NAME..... Marking scheme. .....INDEX NO.....

CANDIDATE'S SIGNATURE.....

DATE.....

232/3
PHYSICS
PRACTICAL
PAPER 3
2 1/4HOURS

LONDIANI SUB COUNTY JOINT EVALUATION EXAMINATION 2022

Kenya Certificate of Secondary Education

PHYSICS
PRACTICAL
PAPER 3
2 1/4 HOURS

INSTRUCTIONS

Answer all the questions in this paper
You are supposed to spend the first 15 minutes of the 2 1/4hours allowed for this paper reading the whole paper carefully before starting your work.
Marks are given for clear record of the observations made, their suitability and accuracy and the use made of them.
Candidates are advised to record observations as soon as they are made
Mathematical table and electronic calculators may be used.

For Examiner's use only

QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	12	
B	21	
C	7	
	GRAND TOTAL	40

This paper consists of 9 printed pages

QUESTION 1

You are provided with the following:
- Lump of plasticine
- 50g mass
- Stand, boss and clamp
- 3 pieces of threads
- Meter rule
- Measuring cylinder
- Some water in a beaker

(a) Put 50ml of water in a measuring cylinder.
Mould the plasticine into a shape that can fit into the measuring cylinder without touching it's walls and tie it with the thread and completely immerse it in water in the measuring cylinder to determine it's volume, V.

V=....12 ± 1.....cm^3 (1mark)

V=....1.2×10^{-5}.....m^3 (1mark)

(b) Given that upthrust, **U** experience by the plasticine in water is **U=vρg**
Where: **v** – volume of the 20g mass
ρ- density of water ($1g/cm^3$)
g – acceleration due to gravity
Determine upthrust **U** on the of plasticine (3 marks

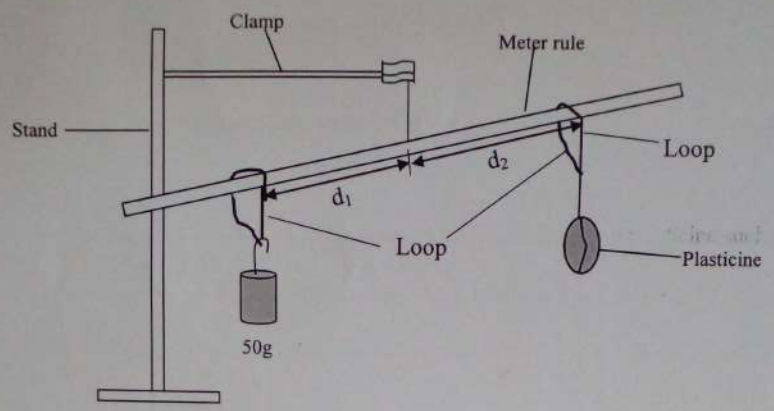
.....$U = 1.2 \times 10^{-5} \times 1000 \times 10$.....

.....$= 0.12\,N$.....

(c) Tie the meter rule with the thread at the center (50cm mark) and suspend it on the stand as shown on the figure below.

(d) Tie 50g mass with the thread and suspend it on the meter rule at a distance d_1 = [redacted]0cm from the center as shown on the figure.

Suspend the plasticine on the meter rule and then adjust distance d_2 of the plasticine such that the system balances horizontally as shown in the set up below.



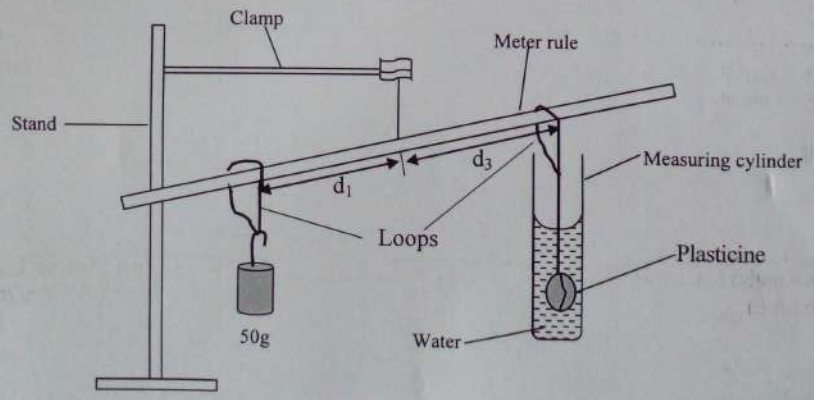
(f) Using the principle of moment determine the weight, W of the plasticine when the system is balancing horizontally. (3 marks)

$d_2 = 25.0\text{CM} \pm 2\text{CM}$

$0.5\text{N} \times 0.1\text{M} = W \times 0.25\text{M}$

$W = \frac{(0.5\text{N} \times 0.1\text{M})}{0.25\text{M}} = 0.2\text{N}$

(g) Immerse the suspended plasticine in the water in the measuring cylinder and adjust distance d_3 of the plasticine such that the system balances horizontally as shown below



(h) Record the value of d_3 (1mark)

$d_3 = 28.0\,cm\ (\pm 2.0\,cm)$ (1 d.p)

i) Given $R = \frac{d_3}{d_3 - d_2}$ determine the value of **R** (3marks)

$R = \frac{28}{28-25} = \frac{28}{3} = 9.333$

QUESTION 2

You are provided with the following:
- Two dry cells and a cell holder
- One voltmeter (0 – 5V)
- One ammeter (0 – 1A) or (0 – 2.5A)
- Six resistors labeled AB
- One resistor labeled R
- A switch
- 6 connecting wires with crocodile clip at one end
- Jockey attached to a connecting wire

(a) Set up the circuit as shown in figure 1

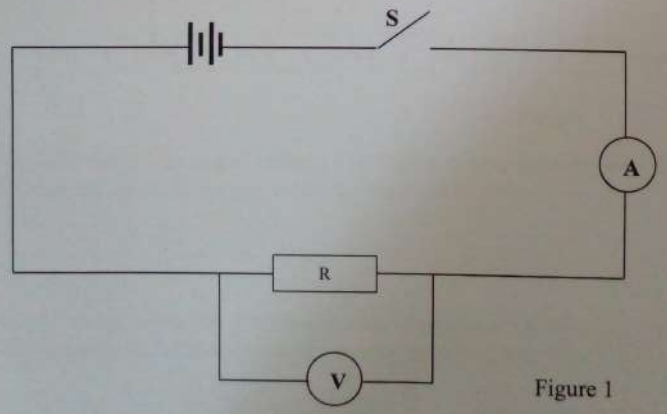


Figure 1

(i) Close the switch S, Read and record the voltmeter and ammeter readings

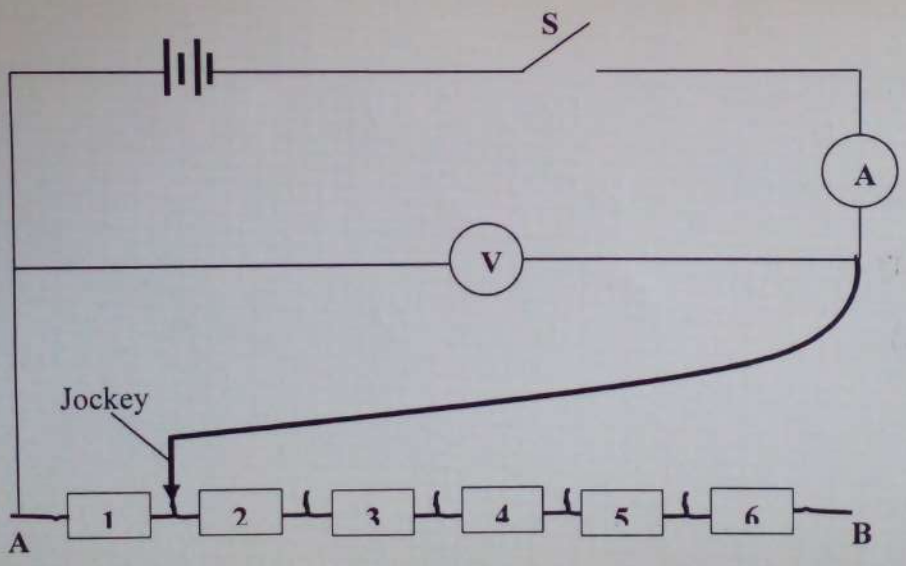
V = 2.40 ± 0.20V (1.d.p) ..... (1mark)

I = 0.24 ± 0.02A (2.d.p) ..... (1mark)

(ii) Determine the value of R given that $R = \frac{V}{I}$ (3marks)

$R = \frac{2.4}{0.24}\ \Omega = 10\text{V/A}$ ✓

(b) Set the circuit as shown in figure 2



Figure

(i) With the jockey across resistor 1 as shown above, close the switch, read and record the ammeter and voltmeter readings in table.

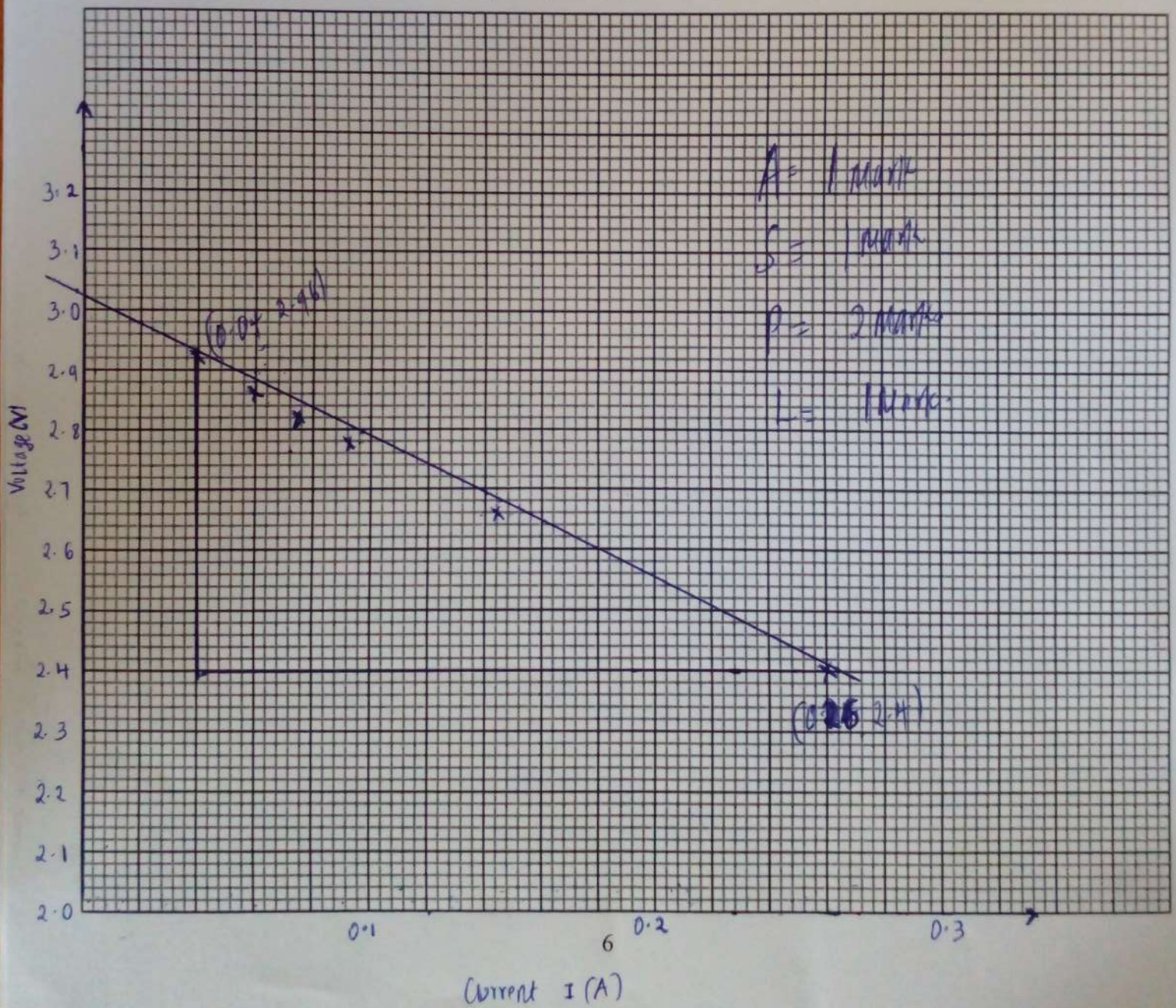
(ii) Repeat the procedure b (i) with crocodile clips across resistors 2, 3, 4, 5 and 6 respectively, each time recording the corresponding values for V and I in table 1

Table 1

Number of resistors	1	2	3	4	5	6	
p.d. (volts)	2.40	2.68	2.78	2.82	2.88	2.92	± 0.20
Current I (Amperes)	0.26	0.14	0.09	0.07	0.06	0.04	± 0.02.

(6 marks)

(c) On the grid provided plot the graph of p.d (V) (y axis) against I (A) (5 marks)



QUESTION 3

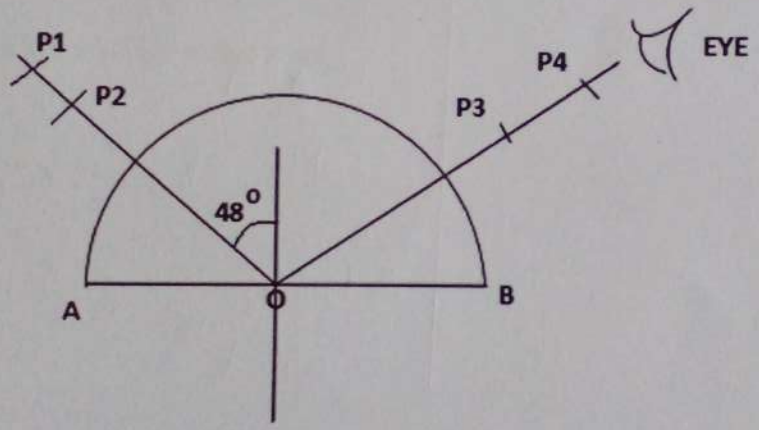
You are provided with the following:

- A semi-circular glass block
- Soft board
- White paper
- Four Optical pins
- Two Thumb pins
- Vernier calipers

Procedure

a) Measure the thickness of the glass block using the Vernier calipers provided

t = ...1·50...cm ± 0·10 CM (2.dp) (1mark)



b) Fix the plain paper to the soft board using drawing/thumb pins

c) Place the semi-circular glass block on the paper and trace its outline. Remove the block and label A and B as shown in figure above.

d) Identify the centre O of the plane and draw the normal at that point as shown in the figure above.

e) Measure incident angle i as 48^0 then draw the incident ray

d) Place two pins P_1 and P_2 on the incident ray as shown.

e) Move your eyes at curved face and locate the images of pins P_1 and P_2, place pins P_3 and P_4 such that the four pins are aligned in a straight line.

f) Remove the glass block and join points P_3 and P_4 to meet the interface AB.

g) Measure the angle Y between incident ray and the reflected ray

Y= 96 ± 2° ✓ (1 mark)

.....

h) Find the value of **M** given that (3marks)

$M = \left(\frac{tY}{2}\right)^{-1} = \left(\frac{0.015 \times 96}{2}\right)^{-1} = 1.388$

.....

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i) Hand in the white paper used (2marks)