

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

25 MAY 2022 (a.m.)



FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

TEST CODE

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SUBJECT PHYSICS – Paper 032

PROFICIENCY GENERAL

REGISTRATION NUMBER

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SCHOOL/CENTRE NUMBER

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NAME OF SCHOOL/CENTRE

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CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)

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DATE OF BIRTH

D	D	M	M	Y	Y	Y	Y
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FORM TP 2022104



TEST CODE **01238032**

MAY/JUNE 2022

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION

PHYSICS

Paper 032 – General Proficiency

Alternative to School-Based Assessment

2 hours 10 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of THREE questions. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. Where appropriate, ALL WORKING MUST BE SHOWN in this booklet.
5. You may use a silent, non-programmable calculator to answer questions, but you should note that the use of an inappropriate number of figures in answers will be penalized.
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.**

1. You are required to determine an unknown weight, W , by using the principle of moments.

Apparatus and Materials

- Metre ruler
- Spring balance (0–10 N)
- Retort stand
- Unknown mass
- Pivot
- String

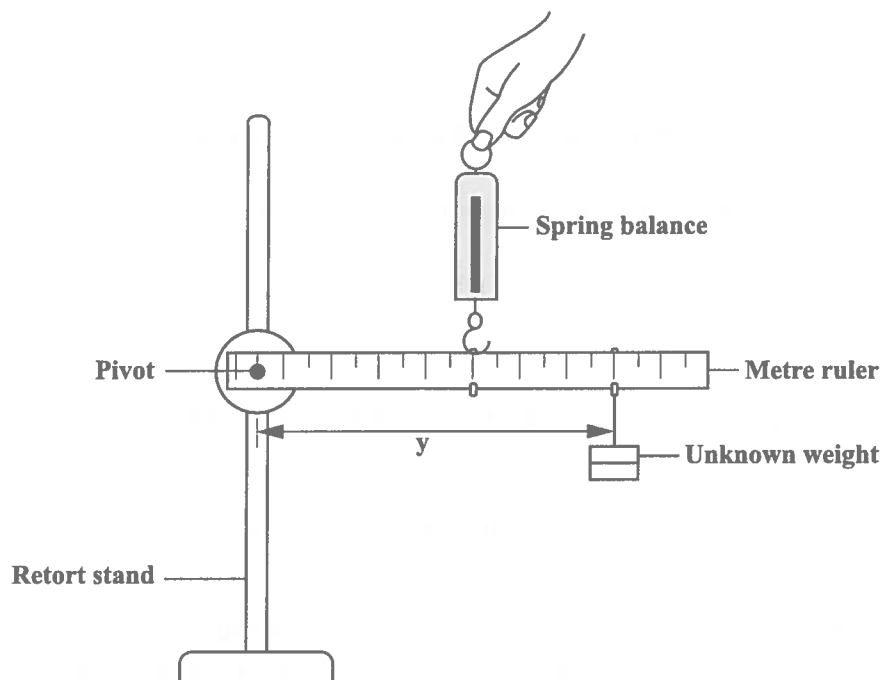


Figure 1. Set-up of apparatus for finding the unknown weight, W , using moments



Procedure

1. Set up the apparatus as shown in Figure 1.
2. Attach the spring balance to the metre ruler at the 50 cm mark.
3. Pivot the metre ruler at the 2 cm mark by pushing the pin through the hole, as shown in Figure 1 on page 4.
4. Attach the unknown weight securely to the metre ruler at the 72 cm mark so that $y = 70$ cm.

[NB: y is the distance between the pivot (at the hole) and the point on the metre ruler from which the unknown weight is suspended.]

5. Hold the spring balance so that the metre ruler is in the horizontal position.
6. Record the reading for force, F , on the spring balance and the corresponding length, y , in Table 1 on page 6.
7. Vary the position of the unknown mass on the metre ruler for an additional five values: 22 cm, 32 cm, 42 cm, 62 cm, 82 cm.
8. Repeat Steps 5 and 6 for each position of the unknown mass on the metre ruler.

TABLE 1: LENGTH, y , (cm) AND CORRESPONDING FORCE, F , (N)

Position on Metre Ruler (cm)	Length, y (cm)	Force, F (N)
22		
32		
42		
62		
72	70	
82		

(4 marks)

- (b) Using the grid provided in Figure 2 on page 7, plot a graph of force, F , against length, y . (8 marks)

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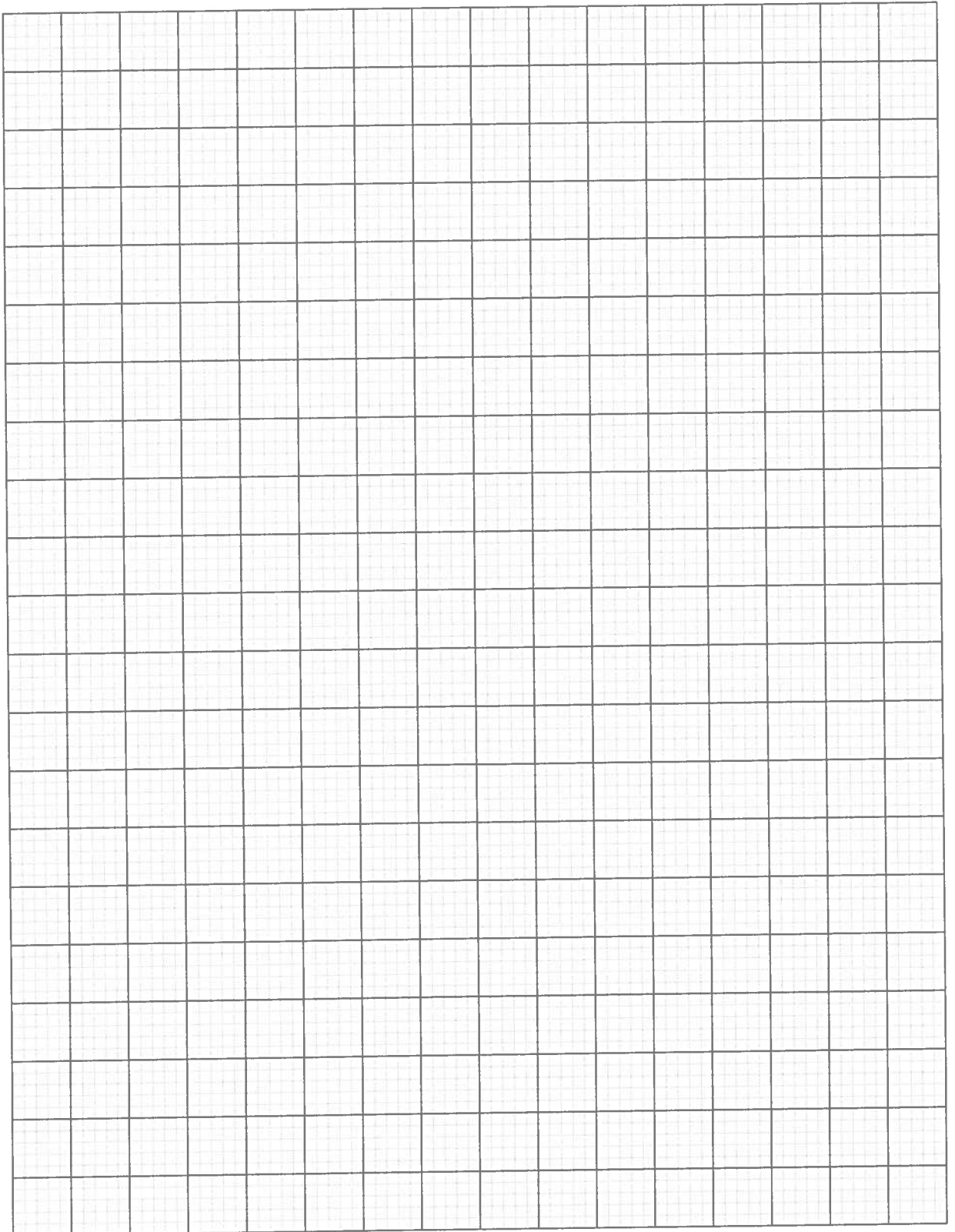


Figure 2. Graph of force, F , against length, y

(5 marks)

(d) Find the unknown weight, W , given that $G = W/48$.

(3 marks)

(e) State ONE precaution which should be taken to ensure that the metre ruler is horizontal.

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(1 mark)

Total 21 marks



NOTHING HAS BEEN OMITTED.

The results were used to obtain the graph in Figure 3.

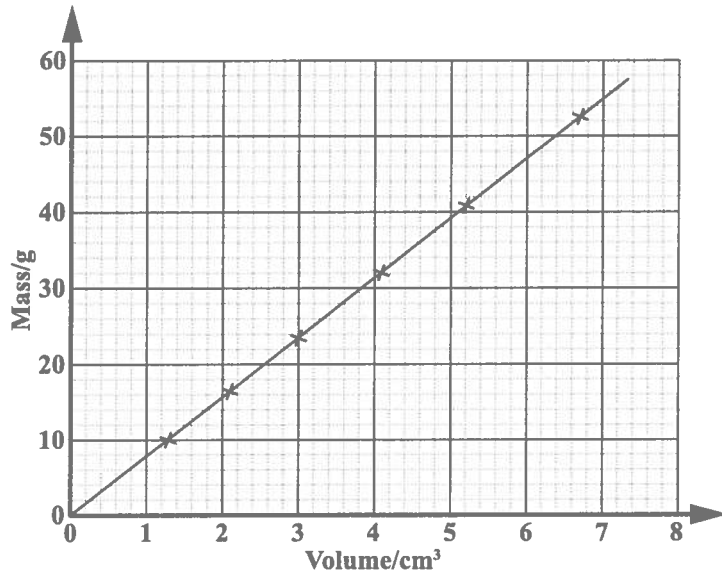


Figure 3. Graph of mass, g , versus volume, cm^3

- (a) Assuming the pieces of material to be tested were irregularly shaped, describe a method that could be used to obtain the data plotted in Figure 3.

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(4 marks)

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- (b) Using the graph in Figure 3, on page 10, complete Table 2.

TABLE 2: MASS, *g*, AND CORRESPONDING VOLUME, cm^3

Mass (<i>g</i>)	Volume (cm^3)
	1.3
16.5	
23.6	
	4.1
41.0	
	6.7

(6 marks)

- (c) Calculate the gradient of the graph drawn in Figure 3 on page 10.

TABLE 3: MATERIAL AND CORRESPONDING DENSITY

Material	Density (g cm⁻³)
Aluminium	2.64
Brass	8.55
Granite	2.69
Gold	19.29
Rubber	1.52
Steel	7.85

Material tested

(1 mark)

Total 17 marks

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3. Shastri recalled reading that for an ideal transformer, “the ratio of the primary voltage to the secondary voltage is equal to the ratio of the secondary current to the primary current.”

Plan and design an experiment to investigate whether the statement above is true.

(a) With the aid of a fully labelled circuit diagram, describe a procedure which can be used to investigate whether the statement is true. The circuit diagram must include the following components:

- A variable AC voltage supply
- AC voltmeters
- AC ammeters
- A transformer with adjustable turns ratio
- Connecting wires
- A load resistor

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(8 marks)

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(1 mark)

(c) State ONE conclusion that could be drawn from the investigation.

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(1 mark)

Total 10 marks

END OF TEST

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

01238032/MJ/CSEC 2022



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1. Fill in all the information requested clearly in capital letters.

TEST CODE:

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SUBJECT: PHYSICS – Paper 032

PROFICIENCY: GENERAL

REGISTRATION NUMBER:

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FULL NAME: _____
(BLOCK LETTERS)

Signature: _____

Date: _____

2. Ensure that this slip is detached by the Supervisor or Invigilator and given to you when you hand in this booklet.
3. Keep it in a safe place until you have received your results.

INSTRUCTION TO SUPERVISOR/INVIGILATOR:

Sign the declaration below, detach this slip and hand it to the candidate as his/her receipt for this booklet collected by you.

I hereby acknowledge receipt of the candidate's booklet for the examination stated above.

Signature: _____
Supervisor/Invigilator

Date: _____

