



MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education
PRE-MOCK EXAMINATIONS 2023

232/3

PHYSICS

Paper 3

April 2023 – 2½ Hours

Name: Adm No:

Class:Candidate's Signature:Date: 7/4/2023.

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided
- Answer ALL the questions in the spaces provided in the question paper
- You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work.
- Marks are given for a clear record of the observations actually made.
- Non-programmable silent electronic calculators and KNEC Mathematical tables may be used except where stated otherwise.

FOR EXAMINERS USE ONLY

QUESTION 1

	e	j	k	l	m	n	TOTAL
Maximum Score	1	7	5	3	3	1	20
Candidate's Score							

QUESTION 2

	a	b	d	f	g	h	i	j	TOTAL
Maximum score	2	1	1	6	1	4	2	3	20
Candidate's score									

TOTAL SCORE

QUESTION 1

You are provided with the following: -

- 2 new size D dry cells
- A cell holder
- A switch
- An ammeter
- Five connecting wires
- Wire mounted on the metre rule labelled X
- A micrometer screw gauge (to be shared)
- A Voltmeter

Proceed as follows

(a) Measure the diameter of the wire three times and determine the average diameter,

d mm (1 mark)

d..... m (1 mark)

(b) Determine the cross-section area of the wire,

A..... m² (1 mark)

(c) Connect the circuit as shown in the **figure 1** below.

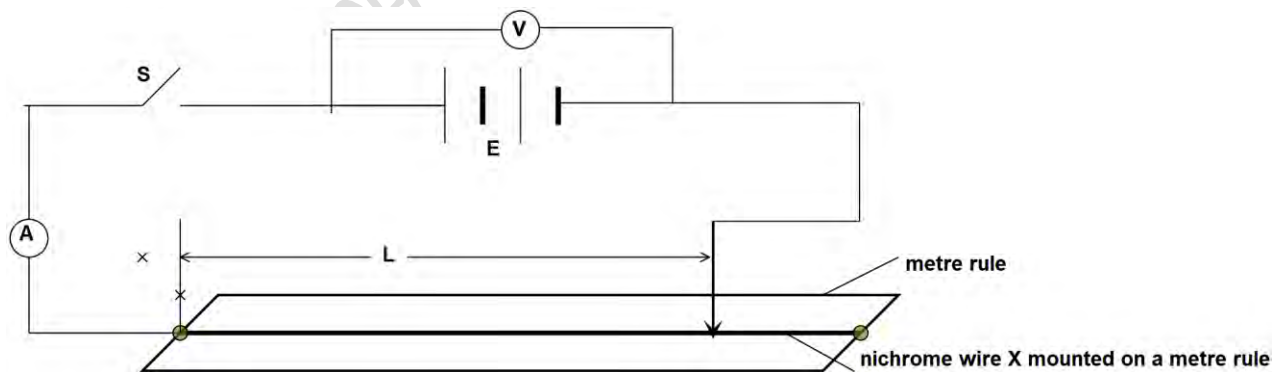


Figure 1

(d) **Measure** the voltage E from the Voltmeter, before closing the switch.

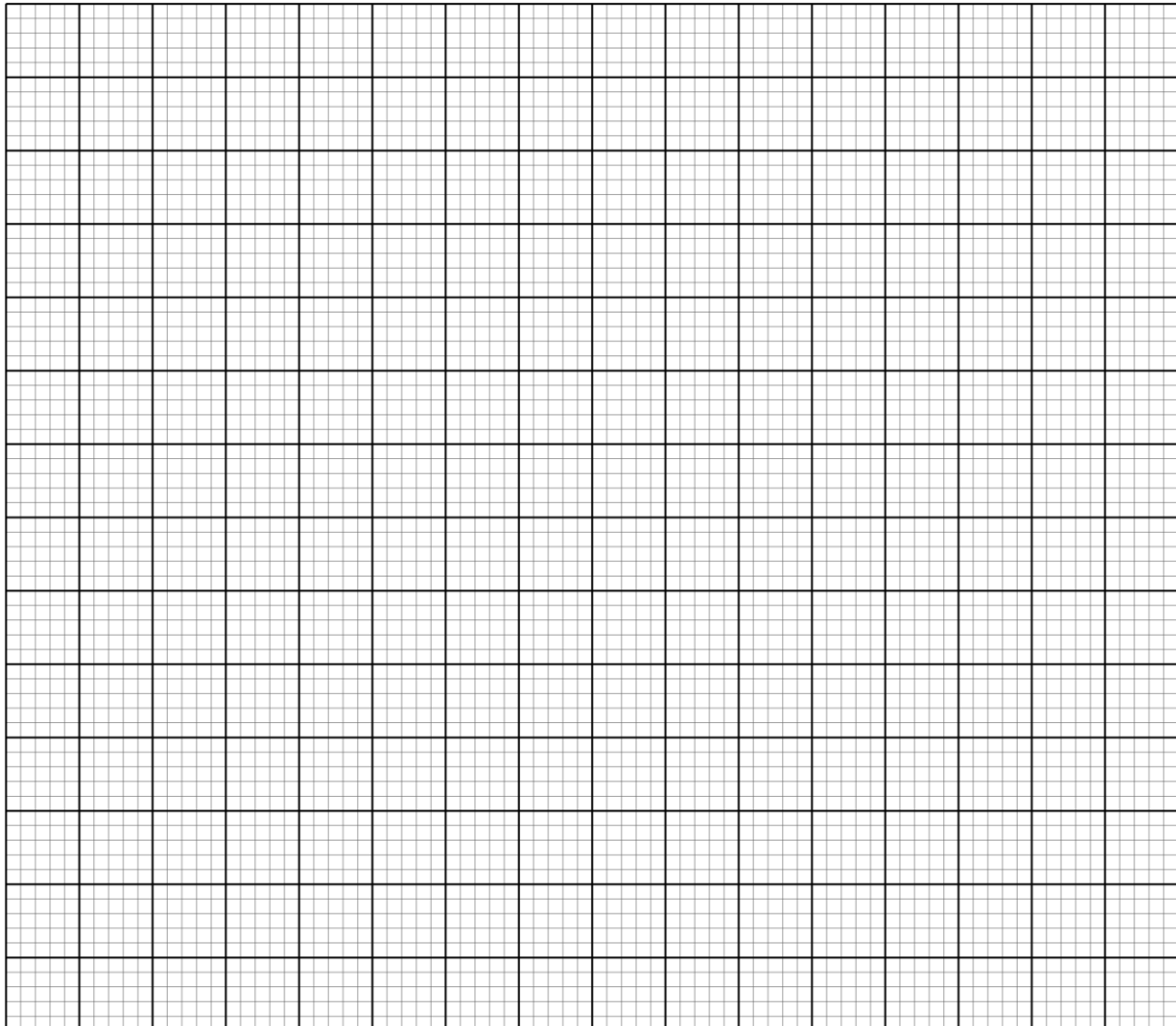
$E = \dots\dots\dots$ V (1 mark)

- (e) Adjust the length, l of the wire to 0.20m, close the switch, S and read the value of current and record in the **table 1** below.

Table 1

Length, l (m)	0.20	0.30	0.40	0.50	0.60	0.70
Current, I (A)						
$\frac{1}{I}$ (A^{-1})						

- (f) Repeat the procedure in (e) above for the values of lengths given. (6 marks)
- (g) **Calculate** the value of $\frac{1}{I}$ and record in the table above. (1 mark)
- (h) On the grid provided **plot** a graph of $\frac{1}{I}$ (y -axis) against $l(m)$ (4 marks)



- (i) **Determine** the gradient of the graph. (2 marks)

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- (j) Given that the equation $\frac{1}{I} = \frac{\rho}{EA}l + \frac{r}{E}$ holds for the graph, determine the value of ρ and r (3 marks)

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QUESTION 2

PART A

You are provided with the following:

- A lens and a lens holder.
- A screen with cross wires
- A candle
- A metre rule.

Proceed as follows:

- a) Arrange the lightened candle, the lens and the screen as shown in **figure 2**. Adjust the position of the screen until a sharp inverted image of the candle is formed on the screen.

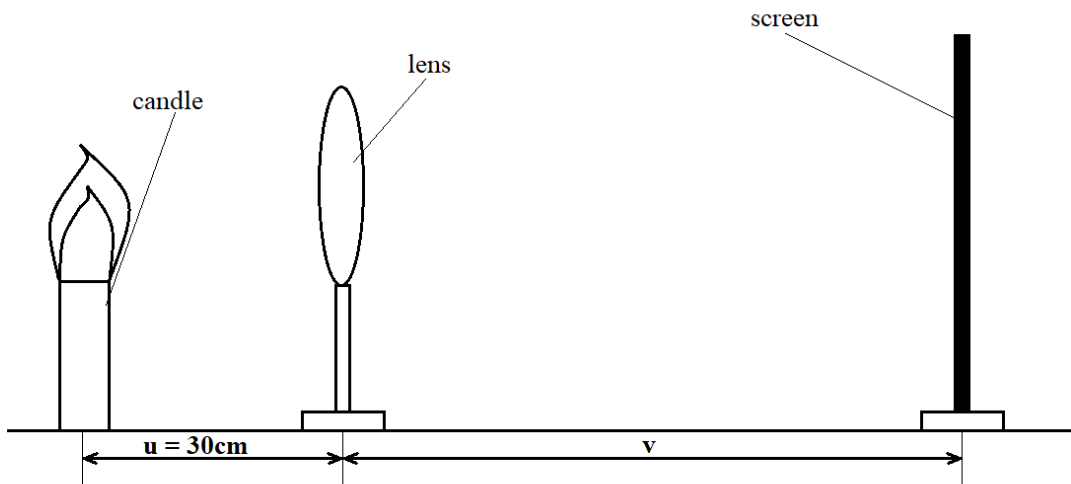


Figure 2

- i) Measure the image distance v

$v = \dots\dots\dots$ cm

(1 mark)

- ii) Determine the focal length of the lens using the formula $f = \frac{uv}{u+v}$ (2 marks)

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- b) Now arrange the lighted candle, the screen with cross wires and the lens as shown in **figure 3**. Ensure that the centre of the lens, the cross-wires, and the candle flame lie on the same horizontal line. The candle flames should be placed close to the cross-wires for better illumination.

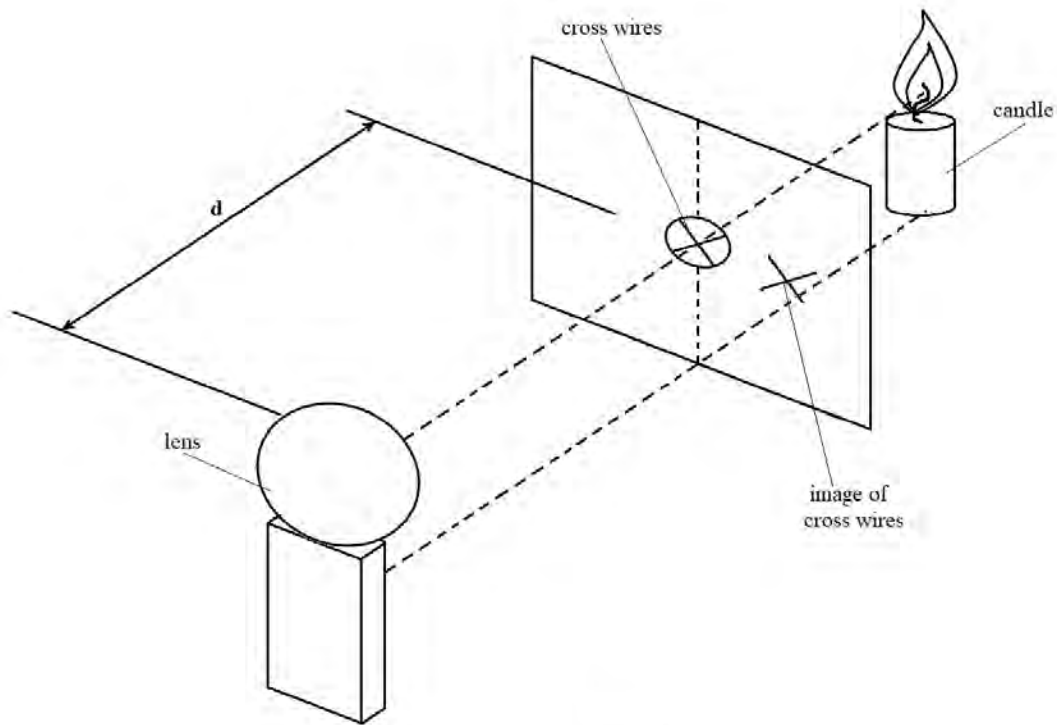


Figure 3

- i) Adjust the position of the lens until a sharp image of the cross-wire is formed on the screen next to the cross wires. (*Hint: You have to rotate the lens slightly about a vertical axis so that the image of the cross-wires falls on the screen next to the cross-wires and not on the cross-wires.*)

Measure the distance d , between the lens and the screen.

$d = \dots\dots\dots$ cm (1 mark)

- ii) Determine the values of L and X :

I. $L = \frac{df}{f-d}$ (2 marks)

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$$\text{II. } X = \frac{L}{2f} + 1$$

(2 marks)

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PART B

You are provided with the following:

- A metre rule
- A knife edge
- One 50g mass and a 100 g mass
- Two pieces of threads each 30 cm long
- Some water in a beaker
- Liquid L in a beaker
- Tissue paper

Proceed as follows

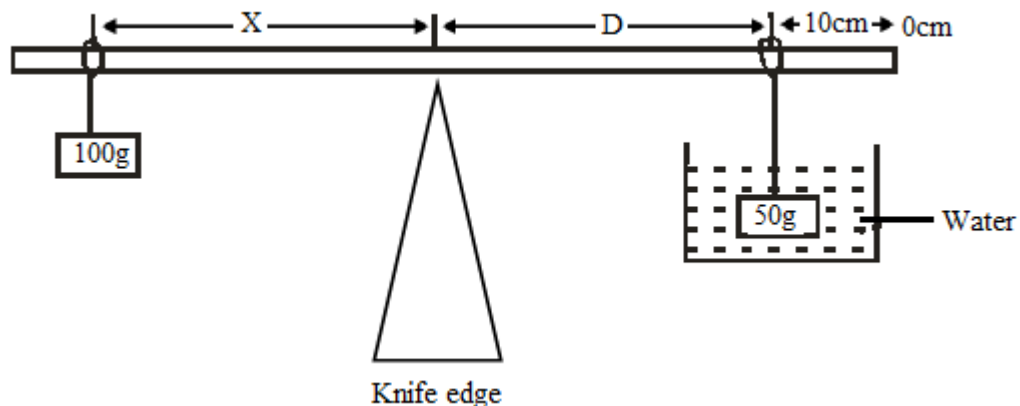
a) Balance the metre rule on the knife edge and record the reading at this point

Balance point =cm mark

(1 mark)

For the rest of this experiment the knife edge must be maintained at this position.

b) Set up the apparatus as shown in the **figure 4**

Figure 4

The balance is obtained by adjusting the position of 100g mass when 50g mass is fully immersed in water. Record the values of X and D.

X =

(1 mark)

D =

(1 mark)

c) Using the principle of moments;

(i) determine the weight W_1 of the 50g mass in water (2 marks)

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(ii) determine the Upthrust U_w in water (1 mark)

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d) Remove the 50 g mass from the water and dry it using a tissue paper.

Keeping D constant, adjust the position of 100g mass until the metre rule is balanced and record the value of distance X when the 50g mass is fully immersed in liquid L.

X = (1 mark)

(i) Determine the weight W_2 of the 50g mass in liquid L. (2 marks)

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(ii) Determine the Upthrust U_L in the liquid. (1 mark)

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e) Determine the relative density R.D of the liquid L, given that $R.D = \frac{U_L}{U_w}$ (1 mark)

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f) Find the density of liquid L in S.I unit (1 mark)

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