FORM TP 2010085

TEST CODE **01230032**

MAY/JUNE 2010

CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE EXAMINATION

INTEGRATED SCIENCE
(Single-Award)

Paper 03/2

General Proficiency

PRACTICAL PAPER

2 1/2 hours

READ THE FOLLOWING DIRECTIONS CAREFULLY.

1. This test consists of TWO questions. You should answer **BOTH** questions.

2. You MUST use this answer booklet when responding to the questions. For EACH question, write your answer in the space indicated and return the answer booklet at the end of the examination.

3. Each question is divided into parts. Each part measures a particular skill. The allocation of marks to the skill within each part is given at the end of that part.

4. You MUST read ALL instructions completely and carefully before you begin the questions.

N.B. You are allowed to have practical notebooks and/or any materials relevant to the practical examination.

You may be given additional materials without penalty.

If you lose time during the examination through no fault of your own, you will be awarded the equivalent time.

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Answer ALL questions

1. You are provided with the following:

– Half of an okra/ochro (longitudinally cut)

– One soaked red bean

– One ruler

– Three petri dishes

– One scalpel

– 25 cm^3 of iodine

– One pipette

Proceed as indicated below.

(a) In the space provided, draw and label a diagram of the

(i) cut okra/ochro

(ii) soaked red bean.

Diagram of an okra/ochro



Diagram of a soaked red bean

(5 marks)

(b) (i) Measure the length and diameter of the okra and record these measurements in Table 1.

(ii) Measure the length of the bean and the width across its centre and record these measurements in Table 1.

TABLE 1: MEASUREMENTS RECORDED

Plant Material	Length (cm)	Diameter (cm)	Width (cm)
Okra			
Bean			

(8 marks)

(c) Write a suitable title for Table 1.

_____

(2 marks)

(d) Procedure

I. Carefully remove ONE okra seed and crush it in a petri dish or saucer provided.

II. Repeat Step I for a second okra seed in another petri dish or saucer provided.

III. To EACH seed add THREE drops of iodine and record any colour change you observe.

IV. Record your observations and inferences in Table 2 below.

V. Carefully open the bean and crush one cotyledon in a petri dish or saucer.

VI. To the crushed cotyledon, add three drops of iodine and note any colour change.

VII. Record your observations and inferences in Table 2. **(4 marks)**

TABLE 2: FOOD TESTS

Plant Material	Observation	Inference
Okra seed 1		
Okra seed 2		
Bean cotyledon		

(e) Classify EACH of the plant materials as fruit or seed, giving ONE reason in EACH case.

Okra: _____

Reason: _____

_____

Bean: _____

Reason: _____

_____

(4 marks)

(f) Suggest ONE reason why two okra seeds were used to perform the food test, instead of one seed.

_____

_____

_____

(1 mark)

(g) Suggest a suitable hypothesis for this investigation.

_____

_____

_____

(2 marks)

Total 26 marks

2. You are provided with the following materials:

- A piece of wood, labelled A, of length 30 cm covered with **rough sand paper**. The piece of wood has a groove at one end.
- A piece of wood, labelled B, of length 30 cm covered with **grease proof/wax paper**. The piece of wood has a groove at one end.
- A mounted piece of wood, labelled C, with nails 2 cm apart attached at the side
- A small box of mass 100g

(a) Procedure

I. Place the piece of wood labelled B on the mounted piece of wood labelled C such that the groove rests on the lowest nail. The nails are 2 cm apart.

II. Place the small box approximately halfway up the piece of wood labelled B and observe what happens.

III. Repeat Step II with a different slope using the nails on the mounted piece of wood labelled C to adjust the height, until the weight on the piece of wood labelled B just starts to slide.

IV. Record, in Table 3, the height at which the weight just starts to move.

V. Repeat Steps I to IV using the piece of wood labelled A instead of the piece of wood labelled B.

TABLE 3: RESULTS OF EXPERIMENT

Material	**Height (cm)**	**Frictional force (_____) units**
A		
B		

Frictional force = height in cm × 0.01 N/cm

(6 marks)

(b) (i) Use your results and the formula above to calculate the frictional force and record your results in Table 3. **(2 marks)**

(ii) In the heading of Table 3, write the unit in which the frictional force is measured. **(1 mark)**

(iii) From your results, state, **with an explanation**, which surface had the HIGHEST frictional force.

_____

_____

_____

_____

(2 marks)

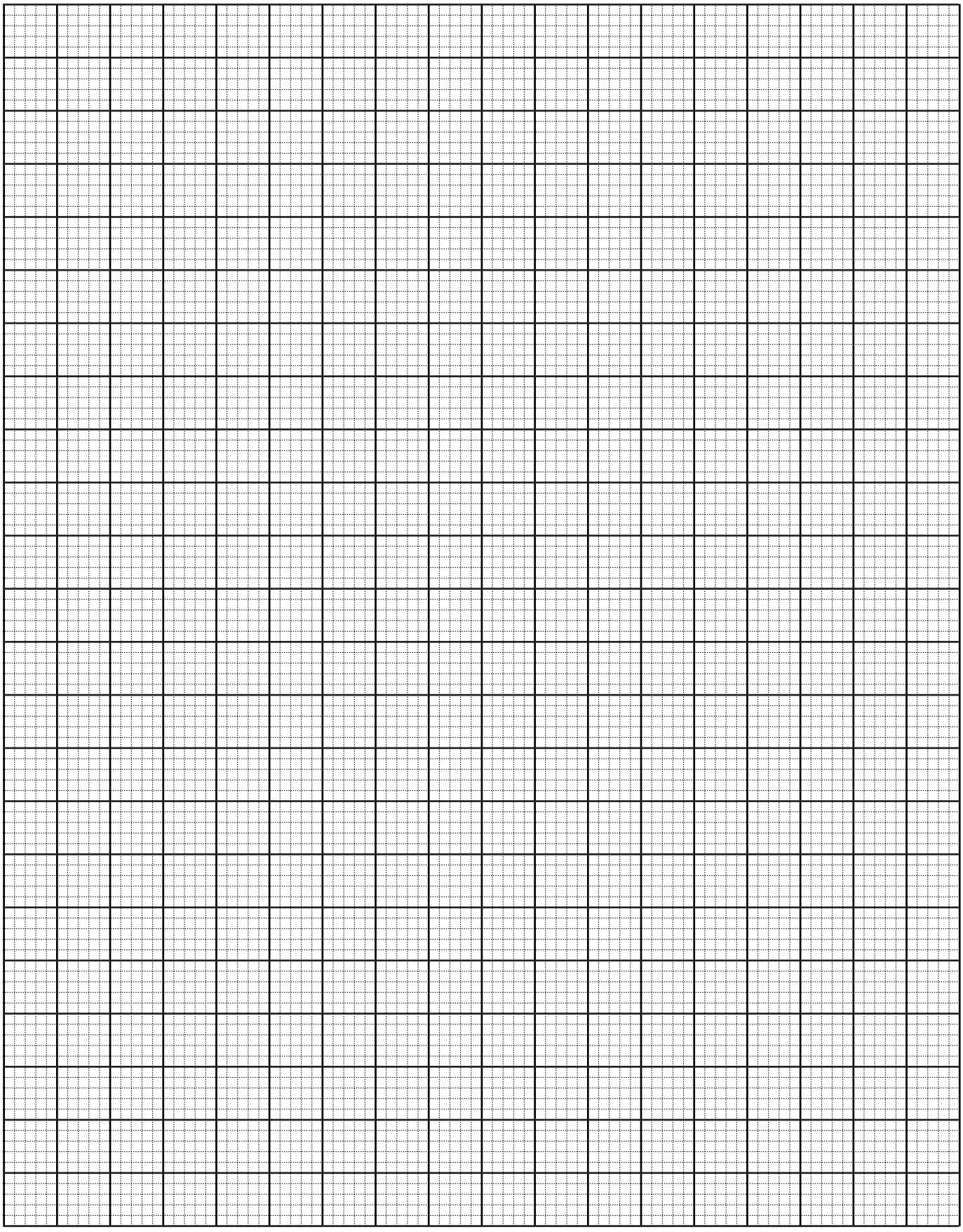
(c) (i) In the space below, draw a labelled diagram of the apparatus as it was used.

(2 marks)

(ii) Write a suitable title for this drawing.

_____

(1 mark)



(d) (i) Table 4 gives varying heights in centimetres. For EACH height, calculate the corresponding frictional force.

TABLE 4. FRICTIONAL FORCE

Height (cm)	Frictional force
0	
4	
8	
12	
16	
20	
24	
28	

(3 marks)

(ii) Using the data in Table 4, plot a graph of the frictional force against height on the graph paper provided on page 8. **(6 marks)**

(iii) Indicate on the graph the MAXIMUM frictional force for the box on the piece of wood labelled A. **(1 mark)**

(iv) What is the frictional force on the box when the height is 15 cm?

_____

(1 mark)

(e) List THREE variables that were controlled in this experiment.

_____

_____

_____

(3 marks)

Total 28 marks

END OF TEST

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General Proficiency

INSTRUCTIONS FOR SETTING UP THE PRACTICAL EXAMINATION

The attention of Supervisors is drawn to the *Supervisor's Report on the Practical Examination* which accompanies these instructions. The report MUST be filled in, placed on top of the completed scripts for the Practical Examination and sent to the appropriate marking centre.

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NOTES TO SUPERVISORS

A. On the day of the examination, the person responsible for preparing the practical **MUST** carry out the experiments as described on the question paper and **SEND** in a report using the attached form entitled "Supervisor's Report on the Practical Examination". If this is not done, candidates may be at a disadvantage.

N.B. The report should include any special conditions that might have affected candidates' performances. Supervisors should specify whether all candidates were affected or if not, give the registration numbers of those candidates who were affected.

B. The experiments must be carried out using similar apparatus to, and the same materials as, those supplied to the candidates. They should also be performed at the same time as the examination or immediately before or after.

*The Supervisor's work should **NOT** be seen by, nor should his/her results be communicated to the candidates.*

C. Candidates are allowed to have practical notebooks and/or materials relevant to the practical examination. Candidates may be given additional materials without penalty.

If candidates lose time during the examination through no fault of their own, they must be awarded the equivalent time.

Each candidate should be provided with the following materials and apparatus:

Question 1.



- Half an okra/ochro cut in longitudinal section
- One red bean soaked in water overnight
- One ruler
- Three petri dishes (if these are not available glass or porcelain saucers may be used)
- One scalpel (if this is not available a razor blade may be used)
- 25 cm^3 iodine solution
- One pipette/medicine dropper

Question 2.

- A retort stand. (If retort stand is not available a sturdy support for the wood strip C may be used as a replacement)
- A 100 g weight enclosed in a matchbox sized box which is totally covered with white bond paper
- Strip A – one piece of wood 30 cm long, 3 cm wide and 1 cm thick covered with rough sand paper. The piece of wood should have a groove 1 cm from the end which can accommodate the nail.

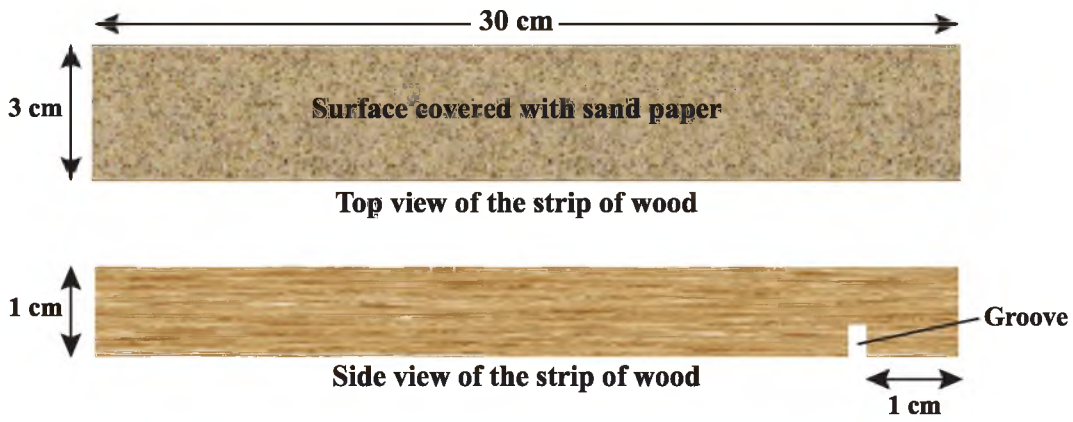


Figure 1 – Strip A

- Strip B – one piece of wood 30 cm long, 3 cm wide and 1 cm thick covered with grease proof paper. The piece of wood should have a groove 1 cm from the end which can accommodate the nail.

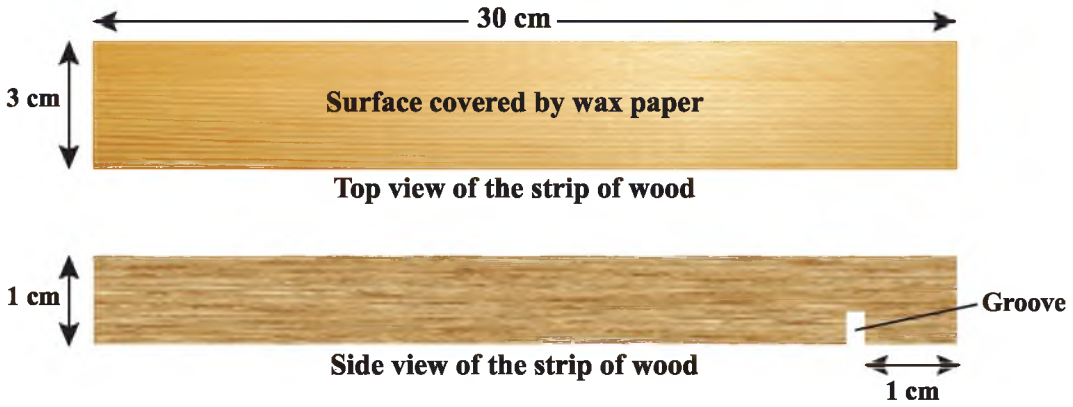


Figure 2 – Strip B

- Strip C – one piece of wood 30 cm long, 3 cm wide and 1 cm thick covered with headless nails (at least 3 inches or 7.5 cm) stuck at exactly 2 cm intervals in the side of the strip.

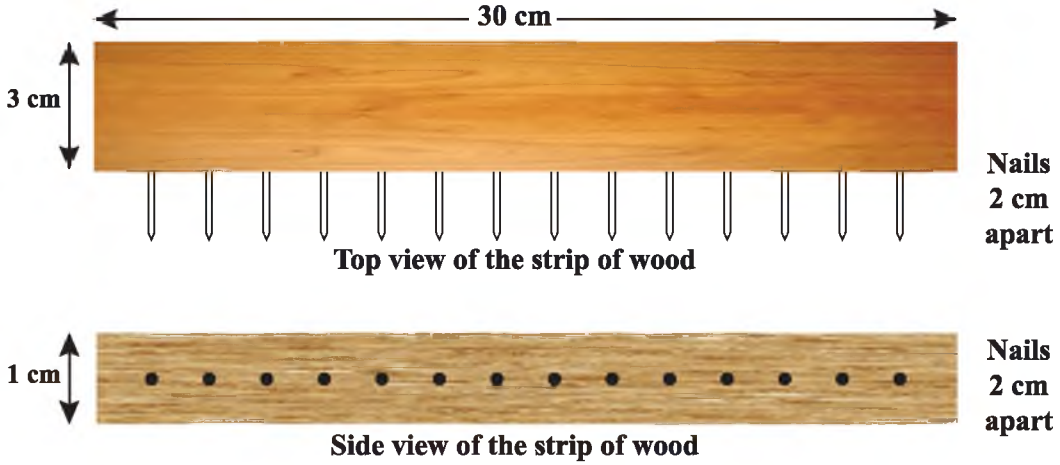


Figure 3 – Strip C

The apparatus must be assembled prior to the start of the examination as in Figure 4.

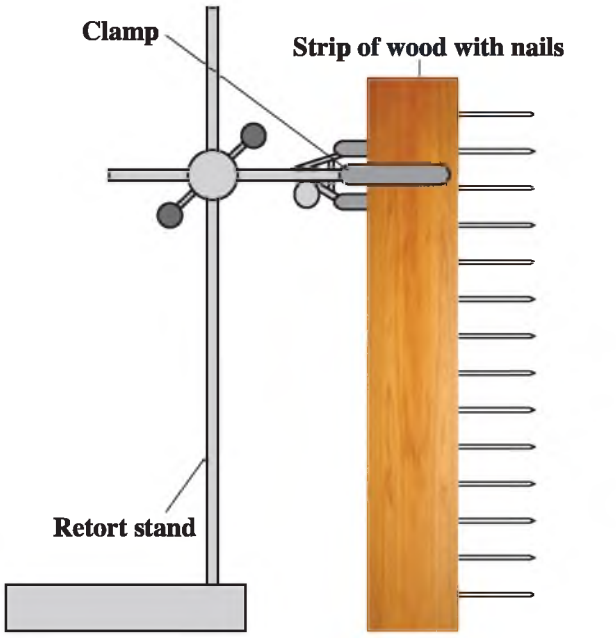


Figure 4

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SUPERVISOR'S REPORT ON THE PRACTICAL EXAMINATION

SCHOOL CODE:		**SCHOOL NAME:** _____		**SUPERVISOR'S NAME:**	

The person responsible for setting up the examination MUST complete the back page of this report, which MUST accompany candidates' answer booklets for the Practical Examination and be sent to the appropriate marking centre.

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B. The experiments must be carried out using similar apparatus to, and the same materials as, those supplied to the candidates. They should also be performed at the same time as the examination or immediately before or after.

*The Supervisor's work should **NOT** be seen by, nor should his/her results be communicated to the candidates.*

C. Candidates are allowed to have practical notebooks and/or materials relevant to the practical examination. Candidates may be given additional materials without penalty.

If candidates lose time during the examination through no fault of their own, they must be awarded the equivalent time.

The supervisor must carry out the instructions given to the candidates in Questions 1 and 2 and record the observations or measurements in Table 1, Table 2 and Table 3 respectively.

TABLE 1. MEASUREMENTS RECORDED

Plant Material	Length	Diameter	Width
Okra			
Bean			

TABLE 2. FOOD TESTS

Plant Material	Observation	Inference
Okra 1		
Okra 2		
Bean cotyledon		

TABLE 3.

Material	Height (cm)
A	
B	

Supervisors should provide a report on any candidate who experienced any difficulties during the examination. (Indicate registration numbers.)

Report on any special conditions that may have affected the performance of all the candidates.