

232/2  
**PHYSICS**  
**PAPER 3**  
**Time: 2½ hours**  
**KCSE 2023 TOP PREDICTION MASTER**  
**CYCLE 3**

Name----- Index No -----

Candidate sign. -----Date -----

**INSTRUCTIONS TO CANDIDATES**

- (a) Write your name and index number and school in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) Answer ALL the questions in the spaces provided in the question paper.
- (d) You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.
- (e) Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.
- (f) Candidates are advised to record their observations as soon as they are made.
- (g) Non-programmable silent electronic calculators may be used.
- (h) This paper consists of 8 printed pages.
- (i) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (j) Candidates should answer the questions in English.

**For Examiner's Use Only**

**Question 1**

	e	f	g(i)	g(ii)	h
<b>Maximum Score</b>	7	5	2	2	4
<b>Candidate's Score</b>					

**Question 2**

	a(i)	a(ii)	a(iii)	b(i)	b(ii)	e	f	g	j
<b>Maximum Score</b>	1	2	2	2	2	5	2	1	3
<b>Candidate's Score</b>									

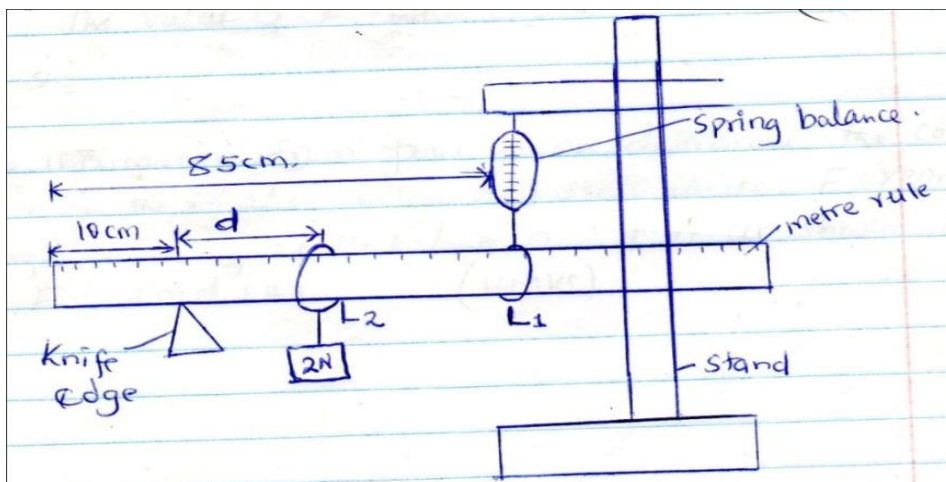
**1. You are provided with the following:**

- A metre rule
- A spring balance
- A mass of 200g ( 2N) with a hook or (two 100g masses)

- Stand
- Knife edge support.
- Two light strings about 10cm long.

Proceed as follows:

- (a) Using the string provided make two loops to be used as hooks L1 and L2 in the diagram.
- (b) Suspend the spring balance from a clamp and using one loop to support the rule from the spring so that the loop L2 is on 85cm mark.
- (c) Support the other end of the rule with a knife edge at the 10cm mark so that the rule is horizontal.



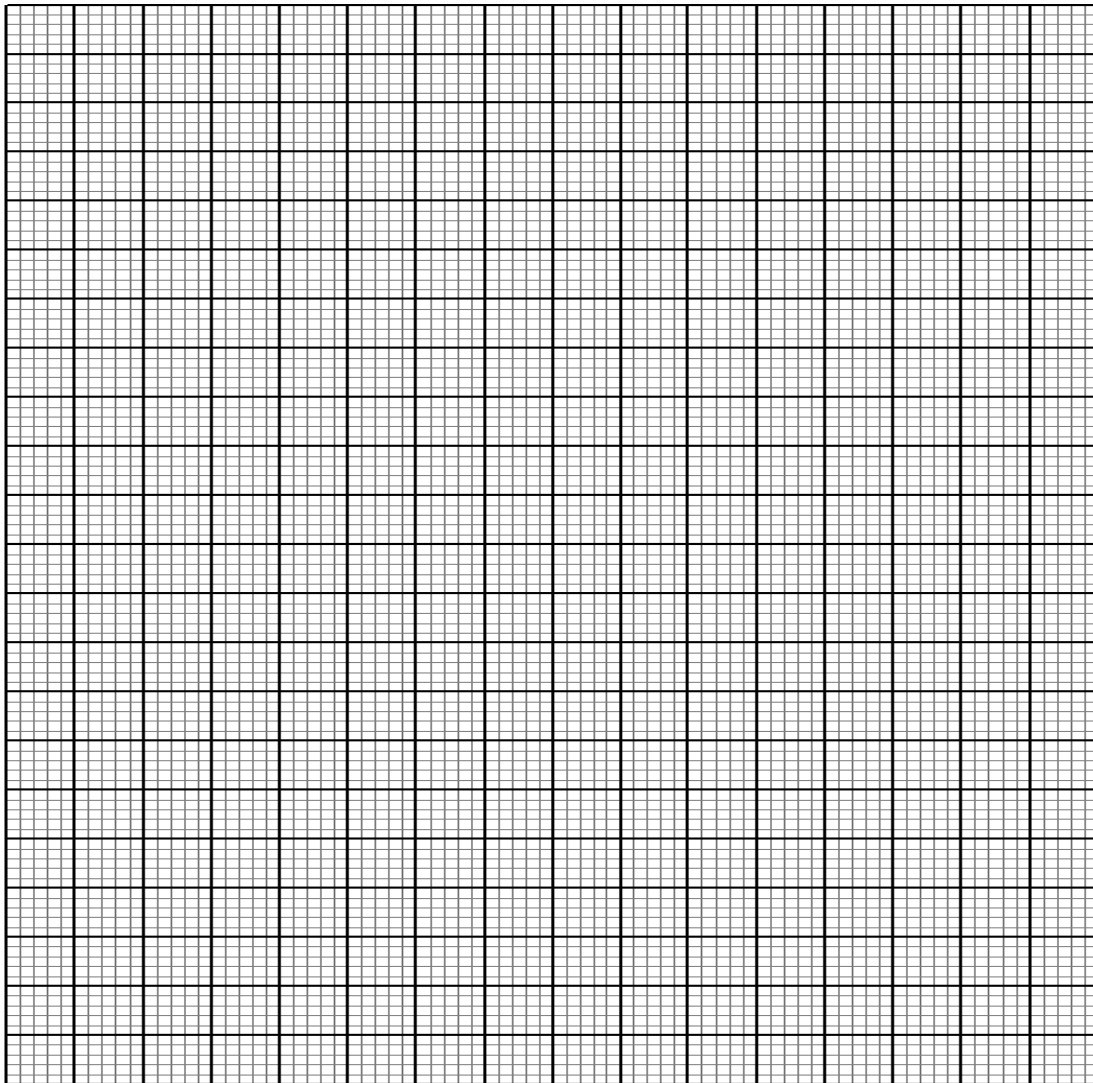
- (d) Using loop 1 suspended the 2N weight at a distance  $d=10\text{cm}$  from the knife edge as shown and take the reading of the spring balance, record the results in table 1.
- (e) Adjust the distance  $d$  to 20cm, 30cm e.t.c and each time recording the reading of the balance to complete the table.

Table 1

Distance (d)	10.0	20.0	30.0	40.0	50.0	60.0	70.0
Force (N)							

(7marks)

- (f) Plot a graph of force  $F$  against distance  $d(\text{cm})$  (5 marks)



(g) From your graph determine:  
 i) The slope (2mks)

ii) The value of F when  $d=0$  (2mks)

(h) Using the information from your graph, determine the constant k and m in the equation below and state units, f represents the reading of the balance and d is as shown in the above.  **$F=2md + 40k$** . (4marks)

## Question 2

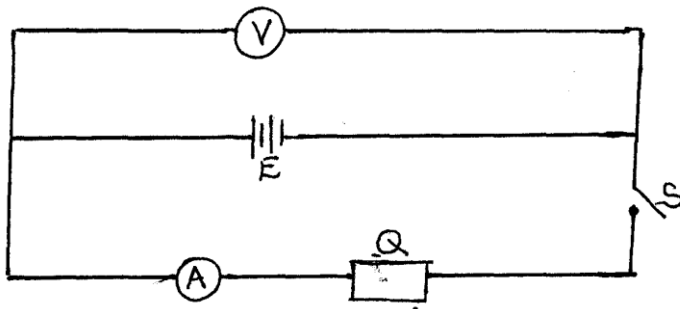
**PART A**

**You are provided with the following:**

- Two new dry cells
- A resistor labeled Q
- Wire mounted on a millimeter scale
- 6 connecting wires with crocodile clips on one end of at least three
- A voltmeter
- An ammeter
- A switch

**Proceed as Follows:**

(a) Connect the apparatus provided as shown in the figure below.



(i) Take the voltmeter reading when the switch S is open.

$V_1 = \dots\dots\dots$  volts (1 mark)

(ii) Close the switch S, and take the voltmeter reading  $V_2$  and the ammeter reading I

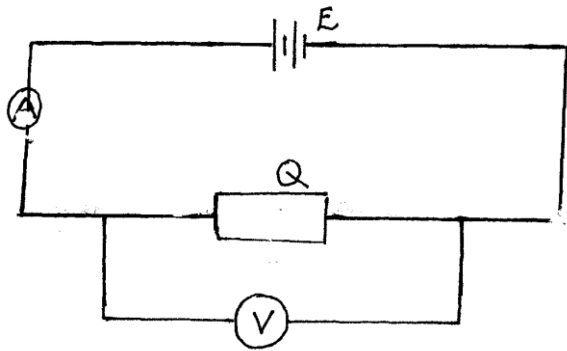
$V_2 = \dots\dots\dots$  volts (1 mark)

$I_1 = \dots\dots\dots$  Amperes (1 mark)

(iii) Calculate the quantity  $P = \frac{V_1 - V_2}{I_1}$  (2 marks)

.....  
.....

(b) Set up the circuit as shown in the figure below



- (i) Take the voltmeter reading  $V$  and the ammeter reading  $I$ . (2 marks)

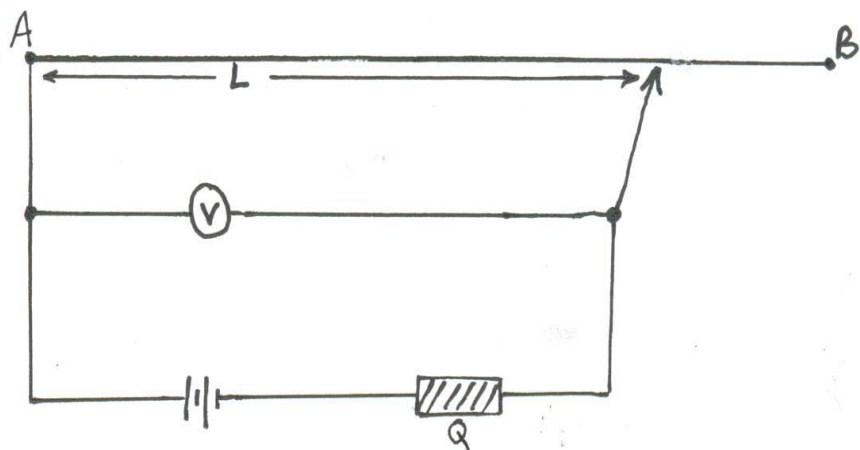
$V = \dots\dots\dots$

$I = \dots\dots\dots$

- (ii) Determine the resistance  $R$  of  $Q$  (2 mark)

.....  
 .....

- (c) Set up the circuit shown in the figure below



- (d) Move the crocodile clip along the wire  $AB$  to a point such that  $L = 100\text{cm}$ . Note the voltmeter reading and record in table 2.

- (e) Repeat (d) above for values of  $L = 80\text{cm}$ ,  $60\text{cm}$ ,  $40\text{cm}$ ,  $20\text{cm}$  and  $0\text{ cm}$ , tabulate your results.

(5 marks)

**Table 2**

<b>Length L</b> <b>(cm)</b>	<b>100</b>	<b>80</b>	<b>60</b>	<b>40</b>
$\frac{1}{L} \left( \frac{1}{cm} \right)$				
<b>Voltmeter Reading</b> <b>(V)</b>				
$\frac{1}{V} \left( \frac{1}{V} \right)$				
$Z = \frac{\frac{1}{L}}{\frac{1}{V}} \text{ (V/cm)}$				

(f) Determine the average value of Z. (2 marks)

.....

.....

.....

## **PART B**

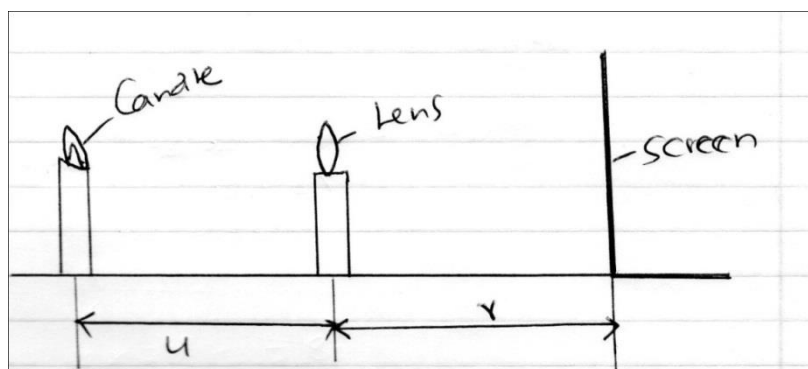
You are provided with the following

- A candle
- A lens and a lens holder
- A screen
- A metre rule

(g) Determine the focal length, f by focusing a distant object.

f = .....cm (1mark)

(h) Set up apparatus as shown in the figure below ensure that the candle flame and the lens are approximately the same height above the bench.



- (i) Set the position of the lens so that it is 40cm from the candle ( $u=40\text{cm}$ ). Adjust the position of the screen until a sharp image of the candle flame is obtained. Measure the distance ( $v$ ) between the lens and screen. Record the value of  $v$  in the table below.
- (j) Repeat the procedure in (i) above for the other values of  $u$  in the table 3 below. Complete the table (3marks)

Table 3

<b>U(cm)</b>	<b>40</b>	<b>50</b>
<b>V(cm)</b>		
<b>Magnification <math>m=v/u</math></b>		

THIS IS THE LAST PRINTED PAGE