncooked pieces of potato strips 4 cm long, with the same dimensions, were placed in 100 cm^3 of distilled water and 100 cm^3 of saturated sugar solution respectively for 24 hours at room temperature. The results are shown in the diagram below.

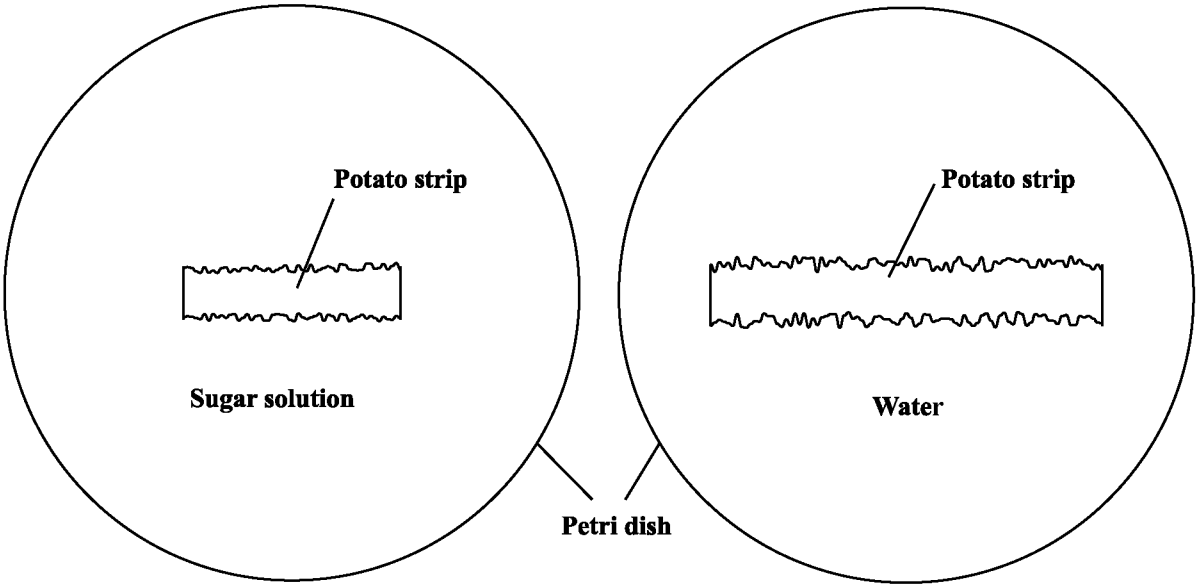


Figure 1. Potato strips in sugar solution and water after 24 hours

(a) (i) Write an appropriate heading for the last column in the table below. **(1 mark)**

(ii) Write an appropriate title for the table in the space provided. **(1 mark)**

TABLE 1: _____

Observation	Strip in Water	
Original length of potato strip (cm)	4.0	4.0
Length of potato strip after 24 hours (cm)		
External appearance of strips		

(iii) Measure the length of the potato strips in Figure 1. Record your answers in the appropriate sections of Table 1. **(2 marks)**

(iv) Describe the appearance of EACH strip after being in the liquid for 24 hours. Record your answer in the appropriate section of Table 1. **(2 marks)**

(v) Write an appropriate aim for this experiment.

_____

_____

(1 mark)

GO ON TO THE NEXT PAGE

(vi) Explain the differences observed in the two strips.

_____

_____

_____

_____

(4 marks)

(vii) Explain how the results of the experiment would differ if the same experiment was repeated with strips of cooked potatoes.

_____

_____

(2 marks)

(viii) Explain how the results of the potato strip **in water** would differ if the same experiment was carried out at a lower temperature.

_____

_____

(1 mark)

(b) (i) Describe a simple experiment that can be performed to demonstrate diffusion.

_____

_____

_____

_____

_____

(3 marks)

(ii) State ONE difference between osmosis and diffusion.

_____

_____

(1 mark)

Total 18 marks

2. (a) A student performed the experiment shown in Figure 2 to investigate the reaction between zinc and dilute hydrochloric acid. The initial temperature of the reactants of the test tube was noted as 30 °C.

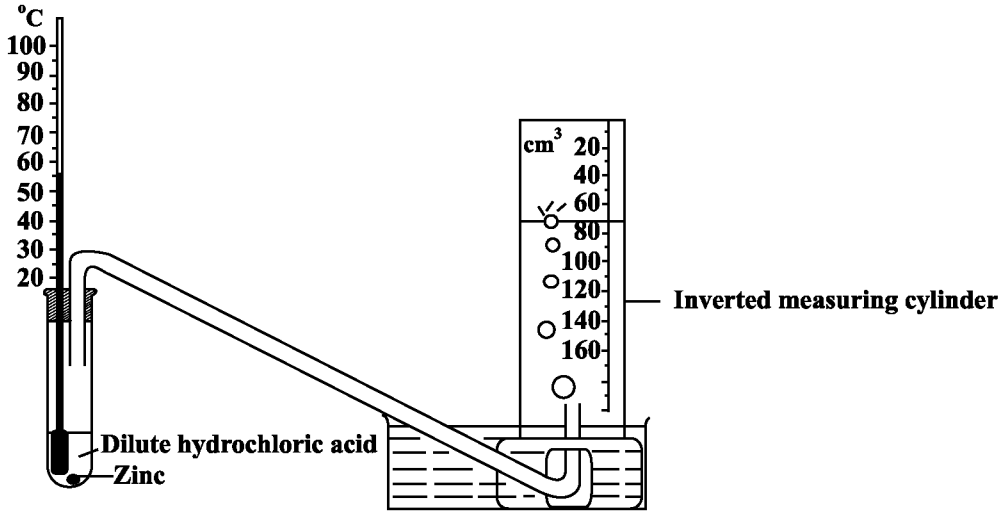


Figure 2. Experiment to show reaction between zinc and dilute hydrochloric acid

(i) Name the gas given off during the reaction.

_____

(1 mark)

(ii) Write a simple word equation for the reaction in (a) (i) above.

_____

(2 marks)

(iii) Read the thermometer in Figure 2 and record the value in the space below.

_____

(1 mark)

(iv) Calculate the change in temperature of the reactants.

_____

(1 mark)

(v) Read the inverted measuring cylinder in Figure 2, and determine the volume of gas produced by the reactants. Record your answer in the space below.

_____

(1 mark)

(b) Three students were each given an activity by their science teacher as shown in Table 2.

TABLE 2: SCIENCE ACTIVITIES PERFORMED BY STUDENTS

Name	**Science Activity Performed**
Vikash	Add copper turnings to dilute hydrochloric acid
Sandy	Add iron filings to dilute hydrochloric acid
Rohan	Heat copper in the presence of oxygen

(i) In which activity will NO reaction be observed?

_____

(1 mark)

(ii) Write a simple word equation to represent the reaction which takes place in Rohan's activity.

_____

(2 marks)

(c) A student constructs a hypothesis which states that a painted iron nail will rust faster than an iron nail covered with oil.

Plan and design a laboratory activity to test the hypothesis.

(i) List the materials required for the laboratory activity.

_____

_____

(3 marks)

(ii) Describe a suitable method to test the hypothesis.

_____

_____

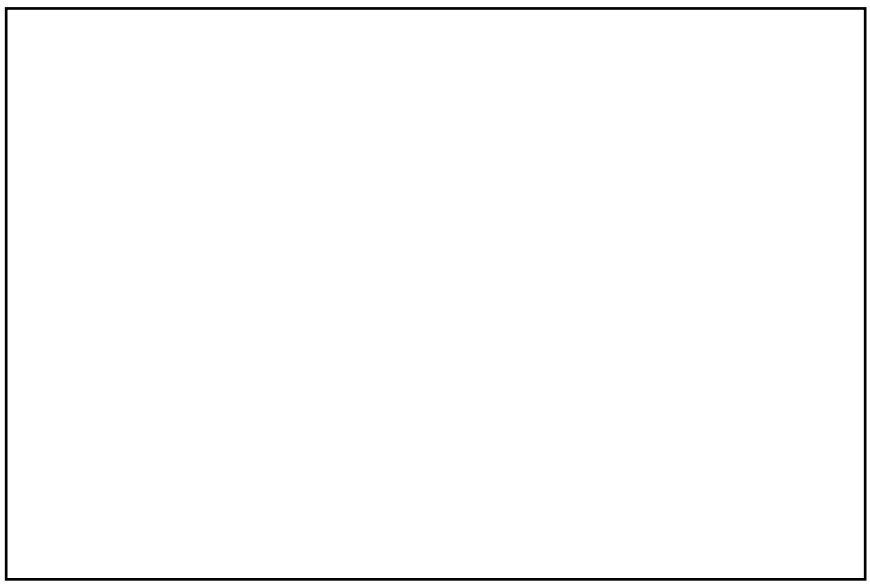
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(4 marks)

(iii) In the space below, draw a diagram of the apparatus to be used in the activity.



(2 marks)

Total 18 marks

3. Jameel constructs a lever which has a fulcrum at C and a load of 100 g at B as shown in Figure 3. He tried to balance the lever by applying an effort at A with a 10 g block, but he found that 15 g of additional mass was required.

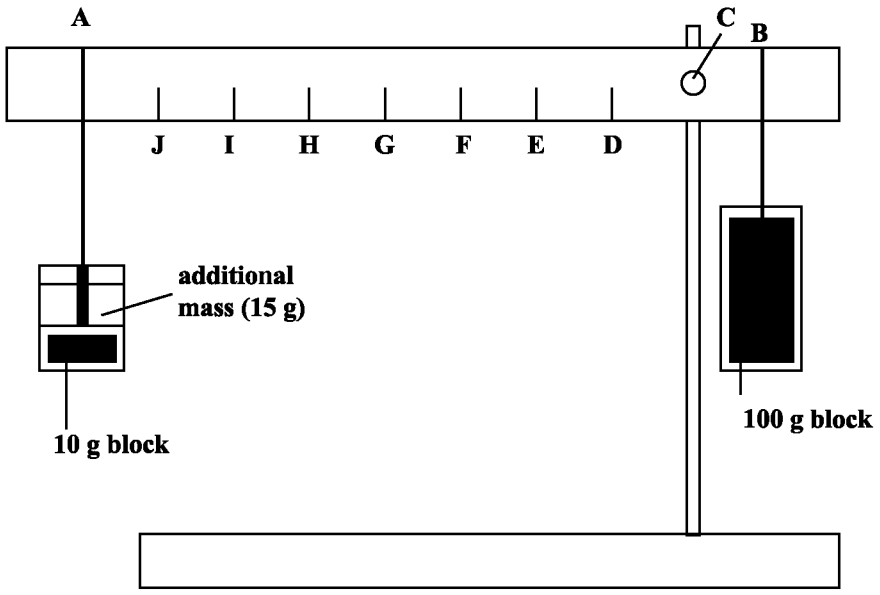
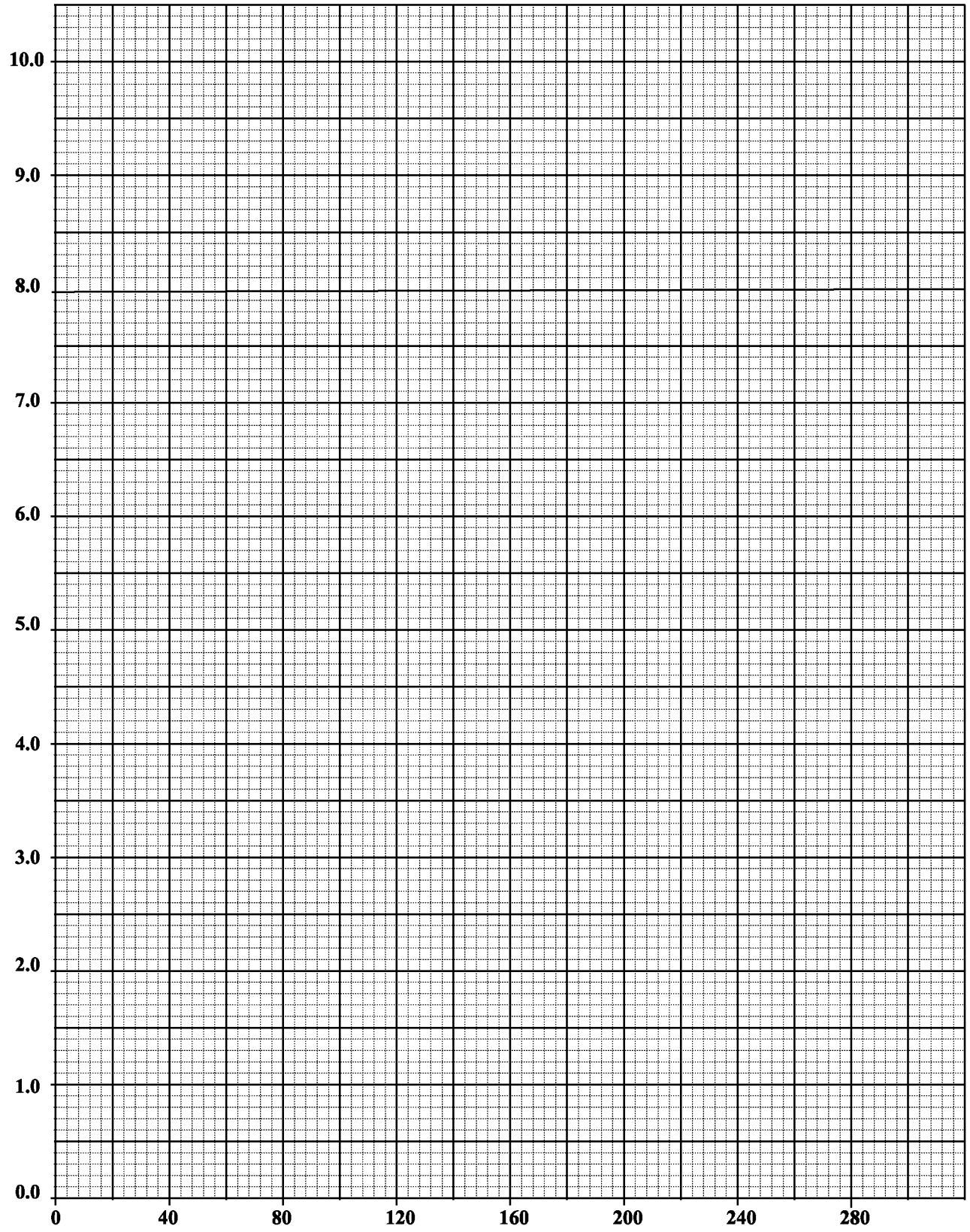


Figure 3. Diagram of lever

(a) Jameel is interested in finding the values of masses which will balance the lever when they are hung at points D – J so he creates Table 3. Complete the table by using your ruler to measure the distance from the fulcrum, C, to the points D, E, F, G, H, I and J in Figure 3. **(5 marks)**

TABLE 3: MASS REQUIRED TO BALANCE LEVER AND DISTANCE OF EFFORT FROM FULCRUM

Position of Effort	Distance of Effort from fulcrum (cm)	Mass required to balance lever (g)
A	8.1	25
J		29
I		33
H		40
G		50
F		67
E		100
D		200


10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
40
80
120
160
200
240
280

(b) Write a hypothesis relating the distance of the effort from the fulcrum and the mass required to balance the lever.

_____

_____

(2 marks)

(c) (i) On the grid provided on page 8, plot a line graph of Jameel's results for the distance of the effort from the fulcrum against the mass required to balance the lever.
(4 marks)

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

(d) (i) Extend your graph to read the point where the load is 250 g. Mark this point with an X. **(2 marks)**

(ii) Using the graph, determine the value of the distance from the fulcrum for a load of 250 g. Draw TWO dotted lines in the appropriate places on the graph to assist you with your reading. **(4 marks)**

(e) From your graph, state how the effort changes as the distance from the fulcrum increases.

_____

_____

(2 marks)

(f) Figure 4 is a picture of one of the masses used by Jameel. In the box provided, draw a two-dimensional diagram of the mass. Include the following in your drawing:

- The magnification
- Clear lines
- A title for the drawing **(3 marks)**



Figure 4. One of the masses used by Jameel

Total 24 marks

END OF TEST

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