MOI GIRLS SECONDARY SCHOOL - KAMANGU

Name…… ***Adm. No***……

FORM 3 PHYSICS

END OF TERM 3 2024

232/3 PAPER 3 (PRACTICAL)

TIME: 2½ HOURS

INSTRUCTIONS TO THE CANDIDATE:

- ***a)*** *Write your **name**, **school** and **Admission number** in the spaces provided at the top of this page*
- ***b)*** *Answer all questions in the spaces provided*
- ***c)*** *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.*
- ***d)*** *Marks are given for a clear record of the observations actually made, their suitability, accuracy and the used made of them.*
- ***e)*** *Candidates are advised to record their observations as soon as they are made.*
- ***f)*** *Non- programmable silent **electronic calculator** and **KNEC Mathematical tables** and electronic calculators may be used except where stated otherwise.*

FOR EXAMINERS USE ONLY

Question 1	**A1**	**Total**
Maximum Score		**20**
Candidate's Score		

Question 2			
	2	**Total**	
Maximum Score		**20**	
Candidate's Score			

This paper consists of 8 printed pages. Candidates should check to ensure that all pages are

Printed as indicated and no question(s) is missing.

Question One

You are provided with the following apparatus

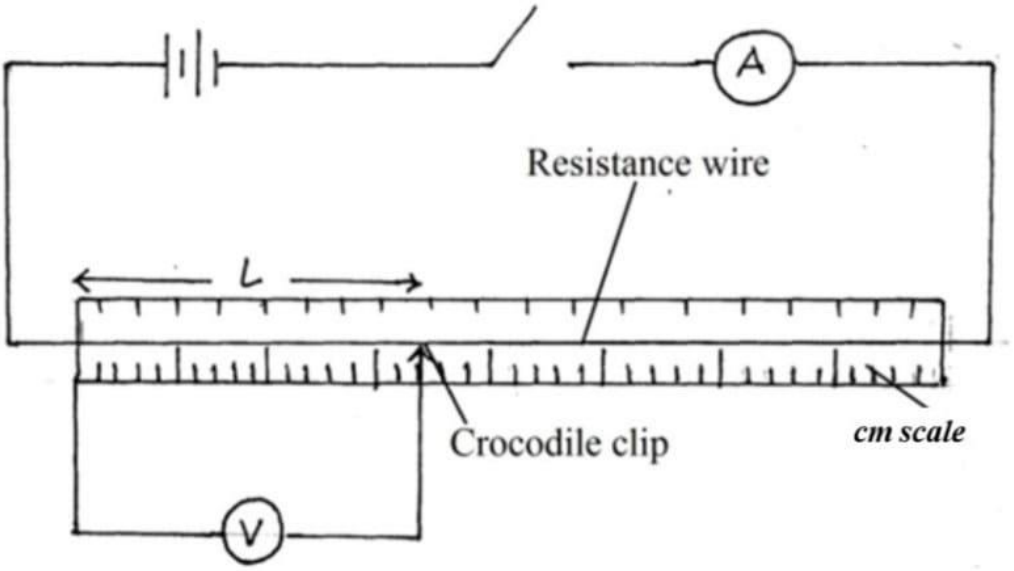
- Voltmeter
- Ammeter
- Resistant wire mounted on an **cm scale**
- A switch
- Seven connecting wires
- Two new dry cells and a cell holder
- Micrometre screw gauge

Proceed as follows

(a) Measure the diameter **d,** of the mounted wire

d= _____mm (1mark)

(b) Set up the apparatus as in the circuit below



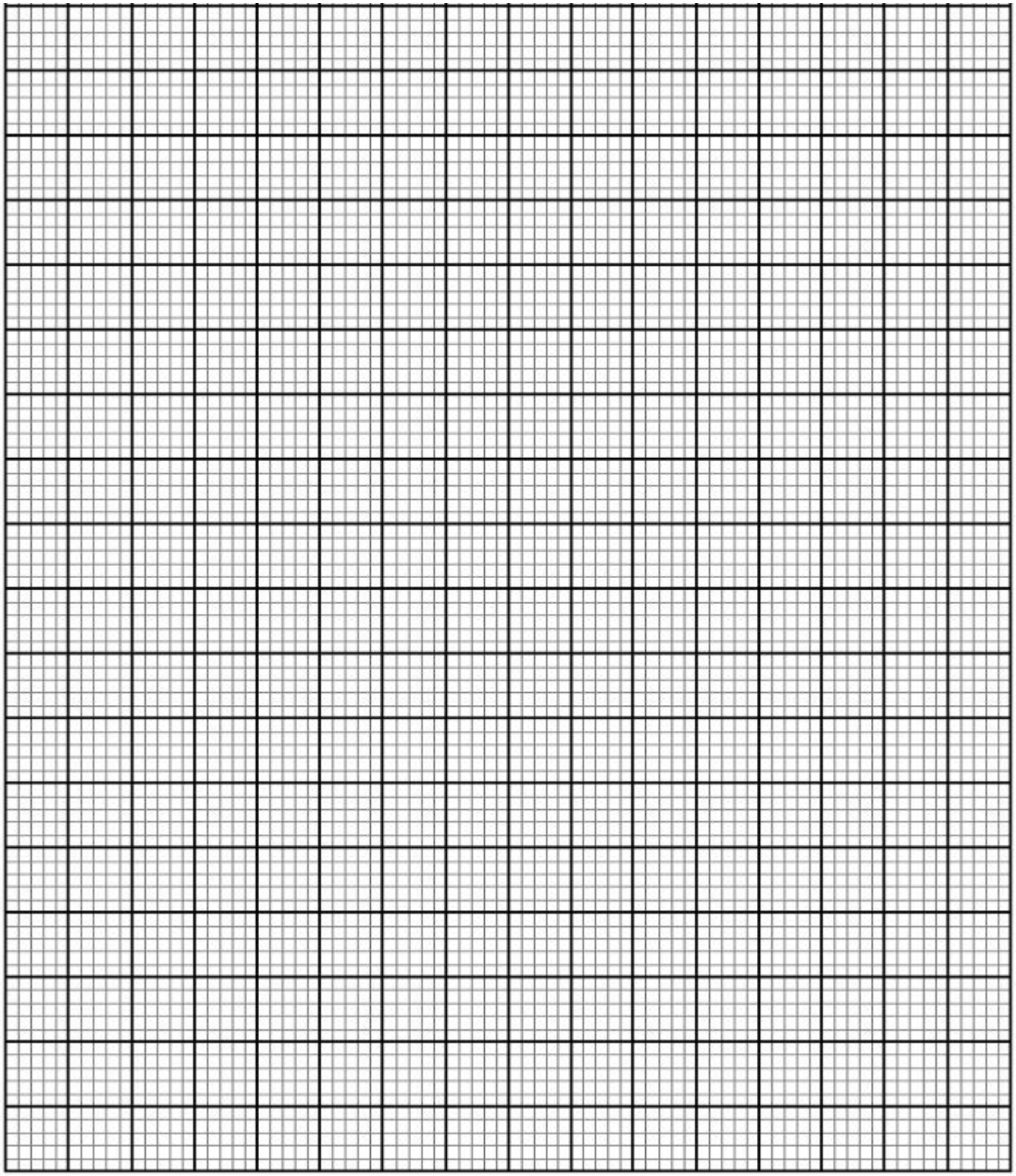
(c) Close the switch and tap the mounted wire with the crocodile clip as shown in the circuit. Ensure both meters show positive deflection. Open the switch.

(d) Tap the wire at **L=20cm.**Close the switch and read and record in the table provided the ammeter and voltmeter reading.

Repeat for other values of L shown in the table and complete the table (7marks)

L(cm)	20	30	40	50	60	80
L(m)						
V(V)						
I (A)						
R=$\frac{V}{I}$ (Ω)						

(e) (i) Plot the graph of **R(Ω)** against **L(m)** (5marks)



(ii) Determine the **slope** of the graph (2marks)

(iii) Given that $\boldsymbol{R = \frac{kL}{A}}$ where **A** is the cross-sectional area of the wire in $\mathbf{m^2}$, determine the value of ***k.*** (4marks)

(iv) What is the significance of **k** (1mark)

Question Two

Part A

You are provided with the following apparatus

- A glass prism
- A plain sheet of paper
- A soft board
- 4 optical pins
- 4 thumb pins

Proceed as follows

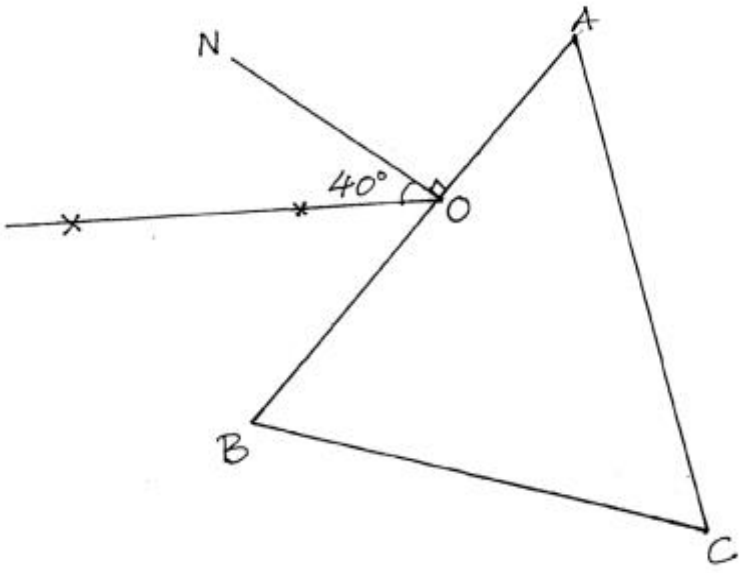
(a) Place the plain sheet of paper on the soft board and fix it using the thumb pins provided.

Place the prism on the plain paper and use a pencil to draw its outline. Remove the prism, extend the lines and label the vertices A, B and C.

(b) Measure angle **A** (1mark)

Angle **A**=_____

(c) Mark a point O on side AB on the diagram and draw a normal line ON. Point O should be a third way along AB nearer A than B. Draw a line making an angle of 40^0 with the normal ON.

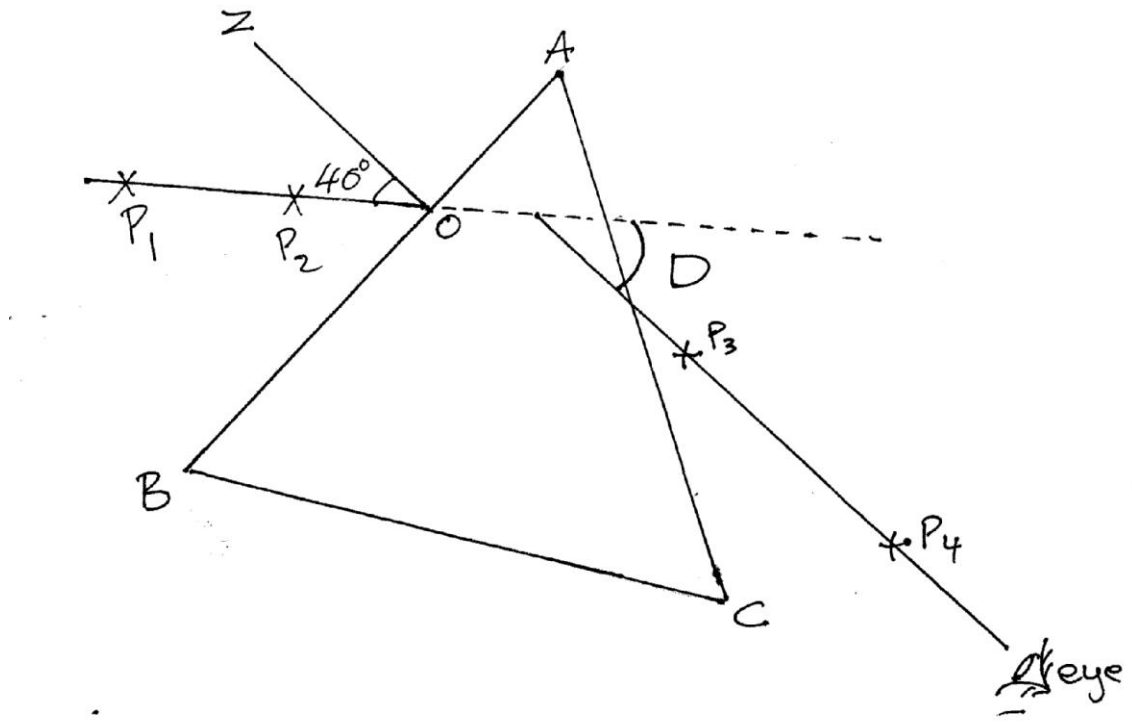


Replace the glass prism and place the object pins P_1 and P_2 along the line as shown in the diagram.

By viewing the images of P_1 and P_2 through side AC, fix two pins P_3 and P_4 so that they are in a straight line with the images of P_1 and P_2.

Remove the prism and draw a line through the pin marks of P_3 and P_4 and extend it into the outline.

Extend the incident line of 40^0 so that the two lines intersect each other.



Measure the acute angle **D** between the two lines (2marks)

Angle **D**_____

(e) Given that **P** = $\frac{\sin\left(\frac{A+D}{2}\right)}{\cos(90-\frac{A}{2})}$ determine quantity **P** (2marks)

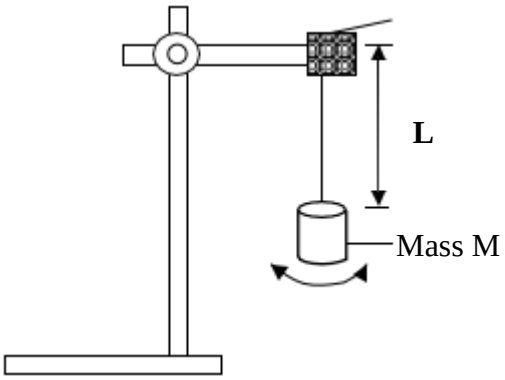
(f) What does quantity **P** represents (1mark)

PART B

(a) You are provided with the following apparatus

- A meter rule
- A retort stand
- A stop watch
- A piece of thread
- Two pieces of wood
- Mass labeled M

b) Set up the apparatus as shown below. Ensure that the thread is free of kinks and the end tied to the hook is firm and the hook does not move.



c) Adjust the length L of the thread so that $\boldsymbol{L = 80cm}$. Give the **Mass M** a slight twist so that when released, it oscillates about the axis as shown in figure above. Measure the time t for twenty oscillations and record in the table below.

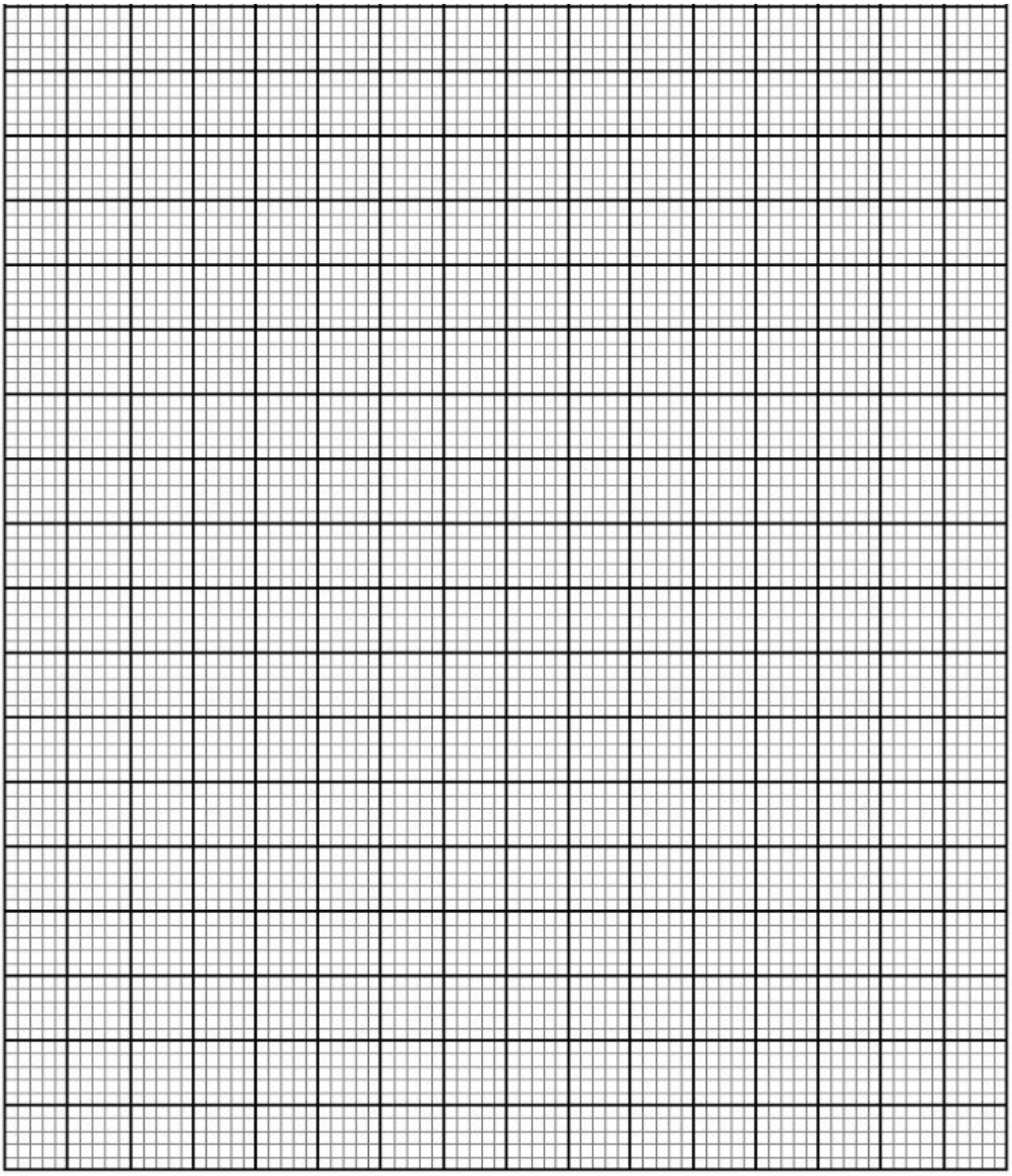
d) Repeat the procedure above for other values of L as shown and complete table 1.

Table 1

Length L (cm)	80	70	60	50	40	30
Length L(m)						
L^2 (m^2)						
Time for 10 oscillation						
Period T(s)						
$T^2(s^2)$						

(6 marks)

(e) On the grid provided plot a graph of $T^2(s^2)$ against $L^2(m^2)$ (5 marks)



(f) Determine the **slope** of the graph (3 marks)