KCSE FINAL PREDICTION

PHYSICS PRACTICAL

(PREDICTION TRIALS 1-10)

An Exclusive Top-Notch KCSE Model Practical Questions.

A special preview of Possible Expected sample KCSE Practical Questions Most likely to be Tested in the Forthcoming KNEC Examinations.

SERIES 1

Proudly prepared by an Exceptional team of Experienced Veteran KNEC examiners within the National Group of Mwalimu Agency.

For Marking Schemes/Answers

0746 222 000

MWALIMU AGENCY

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 1

Confidential

The information contained in this **KCSE Physics Prediction paper** is to enable the head of the school and the teacher in charge of Physics to make adequate preparations for the **232/3 Physics** Practical examination.
No one else should have access to this information either directly or indirectly.

INSTRUCTIONS TO SCHOOLS:

Every student should be provided with the following:

QUESTION ONE

- A lens holder
-Convex lens of *(focal length 15.0 cm ± 1cm)*
- A candle
- A white screen
- A metre rule
-A Equilateral triangular glass prism of side *3.7cm*
-A plain sheet of paper
-A soft board
-4optical pins /thumbs
-4 paper pins
-A watch glass of *(diameter 10.0cm ± 1cm)*
-A piece of plasticine *about 20g*
-A marble of *(diameter 1.60 cm± 0.50cm)*
-A Stopwatch-An electronic balance *(to be shared)*
- Vernier calipers (*to be shared*)
- Geometrical set

QUESTION TWO

- An ammeter (**0 – 1 A**)
- A voltmeter (**0 – 3 V** or **0 – 5 V**)
- A variable resistor of **100Ω**
- A **10Ω** carbon resistor

- A piece of resistance wire (**SWG 30**) **50cm** long
- Two New Size D dry cells
- A cell holder
- A switch
- Seven connecting wires of **4** should have crocodile clips both ends and **3** with crocodile clip on one end

KCSE FINAL PREDICTION

PHYSICS

TRIAL 1 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

c) Marks will be given for clear record of the observations actually made, their suitability, accuracy and the use made of them.

d) Candidates are advised to record their observations as soon as they are made.

e) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINERS USE ONLY

QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

QUESTION 1

PART A

You are provided with the following:

-A watch glass
-A piece of plasticine
-A marble
-A Stopwatch
-An electronic balance (*to be shared*)
- Vernier calipers (*to be shared*)
- Geometrical set

Proceed as follows:

(a) Measure the mass, **m** of the marble.

m = ……g **(1½mark)**

b) Place the watch glass on the table. Cut the plasticine into two pieces and use them to hold the watch glass firmly on the table as shown in **Figure 1**.

c). Release the marble from one end of the watch glass and time 5 complete oscillation with the stopwatch. Repeat this one more time.

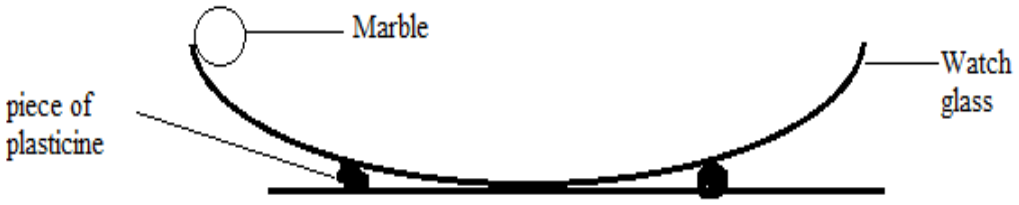


Figure 1

d) Record your values in the **Table 1** **(1½ marks)**

Attempt	Time for **5** oscillations (seconds)	Periodic time, **T**(s)
1st		
2nd		

Table 1

e) Find the average periodic time **T** **(1mark)**

f) (i) Measure the diameter of the marble with the Vernier calipers, hence find its radius

Diameter, **d** = …… **(1mark)**

Radius, **r** = ……m **(½mark)**

(ii) Determine the volume of the marble given that $V=\frac{4}{3}\pi r^3$ where $\pi=3.142$ **(1mark)**

(iii) Calculate the radius of the curvature of the watch glass R from the formula R - r $= \frac{5gT^2}{7(2\pi)^2}$

Where $g=10m/s^2$ and $\pi=3.142$ **(1mark)**

PART B

You are provided with the following:

- A glass prism
- A plain sheet of paper
- A soft board
- 4 optical pins
- 2 Thumb tacks

Proceed as follows:

g) (i)Firmly fix the plain sheet of paper on the soft board using the thumb tacks and place the prism at the centre of the paper. Trace the outline of the prism using a pencil.

(ii)Remove the prism from the outline and label the vertices of the outline L, M and N as shown in **Figure 2**

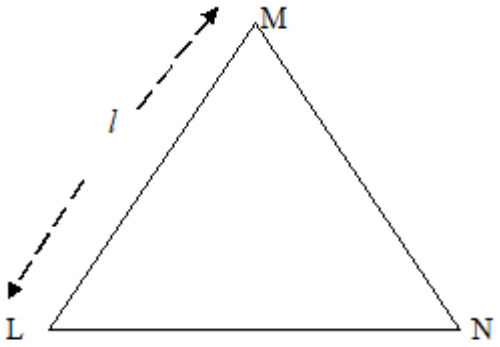


Figure 2

Measure Angle LMN and length, **l** using a ruler

Angle LMN = **……** **(1mark)**

Length, l = **……** **(1mark)**

iii) On the side ML mark a point and draw the normal at that point. Measure an angle T, 60° from the line LM and draw a line along this angle as shown in **Figure 3.**

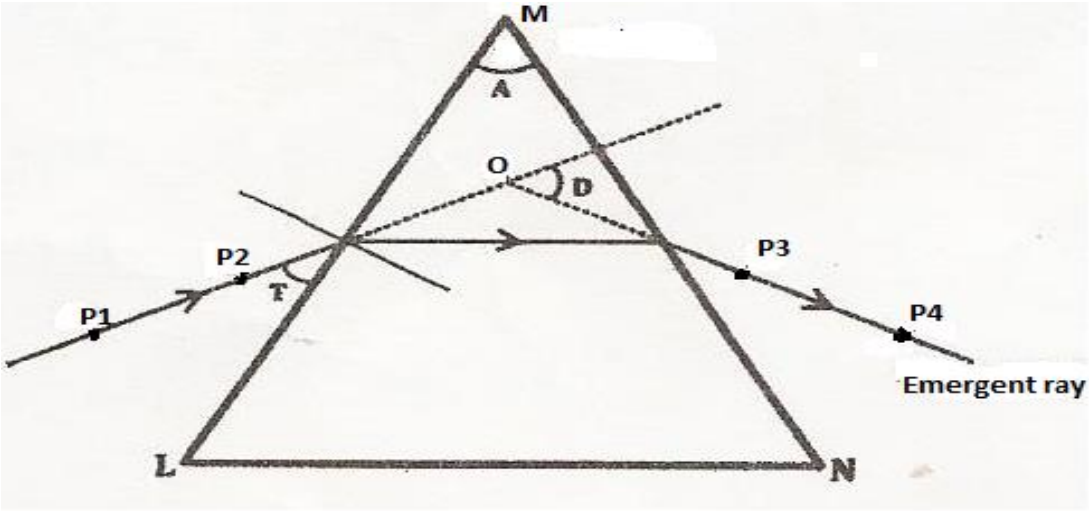


Figure 3

iv). Replace the prism on the outline and fix pins P_1 and P_2 on the 60° line at a distance of 3cm from each other. View the images of the pins P_1 and P_2 through side MN and fix P_3 and P_4 so that they appear to be on straight line with the images of P_1 and P_2.

v). Remove the prism and the pins and draw a line to pass through the holes made by pins P_3 and P_4. Extend the line into the outline as shown in figure 3 above. Also extend the 60° line so that the two lines cross each other at point O. Determine angle D and record it in the **Table 2**

h). (i) Repeat the procedure and complete the **Table 2** **(2 ½marks)**

Angle T (°)	60°	50°	40°
Angle D(°)			
Angle I°$(90° - T)$			

Table 2

(ii) Determine the average value D_m of D **(1mark)**

iii) Determine the constant ***k*** for the glass prism from the formula **(2marks)**

$$k = \frac{\sin(\frac{A + D_m}{2})}{\sin\frac{A}{2}}$$

iv) State the significance of ***k*** **(1mark)**

PART C

You are provided with the following:

- A lens holder
- Convex lens
- A candle
- A white screen
- A metre rule

Proceed as follows:

i) Set up the apparatus as shown in **Figure 4**

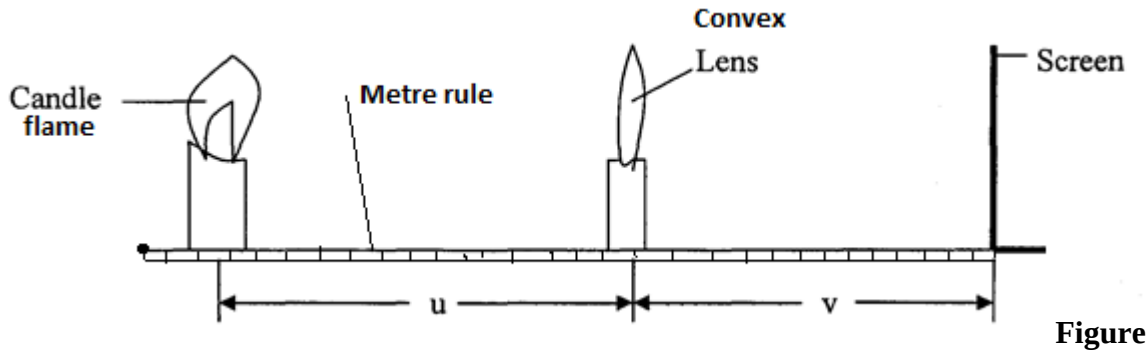


Figure 4

(j) Starting with u = 30 cm, adjust the position of the screen to obtain a sharp image of the candle flame. Record the value of v in **Table 3**.

(k)(i) Repeat the procedure in (i) for u = 30 cm. Complete **Table 3** **(3marks)**

u (cm)	v (cm)	m = $\frac{v}{u}$
30		
50		

Table 3

(ii) Given that the focal length f of the lens satisfies the equation f = $\frac{v}{m+1}$, determine the average value of the focal length, f. **(2 marks)**

QUESTION 2

You are provided with the following:

- An ammeter (**0 – 1 A**)
- A voltmeter (**0 – 3 V** or **0 – 5 V**)
- A variable resistor
- A **10Ω** carbon resistor
- A piece of resistance wire
- Two new dry cells
- A cell holder
- A switch
- Seven connecting wires

Proceed as follows:

a) Take the resistant wire and coil it around the biro pen to make a coil.

b) Set up the apparatus as shown **Figure 5** below such that the **10Ω** carbon resistor and the coil are in parallel connection.

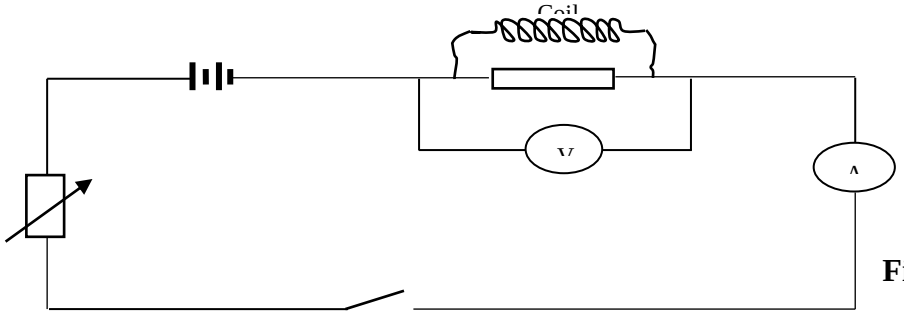


Figure 5

c) Close the switch and the adjust the variable resistor such that the ammeter read a current of I_1=**0.08A** and record the corresponding voltmeter reading $\mathbf{V_1}$

i) $\mathbf{V_1}$ =…… **(1mark)**

ii) Calculate resistance $\mathbf{R_1 = \frac{V_1}{I_1}}$ **(1mark)**

d) Repeat (c) above for current of I_2 = **0.16A** and record the corresponding voltmeter reading $\mathbf{V_2}$

i) $\mathbf{V_2}$ =…… **(1mark)**

ii) Calculate resistance $\mathbf{R_2 = \frac{V_2}{I_2}}$ **(1mark)**

e) Find the average value of resistance **R** **(1mark)**

f) Determine the resistance, **C** of the coil **(2marks)**

g) Now set up the apparatus as shown in **Figure 6** below such that the voltmeter is connected across the cells, **10Ω** carbon resistor and the coil are in parallel connection.

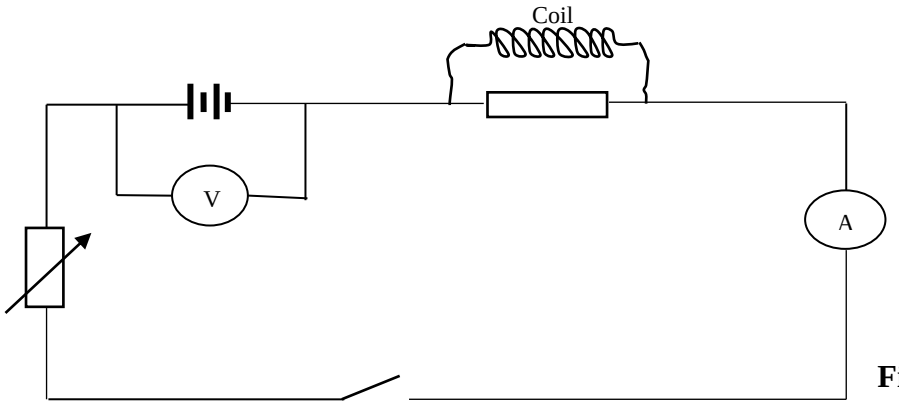


Figure 6

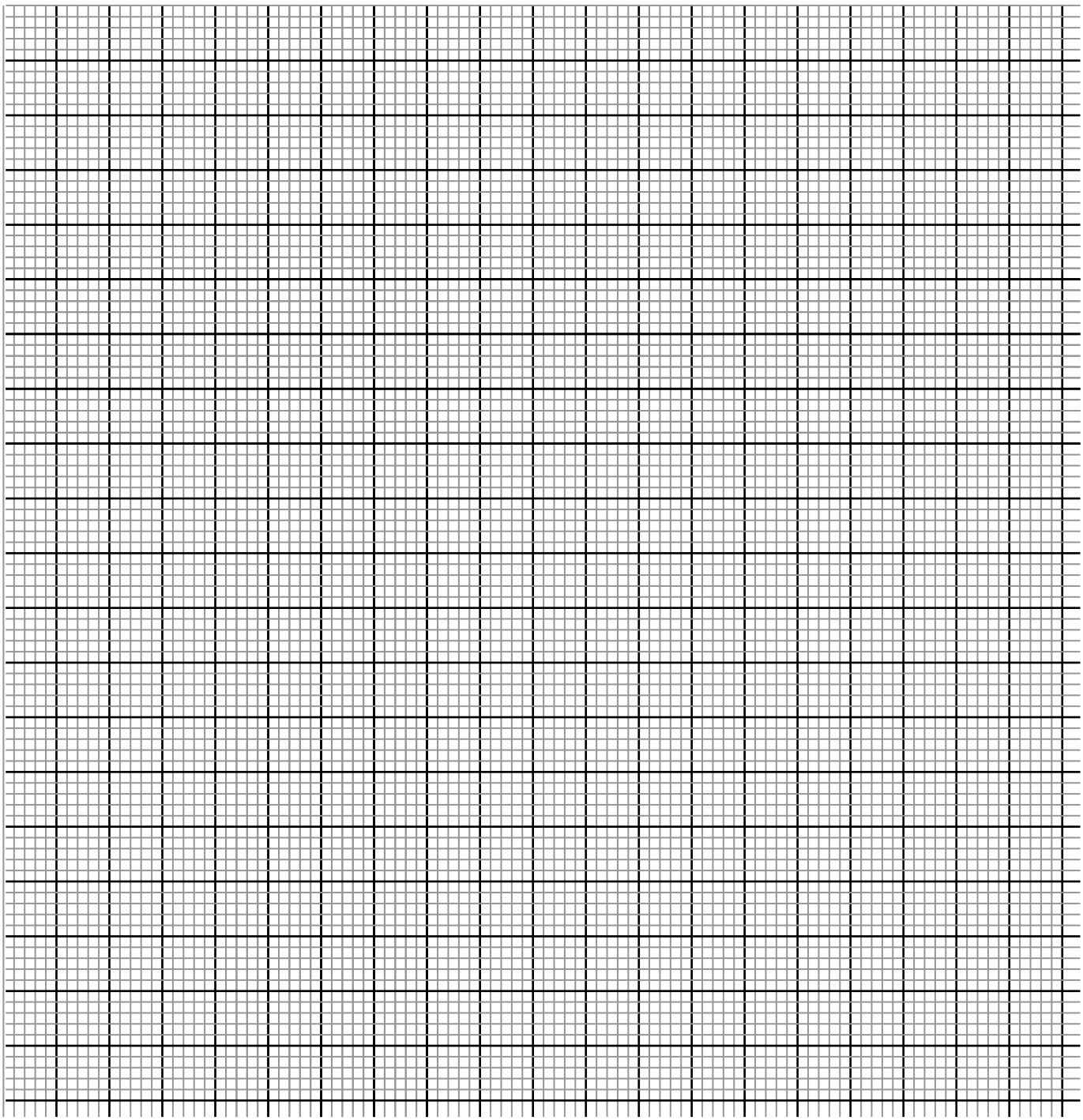
h) Close the switch and the adjust the variable resistor such that the ammeter reads a current of **0.04A** and note the corresponding voltmeter reading. Record the value in the **Table 4** below.

i) Repeat (h) above for other values of current and voltage and complete the **Table 4** below

Current, I (A)	**0.04**	**0.08**	**0.12**	**0.16**	**0.20**	**0.24**
Voltage, V(V)						

(4marks) Table 4

j) On the grid provided plot a graph of **Voltage, V (V)** against **Current, I (A)(5marks)**



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

l) Given that graph is related to equation $\mathbf{E = V + Ir}$ where **E** and **r** are the emf and internal resistance of the cells respectively, use your graph to determine the value of:

E =…… **(1mark)**

r =……..……. **(1mark)**

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 2

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INSTRUCTIONS TO SCHOOLS:

QUESTION 1

Each candidate will require the following.

- A milliammeter.
- A voltmeter (0 – 3V) or (0 – 5V).
- A wire mounted on a mm scale (Nichrome wire SWG 32)
- A switch.
- A long wire with a crocodile clip at one end (crocodile clip to be used as a slider or jockey).
- A micrometer screw gauge (may be shared).
- 5 connecting wires, two with crocodile clips at the end.
- One new dry cell size D.
- Cell holder.

QUESTION 2

EACH STUDENT REQUIRES

- ✓ Micrometer screw gauge (shared between 4 students)
- ✓ Vernier callipers
- ✓ Masses
  - 10g
  - 2 – 20g
  - 50g
  - 100g
- ✓ Helical spring (K = 0.08N/cm)
- ✓ Metre rule or half metre rule
- ✓ Complete retort stand

KCSE FINAL PREDICTION

PHYSICS

TRIAL 2 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

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FOR EXAMINERS USE ONLY

QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

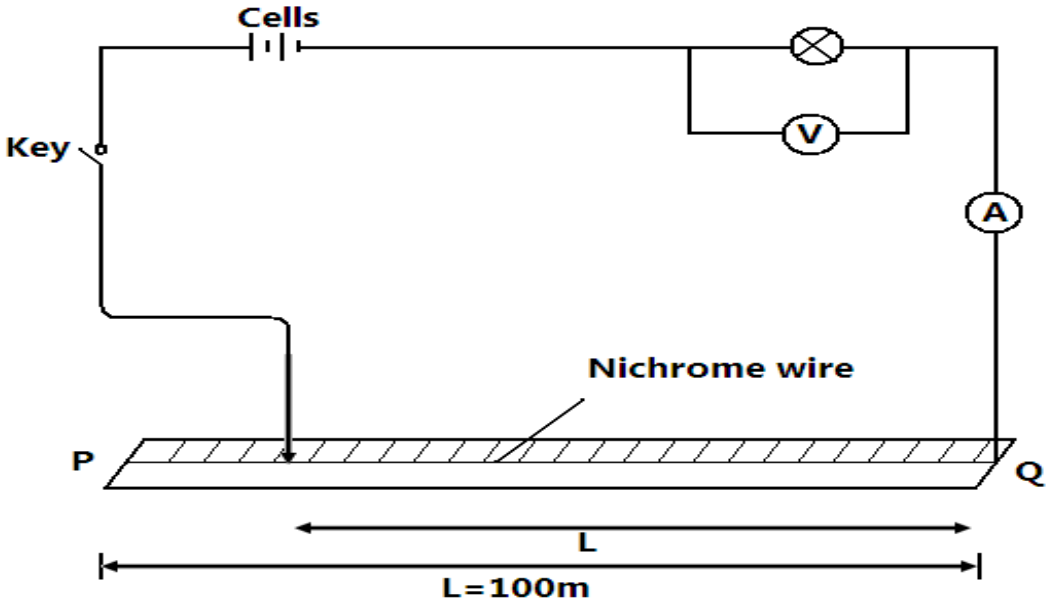
QUESTION 1 (20 MARKS)

You are provided with the following

-Two dry cell
-One bulb
-Voltmeter (0 – 3V)
-Ammeter (0 – 1A)
-Amounted nicrome wire mounted on a millimeter scale
-Switch
-Seven connecting wire at least two with crocodile clips
-Micrometer screw gauge

Proceed as follows:

a) i). Set up the circuit as shown in the figure 1 below.



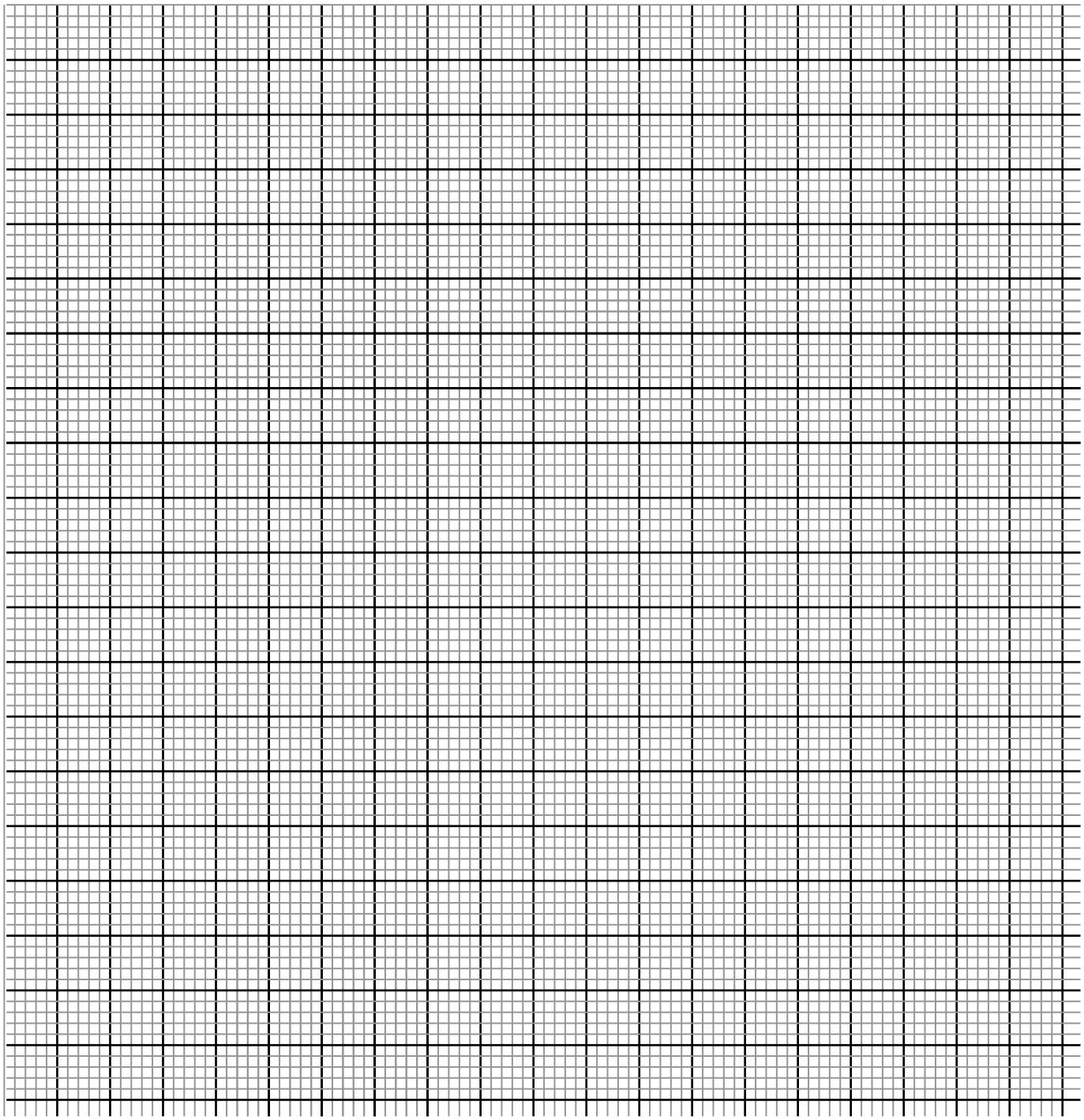
ii) With the crocodile clip at p, take the voltmeter reading and ammeter reading. Record v and 1 repeat the readings for L=80, 60, 40, 20 and 0cm respectively and complete the table below. **(5mks)**

Length, L(cm)	100	80	60	40	20	0
Voltage, V(V)						
Current, I (A)						

iii). What changes do you observe on the bulb as L decreases from p? **(1mrk)**

……
……
……
……

iv). Plot a graph of ammeter reading (y=axis) against voltmeter readings. **(5mrks)**



v). Determine the slope of the graph at V=1 volt. **(2mrks)**

vi). What physical quantity is represented by the slope of the graph at any given point? **(1mrk)**

b. (i) Given the apparatus in a (i) above, draw a diagram of the circuit you would use to determine the current through the resistant wire and the potential difference across. **(1mrk)**

ii). Set up the circuit you have drawn. Record the ammeter reading I and the wire reading V when L=100cm **(2mks)**

V=…… I=……..

iii). Using a micrometer screw gauge, measure the diameter of the wire. **(1mrk)**

d=……m

iv). Calculate the quantity:

p= 0.785 $\frac{(V)}{I}\frac{d^2}{L}$ and give its units, where L is one meter. **(2mrks)**

QUESTION 2

You are provided with the following:-

- Vernier callipers
- Micrometer screw gauge
- Masses; 10g, 20g, 50g and 100g
- A helical spring
- Metre rule or half metre rule

Proceed as follows

(a) Determine the number of complete turns of the helical spring.

N = _____ **(1 Mark)**

(b) Measure the external diameter of the spring using the vernier callipers

D = _____ m **(1 Mark)**

(c) Use the micrometer screw gauge to determine the diameter of the wire of the spring.

d = _____ m **(1 Mark)**

(d) Determine the value of m **(2 Marks)**

N = $\frac{0.4D}{dm}$

……

……

……

(e) Suspend the helical spring vertically alongside the clamped half metre rule as shown in figure 1 below. Determine the length L_0, of the spring before loading it.

L_0 = _____ cm

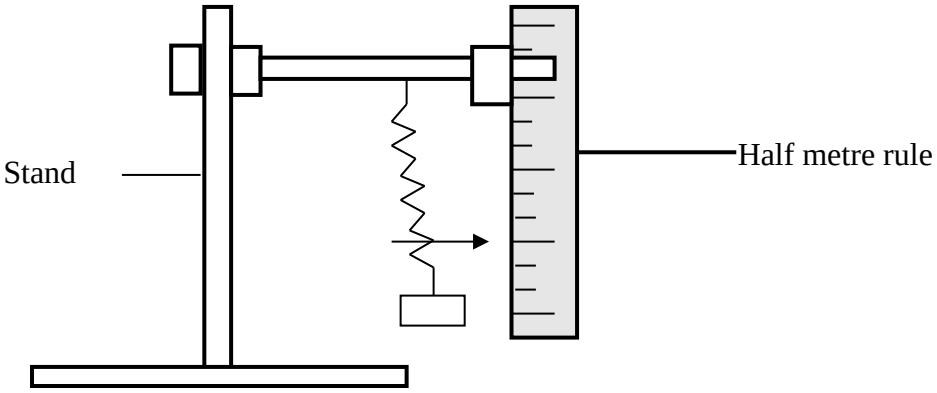


Figure 2

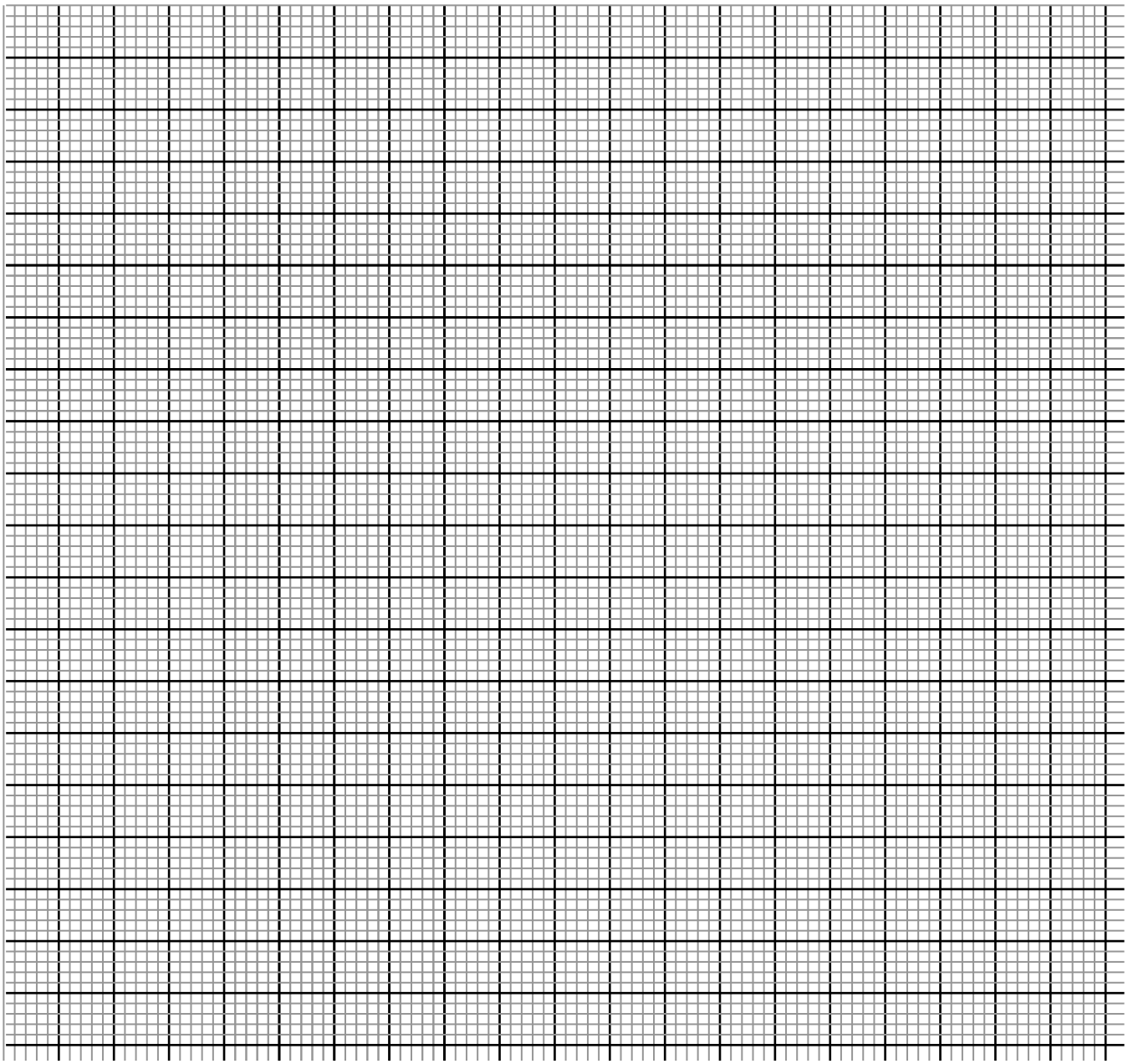
(f) Load the spring with a mass of 20g and determine the new reading on the metre rule. (L) Record this in the table below.

(g) Calculate the extension e = L – L_0 due to the mass of 20g and record the value in the table given below. Repeat step f for other masses and complete the table.

Mass (g)	0	10	20	30	40	50	60	70	80	90	100
Weight (N)											
Reading (L) (cm)											
Extension e (cm)											
$\frac{1}{e}$ (cm^{-1})											

(6 Marks)

(h) Plot a graph of weight (N) against $\frac{1}{e}$ (cm^{-1}) **(4 Marks)**



(i) Determine the slope (s) of the graph at a mass of 45g **(2 Marks)**

……

……

……

(j) Given that m = $\frac{-255T}{(S+60)^2}$

Determine the value of T where (S) is the slope at 45g **(3 Marks)**

……

……

……

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 3

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INSTRUCTIONS TO SCHOOLS:

Please provide the following for the physics practical paper.

QUESTION 1

- 2 dry cells
- A cell holder
- A switch
- An ammeter *(with a scale range of 0-1A)*
- Six connecting wires
- Wire mounted on the metre rule labelled X ***(SWG 28 or 0.37mm in diameter)***
- A micrometer screw gauge *(to be shared)*
- A Voltmeter

QUESTION 2

- a metre rule
- knife edge raised at least 20 cm above bench
- one 50 g mass and one 100 g mass
- a beaker or any container
- 2 pieces of thread *(around 15 cm each)*
- some water in a beaker
- Liquid L in a beaker *(Paraffin)*
- Some tissue paper.
- A triangular **glass** prism
- A piece of soft board
- Four optical pins
- Four office pins
- A sheet of plain paper

KCSE FINAL PREDICTION

PHYSICS

TRIAL 3 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

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FOR EXAMINERS USE ONLY

QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

QUESTION 1

You are provided with the following: -

- 2 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

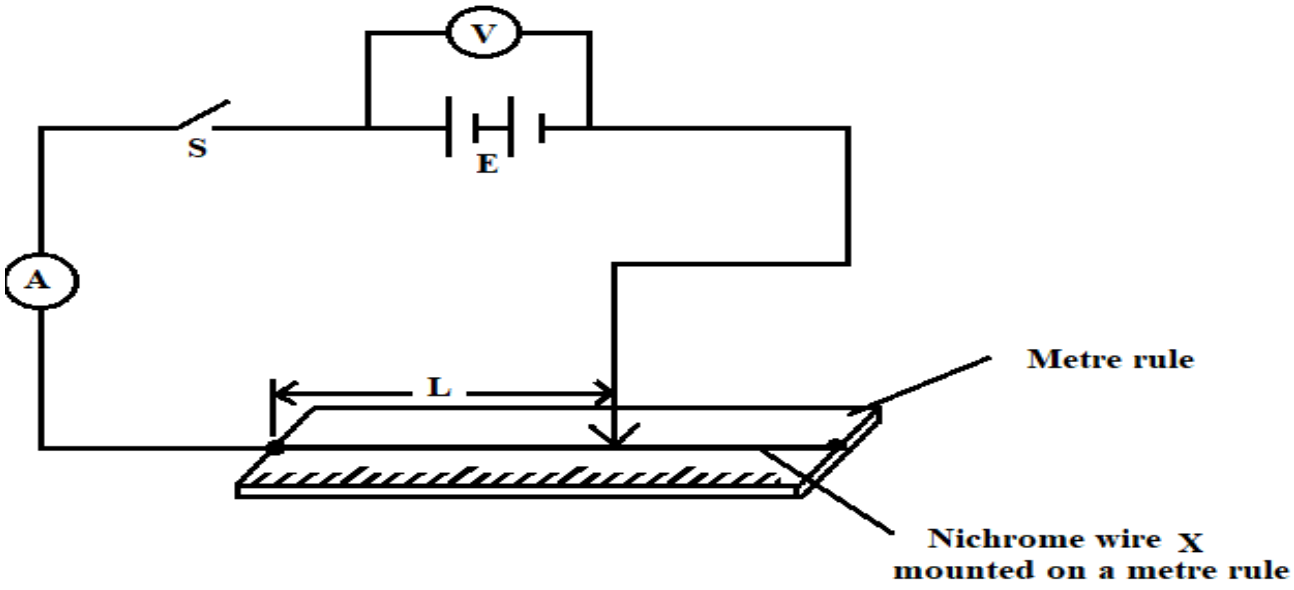
Proceed as follows

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

D ……. m **(2 marks)**

(b) Determine the cross-section area of the wire, A……. m^2 **(1 marks)**

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



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

E = ... **(1 mark)**

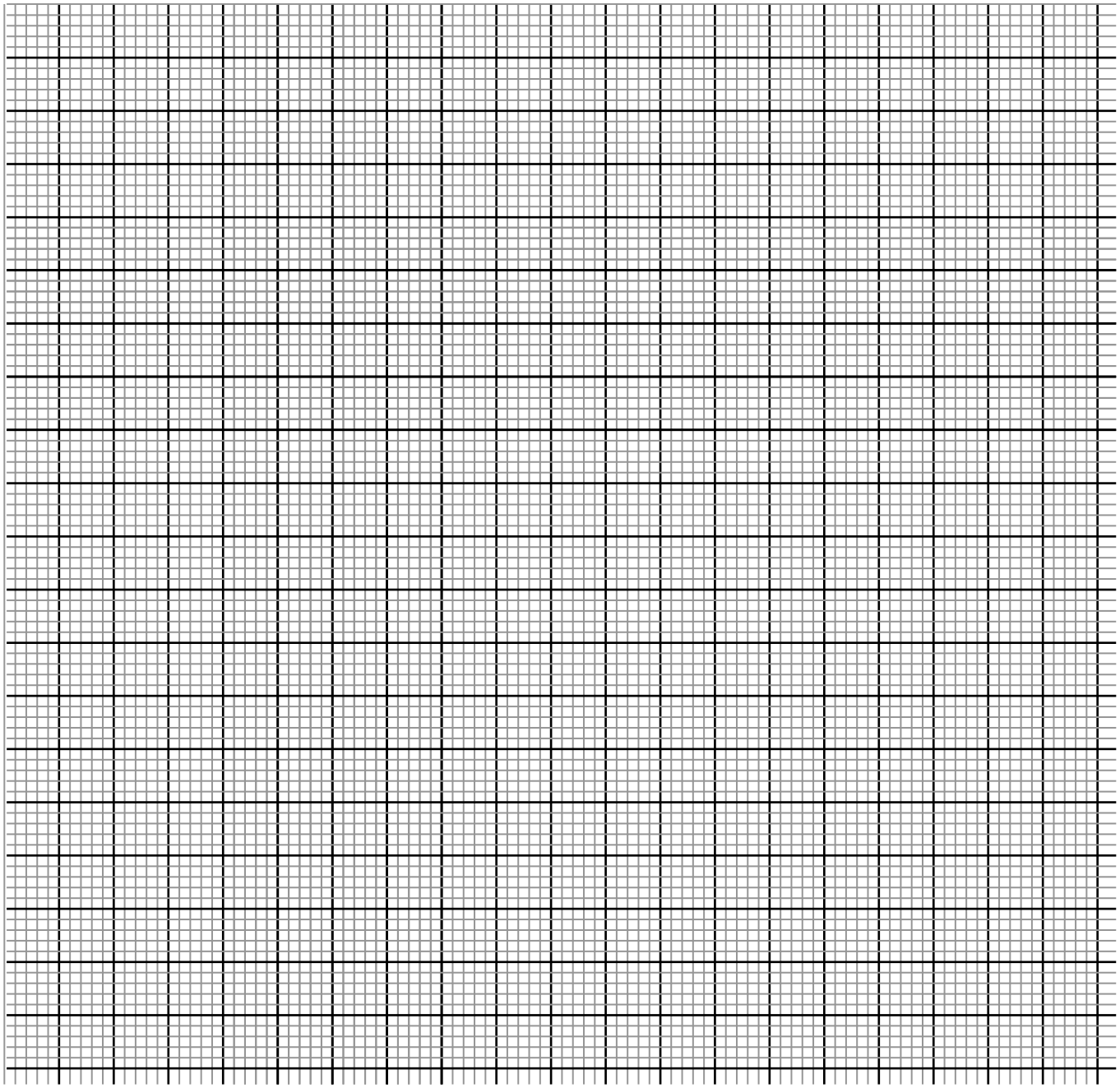
(e) Adjust the length, ℓ of the wire to 0.2m, close the switch, S and read the value of current and record in the table below.

Length, ℓ (m)	0.2	0.3	0.4	0.5	0.6	0.7
Current, I (A)						
$\frac{1}{I}$ (A^{-1})						

(f) Repeat the procedure in (c) above for the values of lengths given. **(5 marks)**

(g) **Calculate** the value of $^{1}/_{I}$ and record in the table above. **(1 mark)**

(h) On the grid provided **plot** a graph of $\frac{1}{I}$ (y- axis) against l **(5 marks)**



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

……

……

……

……

……

(j) Given that, $\frac{1}{I} = \frac{\delta}{EA} l + \frac{r}{E}$, determine the value of $\delta \; and \; r$. **(3 marks)**

……

……

……

……

……

QUESTION 2

You are provided with the following:

- a metre rule
- knife edge raised 20 cm above bench
- one 50 g mass and one 100 g mass
- a beaker or any container
- some thread
- some water in a beaker
- Liquid L in a beaker
- tissue paper
- A triangular glass prism
- A piece of soft board
- Four optical pins
- Four office pins
- A sheet of plain paper

PART A

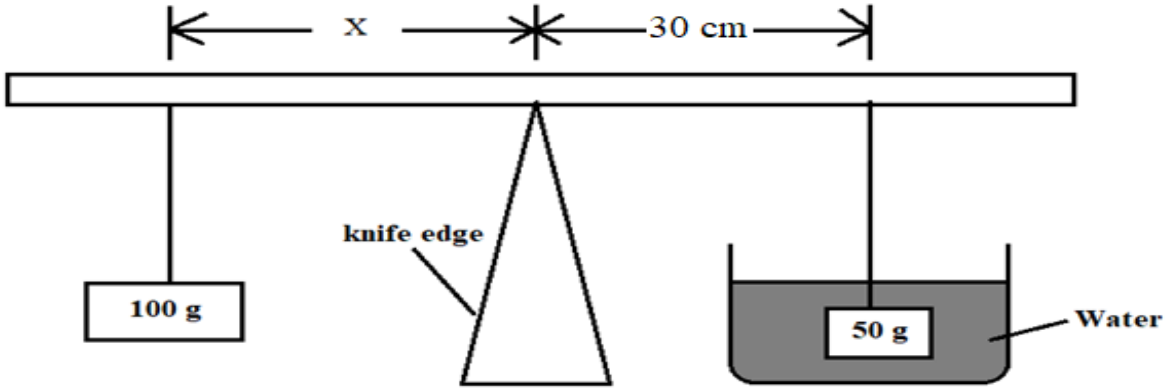
Proceed as follows:

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

Balance point =.....cm **(1 mark)**

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

(b) Set up the apparatus as shown in the figure below.



(c) Use the thread provided to hang the masses such that the positions of support can be adjusted. The balance is attained by adjusting the position of the 100g mass.
Note that the distances X is measured form the knife edge and the 50g mass is fully submerged in the water.

(d) Record the value of X .

X **= .....cm** **(1 mark)**

(e) Apply the principle of moments to determine the weight W_w of the 50 g mass in water and hence determine the up thrust U_w in water

W_w .....N ***(2 marks)***

U_w ..... N **(1 mark)**

(f) Remove the 50 g mass from the water and dry it using tissue paper.

(g) Maintaining the distance of 30cm in step (d), now balance the metre rule when the 50 g mass is fully submerged in the liquid L Record the value of the distance X.

$X =$ ..... cm **(1 mark)**

(h) Apply the principle of moments to determine the weight W_L of the 50 g mass in the liquid L and hence determine the upthrust U_L in the liquid

(i) $\mathbf{W_L =}$ **(2 mark)**

.....

(ii) $\mathbf{U_L =}$ **(1 mark)**

.....

(iii) RD of liquid L **(2 marks)**

.....

.....

.....

PART B

Proceed as follows:

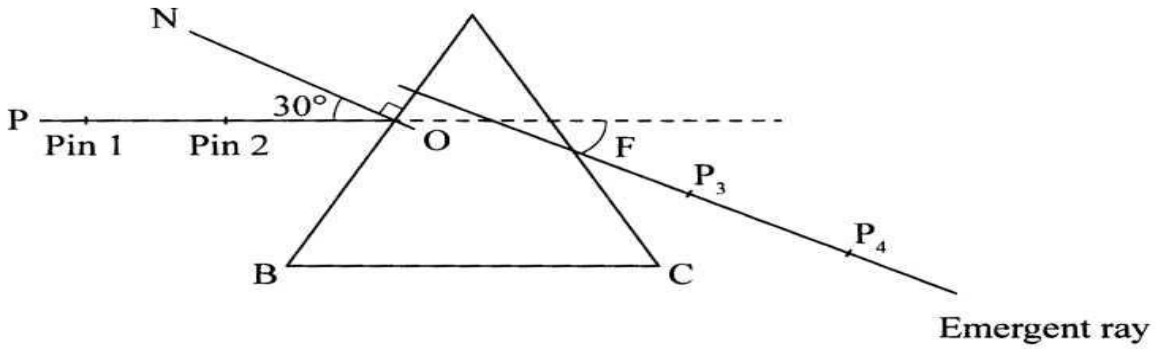
(a) Place the plain sheet of paper on the soft board and pin it using the office pins at the comers. Trace the triangular prism outline of the prism on the sheet of paper (use the upper part to leave space for two other outlines on the same page). Label the vertices of the outline at A, B and C. Remove the prism from the paper.

(b) On the outline at a point O near the centre of side AB draw a normal ON.

(c) Draw a line PO at an angle of 30° to the normal ON as shown in **the figure below.**

(d) Replace the prism accurately on the outline. Fix two optical pins vertically on line PO at different points **(see the figure below).**

(e) View the images of the two pins through side AC of the outline. Fix a third and fourth pin vertically such that they are in line with the images of the first and second pin. Remove the prism and the pins. Draw a line joining the marks made by the third and fourth pins and extend it to join line PO (also extended) as shown below**.**



Measure F, the angle of deviation of the emergent ray. **(2 marks)**

……

……

(f) Repeat part (e) for other angles of incidence shown in the table below**.** (Draw a fresh outline of the prism for each angle of incidence)***Complete table 1*** **(3 marks)**

Angle of	30°	50°	70°
Angle of deviation			

(g) Determine:

E the angle of emergence (between the emergent ray and the normal at the point of emergence) at the least angle of deviation. **(2 marks)**

K given that $K = 2\sin\left(30 + \frac{F_o}{2}\right)$ (where F_0 is the least angle of deviation)**(2 marks)**

(Attach the plain sheet of paper to your question paper and hand them in).

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 4

Confidential

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INSTRUCTIONS TO SCHOOLS:

Each candidate requires the following;

QUESTION 1

- A candle
- A white screen
- A metre rule
- A convex lens of focal length 20cm
- A lens holder
- A piece of plasticine

QUESTION 2

- A clamp, boss and retort stand
- Optical pin fixed on a piece of a cork
- A copper wire of length 15 cm and diameter 1.0mm
- A protractor
- A stop watch

KCSE FINAL PREDICTION

PHYSICS

TRIAL 4 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

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d) Candidates are advised to record their observations as soon as they are made.

e) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINERS USE ONLY

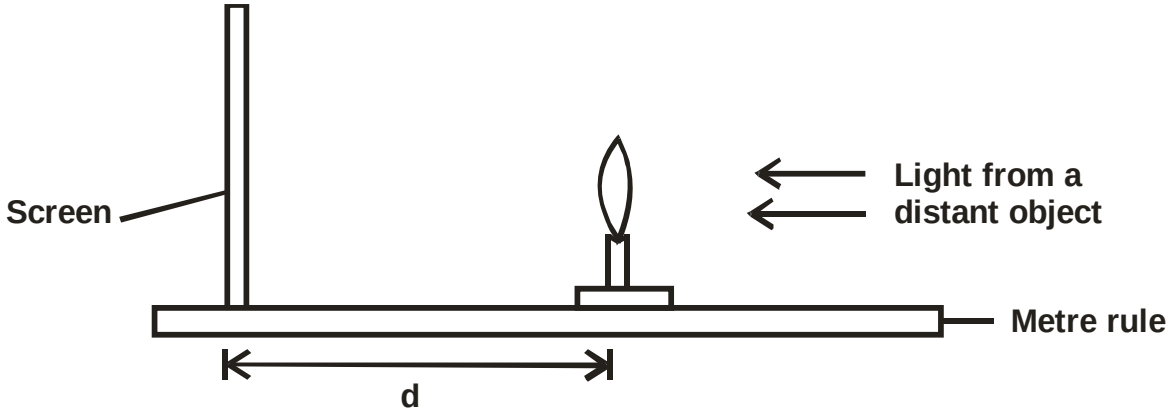
QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

1.You are provided with the following;

- A candle
- A white screen
- A metre rule
- A lens
- A lens holder
- A piece of plasticine.

Proceed as follows:

a) Arrange the apparatus as shown below.



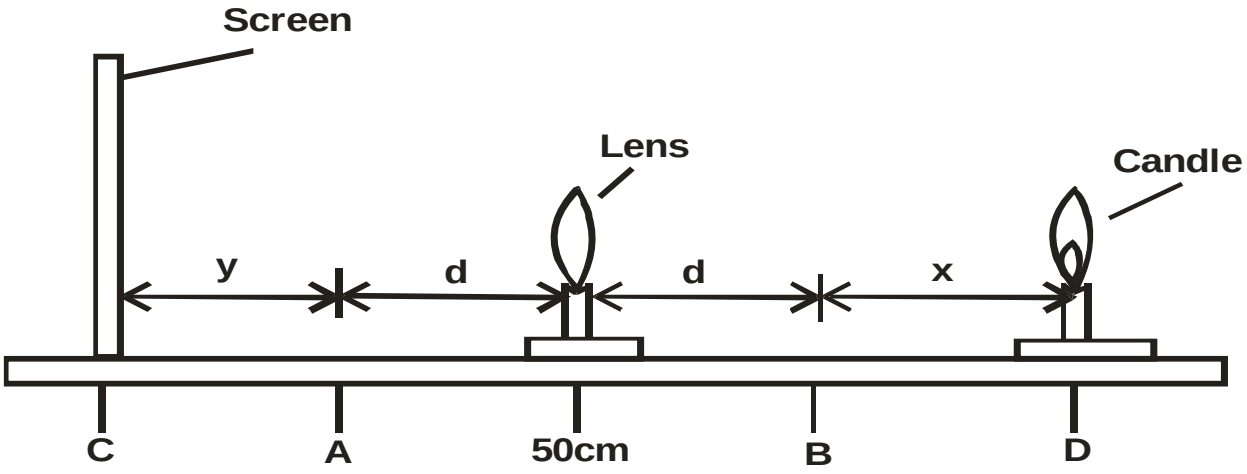
b) Adjust the distance of the lens from the screen until a well-focused image of a very distant object like a tree, is seen on the screen. Record the distance between the screen and the lens as d.

d = _____ cm **(1 mark)**

d = _____ m **(1 mark)**

c) Now place the lens at the midpoint of the metre rule.

(**It will remain at this point throughout the entire experiment**) Arrange the screen and lit candle as shown below.



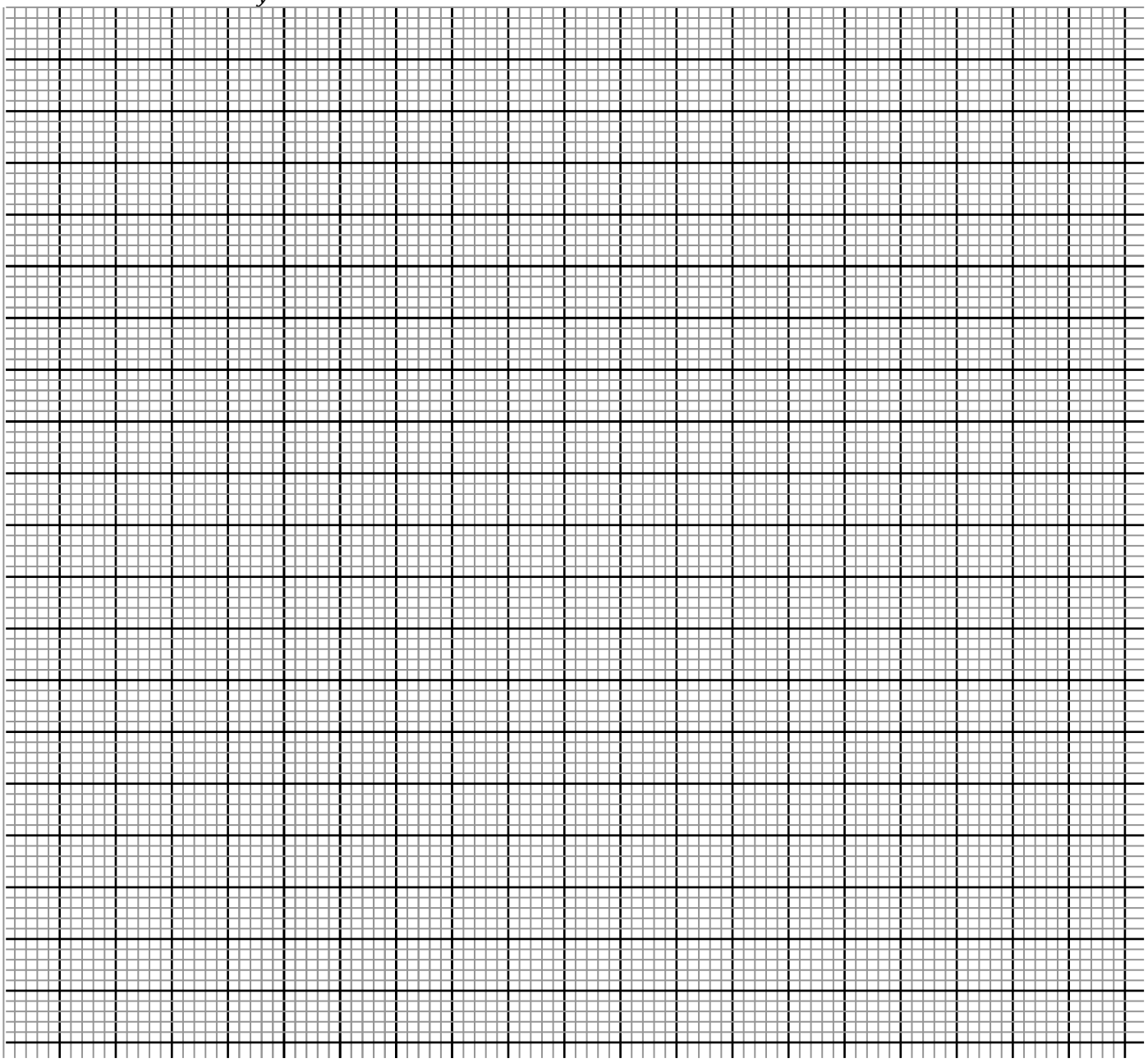
Mark the point A and B each of which a distance 'd' from the lens.

d) Place the lit candle at point d, 30cm from B. Adjust the position of the screen until a sharp image appears on it. The screen is at C. Measure BD and AC and record them as x and y respectively in the table below.

BD = x (cm)	AC = y (cm)	$\frac{1}{y}$ (cm^{-1})
30		
25		
20		
15		
10		

Repeat the procedure in (d) above for other values of x in the table and complete it. **(6 mks)**

e) i) Draw a graph $\frac{1}{y}$ (y-axis) against x. **(5 marks)**



ii) Determine the slope S of the graph. **(3 marks)**

iii) Calculate the value of m given that

$m = \sqrt{\frac{1}{s}}$ **(2 marks)**

iv) Comment on values of m and d. **(2 marks)**

_____

_____

_____

_____

_____

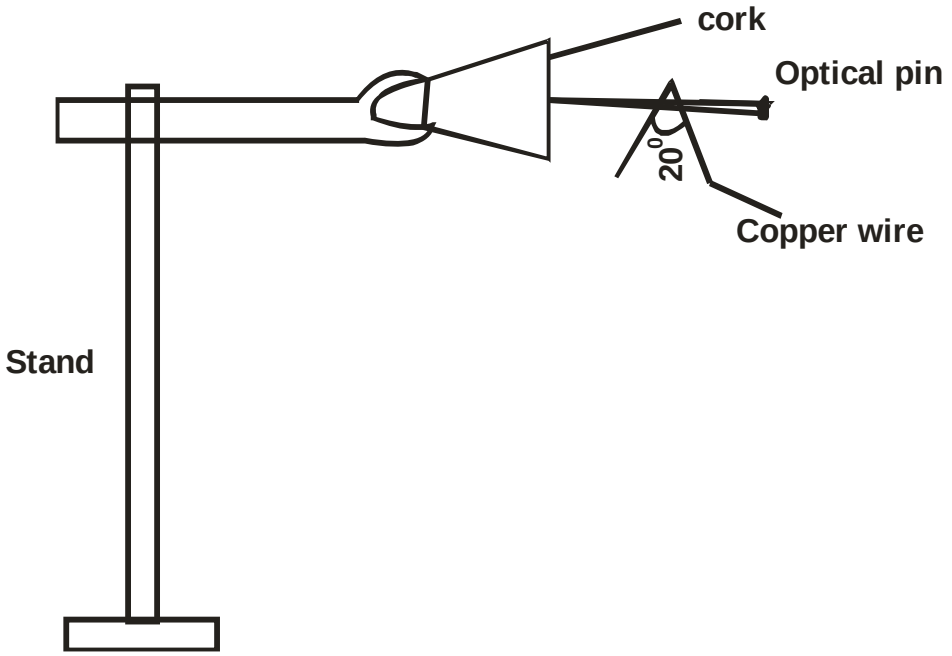
2. You are provided with the following:

- Clamp, boss and stand
- Optical pin fixed on a piece of cork.
- Copper wire of length 15cm
- Protractor
- Stop watch

Proceed as follows:

a) Bend the wire in the middle so that the angle formed is 20^0.

b) Set-up the apparatus as shown in the diagram below.



c) i) Displace the wire horizontally and allow it to swing freely. Record time for 10 complete oscillations.

t = _____ seconds **(1 mark)**

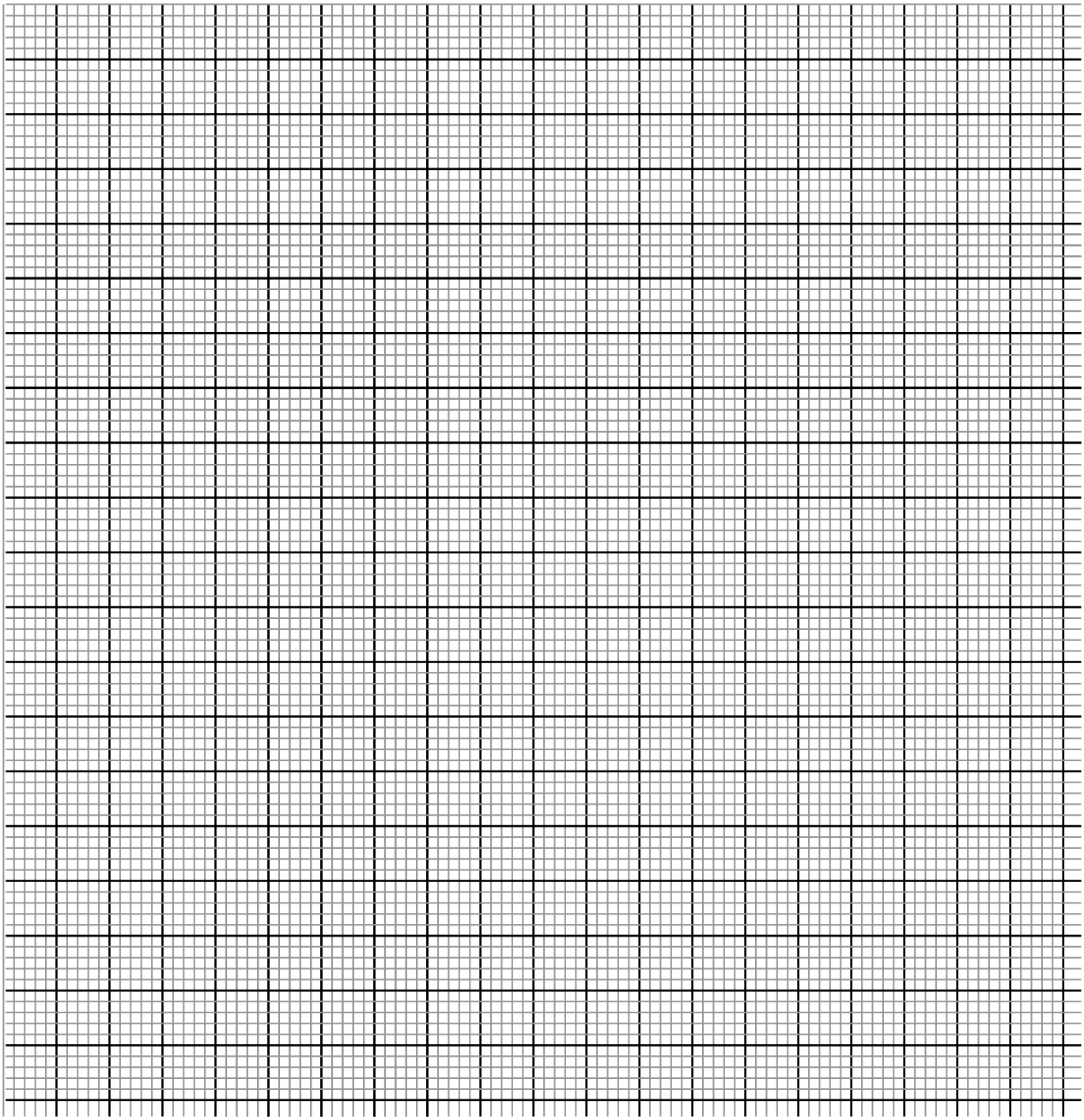
ii) Calculate frequency, f at time in (i) above. **(1 mark)**

d) Repeat the procedure above (c) for other given angles on the table below.

Angle θ^0	Time for 10 oscillation t (s)	Frequency, f = $\frac{t}{10}$	$f^2(Hz)^2$	$Cos\left(\frac{\theta}{2}\right)$
20^0				
40^0				
60^0				
80^0				
100^0				
120^0				

(7 marks)

e) On the grid provided, plot a graph of f^2 (y axis) against $\text{Cos}\left[\frac{\theta^0}{2}\right]$ **(5 marks)**



f) Find the gradient of the graph. **(3 marks)**

g) The equation of the graph is $f^2 = \frac{150K}{4\pi^2 L} \text{Cos}\frac{\theta}{2}$ determine the value of constant K if L is the total length of the wire in centimeters. **(3 marks)**

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 5

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INSTRUCTIONS TO SCHOOLS:

QUESTION ONE

- Two dry cells of 1.5V each.
- Nichrome wire labeled W mounted on a metre rule.
- An ammeter (0-1.5A) or (0-2.5A)
- A cell holder.
- Voltmeter.
- 8 connecting wires atleast 4 wash crocodile clips (or a Jockey)
- A switch.
- A metre rule.

QUESTION TWO

- A metre rule.
- 10cm long cotton thread.
- Two masses of 10g.
- Two masses of 20g.
- Knife edge, 20cm high.
- A candle.
- A lens holder.
- A white screen.
- Converging len of focal length 15cm.

KCSE FINAL PREDICTION

PHYSICS

TRIAL 5 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

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d) Candidates are advised to record their observations as soon as they are made.

e) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINERS USE ONLY

QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

QUESTION 1

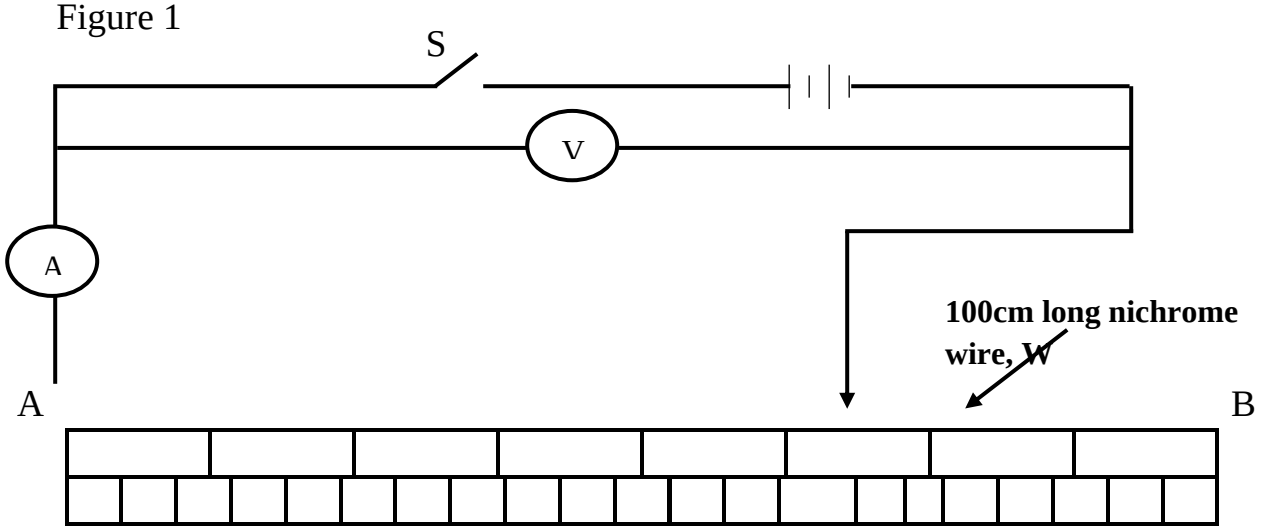
You are provided with the following

- Two cells of 1.5V each
- Nichrome wire labeled W mounted on a metre rule
- An ammeter (0 – 1.5A) or (0 - 2.5A)
- A cell holder
- Voltmeter (0 – 5V)
- 8 connecting wires atleast 4 with crocodile clips (or a jockey)
- A switch
- A metre rule

Proceed As Follows:

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

Figure 1



(b) (i) Connect the end of A and point B when AB = 100cm across the terminals as shown in the figure 1 above.

Close the switch and measure both current I and p.d, V across the wire AB

Current I _____ A

P.d, V _____ V

(ii) Measure the emf of the cell, E = _____ V

(c) Reduce the length AB as shown, 100cm, 70cm, 60cm, 50cm, 40cm, 30cm and 20cm. In each case record the current (I) and the corresponding values of p.d (V)

(d) Enter the length as shown in the table 1 below:

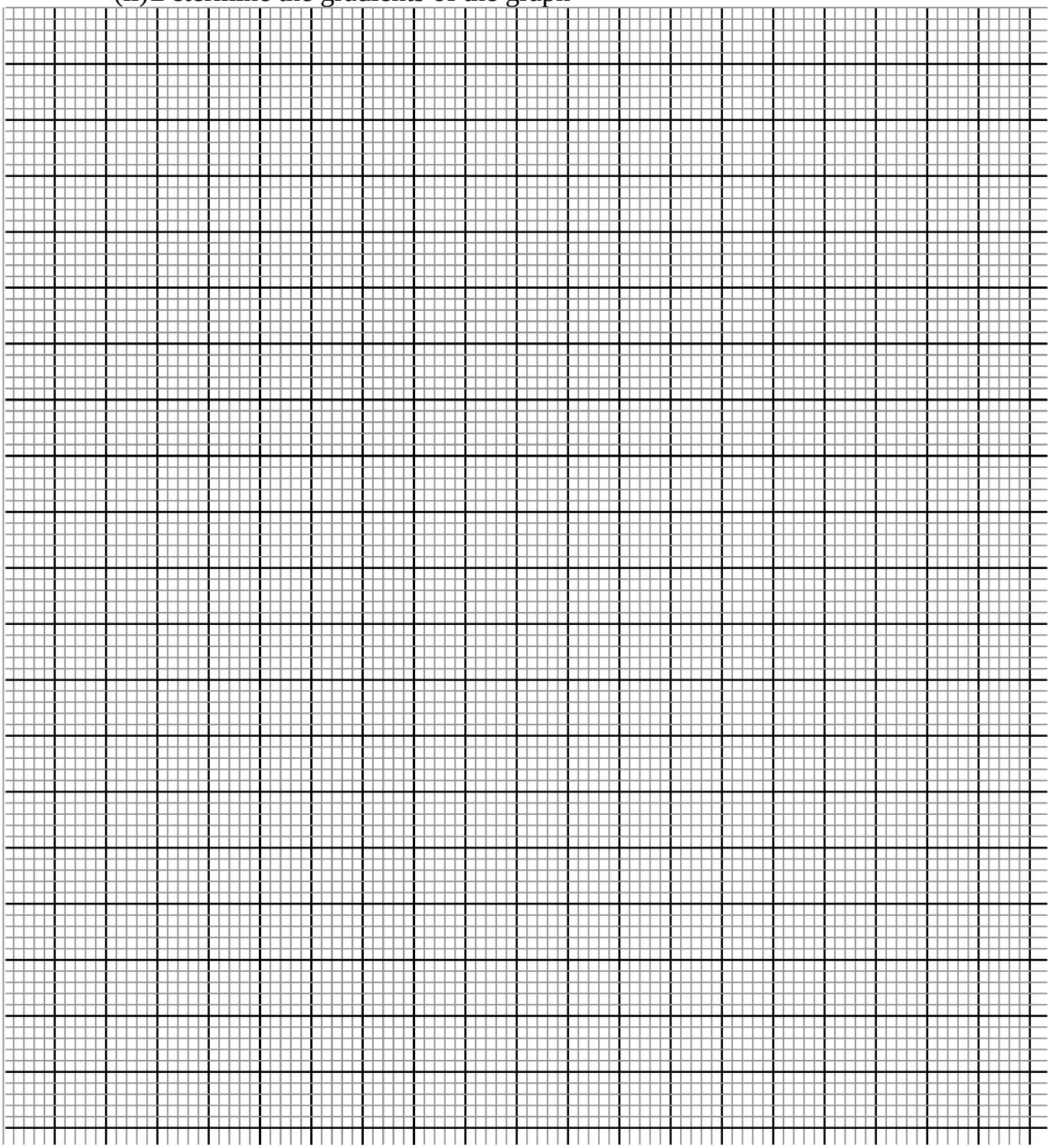
Table 1

Length AB (cm)	100	70	60	50	40	30	20
Current I (A)							
p.d (V)							
E – V (V)							

(e) Complete the table

(i) Plot a graph of (E – V) against I (A)

(ii) Determine the gradients of the graph



Given the equation, E = V =Ir, determine the internal resistance of each cell **(3mks)**

QUESTION TWO

Part A

You are provided with the following apparatus

- A wooden metre rule
- 10cm long cotton thread
- Masses, two of 10g and two of 20g
- Knife edge – 20cm high

Proceed as follows

(a) Arrange the apparatus as shown in figure 2 below

(b) Balance the metre rule on the edge and adjust the metre rule until it balances horizontally when there is no mass on it. The knife edge is now at the position of (cog)

(c) Record the position of (cog)

Position of c.o.g =_____ cm

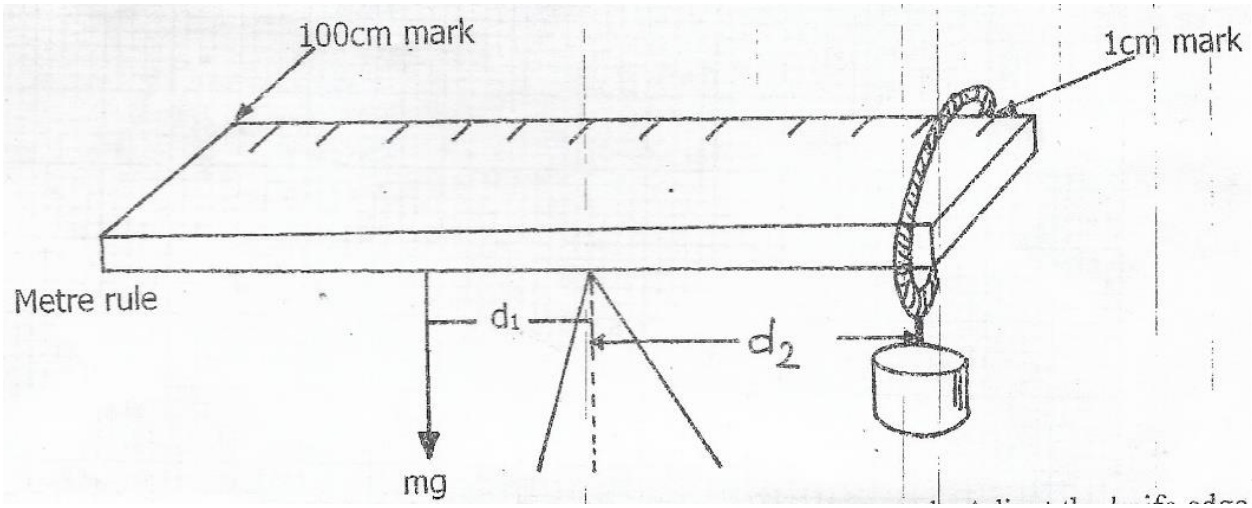


Figure 2

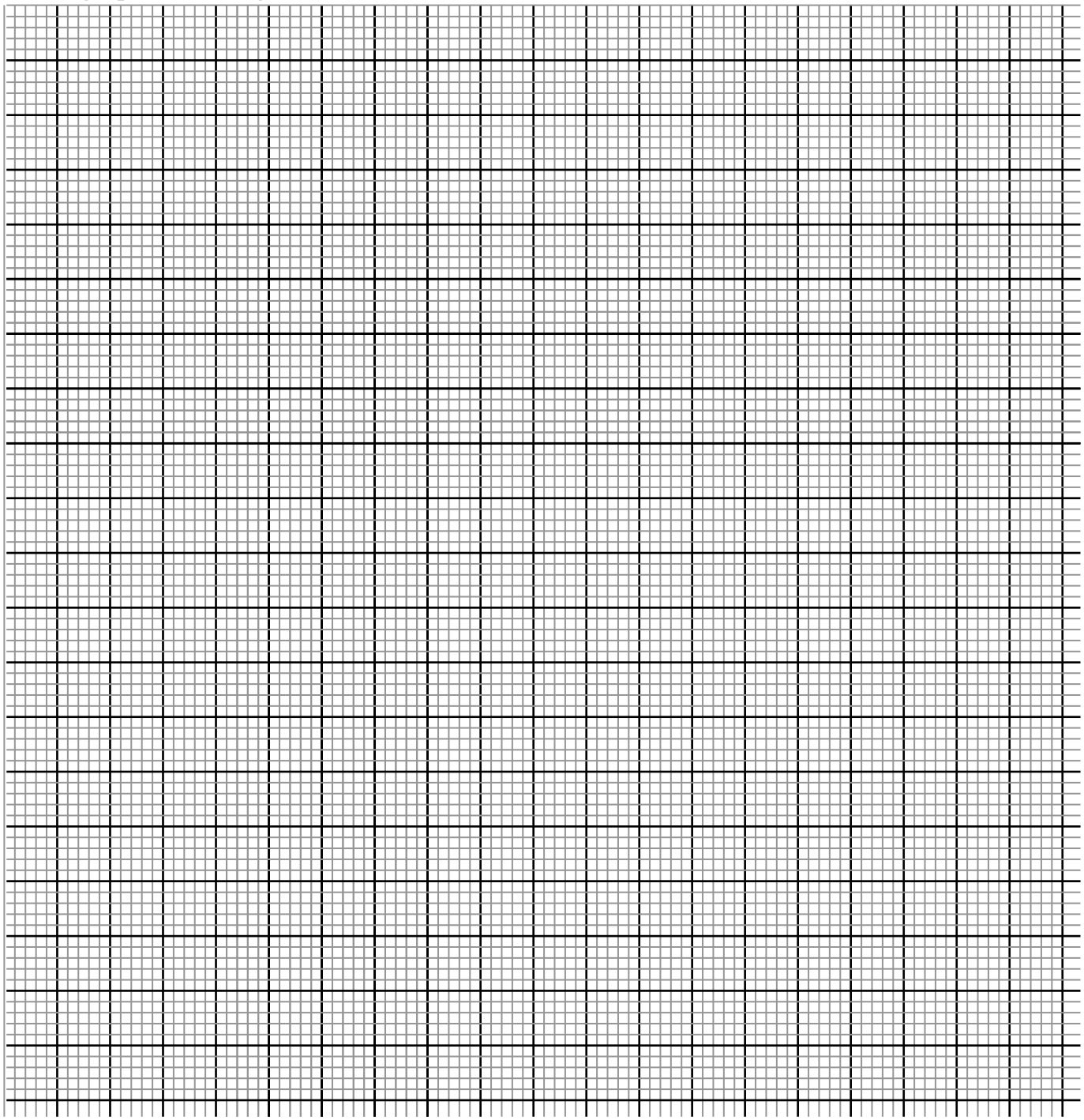
(d) Now hang a mass on the metre rule by use of the thread at 1cm mark. Adjust the knife edge until the metre rule balances again at new mark. Record the length d_1 and the corresponding length d_2.

(i) Repeat the procedure for different masses and complete the table 2 shown below.

Table 2

Mass, m(g)	10	20	30	40	50	60
Distance d_1 (cm)						
Distance d_2 (cm)						
Mass (m) x distance d_2 $=md_2$						

(ii) Plot a graph of md_2 against d_1 **(5mks)**



(iii) Calculate the slopes of the graph **(2mks)**

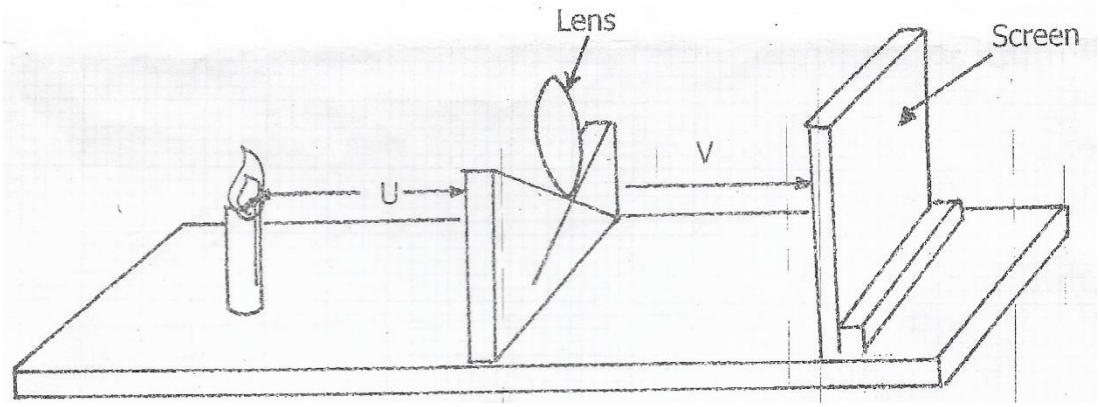
Part B

You are provided with the following apparatus

- A lens
- A lens holder
- A candle
- A white screen
- A metre rule

Procedure

(e) Set up the apparatus as shown in the figure 3 below:



(f) Starting with u = 30cm adjust the position of the screen to obtain a sharp image of the candle. Record value of V in the table shown below:

(g) (i) Repeat the procedure above for u = 20cm and complete table below:

Table 3

u (cm)	v (cm)	M = $^{v}/_{u}$
20		
30		

(2mks)

(ii) Given that the focal length of the lens satisfies the equation, $f = \frac{v}{1+m}$ determine the average value of the focal length

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 6

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INSTRUCTIONS TO SCHOOLS:

Question 1

- Stopwatch
- Cotton thread at least 120cm long
- Stand and a clamp
- Pendulum bob
- Metre rule

Question 2

- Convex lens
- A candle
- White screen
- Lens holder
- Metre rule
- 2 New dry cells
- An ammeter
- A mounted wire labelled AB
- A cell holder
- A switch
- Connecting wires

KCSE FINAL PREDICTION

PHYSICS

TRIAL 6 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

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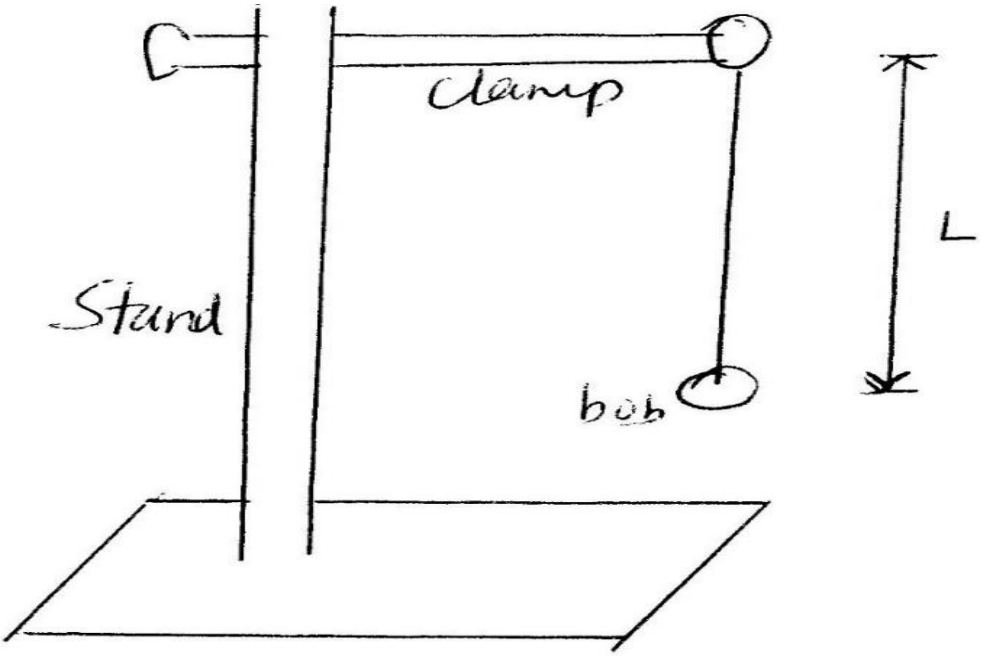
FOR EXAMINERS USE ONLY

QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

1. You are provided with the following;

- A stopwatch
- Cotton thread at least 120cm long
- Stand and a clamp
- Pendulum bob
- Metre rule

Arrange your apparatus as shown



Proceed as follows;

i) Adjust the length of the pendulum to 1meter.

ii) Displace the bob side ways to an angle of about 45^o (estimate) and let the pendulum switching for 10 oscillations and record the time, t, take for the ten oscillations.

iii) Repeat the same for other values of L as shown in the table below and fill in the columns of the table as indicated. **(8 Marks)**

Length L(in m)	Time for 10 oscillations (in sec)	Periodic time (T)	(Periodic Time)^2 T^2 (in 2 d.p.)
1.0			
0.8			
0.7			
0.6			
0.5			
0.4			
0.3			

iv) Plot a graph of T^2 against L. **(5 Marks)**

v) Determine the gradient **(3 Marks)**

vi) Given that period (T) of a pendulum and the length (L) are related by the equation

$$T = {}^{2\pi}\sqrt{\frac{l}{g}},$$

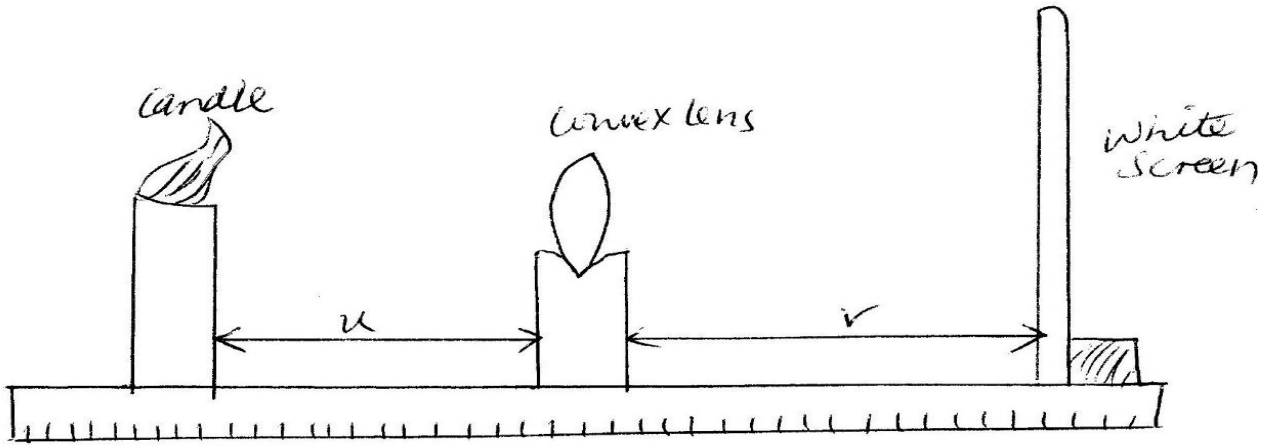
Where g is the gravitational pull, use your graph to determine the value of g. **(4 Marks)**

2. PART A

You are provided with the following apparatus.

- A Convex lens
- A candle
- White screen
- Lens holder
- Metre rule

a) Set up the apparatus as shown in the figure below.

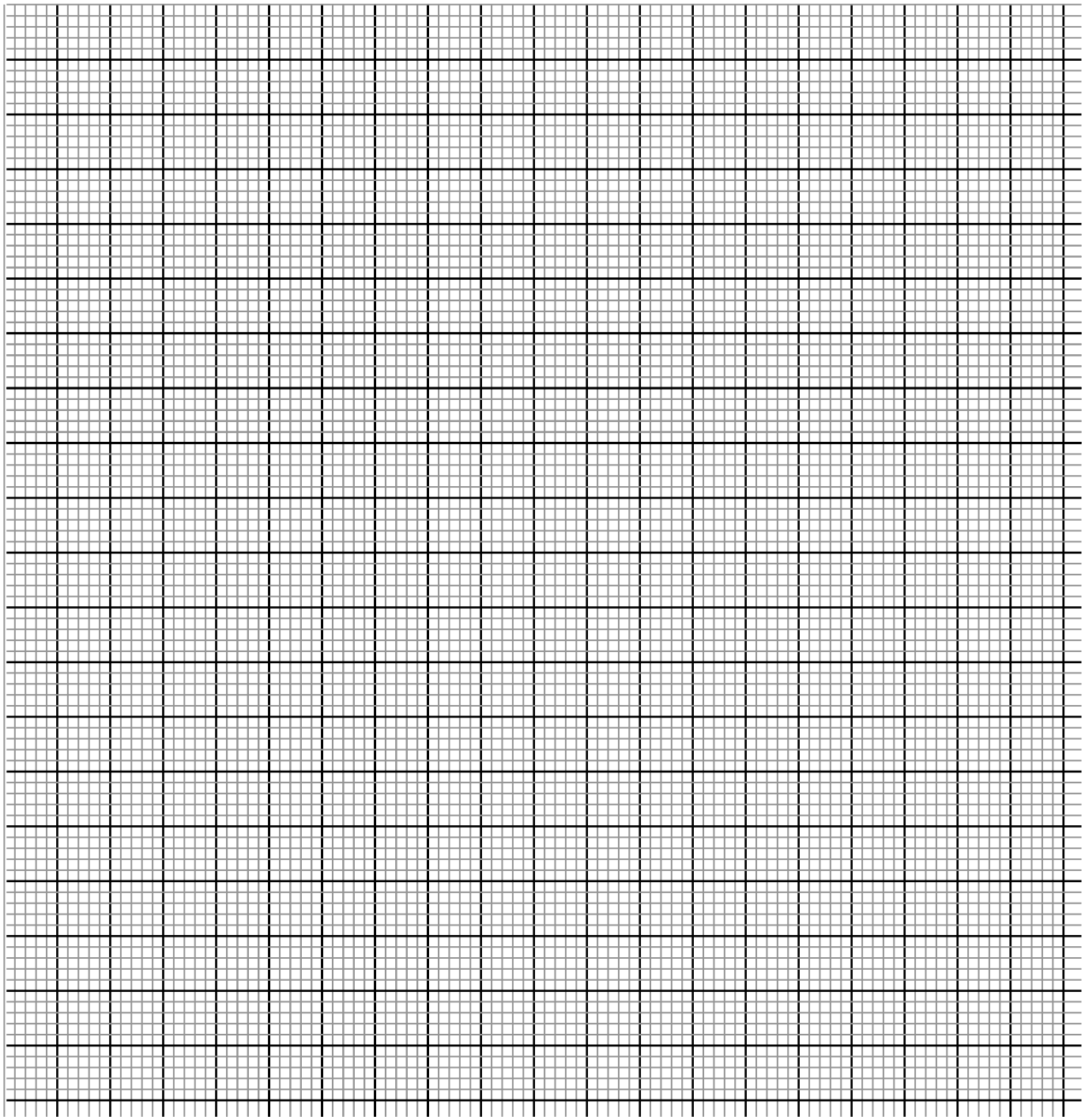


b) Place a lighted candle at object distance, U = 20cm. Move the screen, towards or away the lens until a sharp image of the candle flame is obtained on the screen. Measure the distance V and record the results in the table below.

c) Repeat the same for other values of U as shown in the table and fill their respective values of V. **(5mks)**

Object distance U (in cm)	Image distance V(in cm)	U + V (cm)	UV (cm^2)
20			
30			
45			
60			
75			
90			

d) Plot a graph of UV (cm^2) against (U + V) (cm). **(5 Marks)**



e) Determine the slope of the graph **(2 Marks)**

f) Determine the power of the lens used in the experiment. **(2 Marks)**

PART B

You are provided with the following apparatus

- 2 New dry cells
- An ammeter
- A mounted wire labelled AB
- A cell holder
- A switch
- Connecting wires

a) Draw a circuit that can be used to determine the resistance of the wire AB. **(2 Mks)**

b) Set up the apparatus as in your circuit diagram and tabulate two set of values. **(2 Mk**

c) Calculate the resistance of the wire **(2 Marks)**

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 7

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INSTRUCTIONS TO SCHOOLS:

QUESTION ONE

You are provided with the following:

- 2 new dry cells size D
- A cell holder
- A switch
- A millimeter of range 0 to 1 mA
- A capacitor labeled C (2200μF)
- 8 connecting wires; at least four with crocodile clips on one end
- A stopwatch
- A carbon resistor labeled **R (4.7KΩ)**

QUESTION TWO

You are provided with the following;

- a rectangular glass block of dimensions; 9.6cm X 6.0cm X 2.4cm (Tolerance + or – 0.2cm)
- 4 optical pins
- 2 thumb pins
- a soft board
- a plain paper

KCSE FINAL PREDICTION

PHYSICS

TRIAL 7 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

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FOR EXAMINERS USE ONLY

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1	20	
2	20	
TOTAL	40	

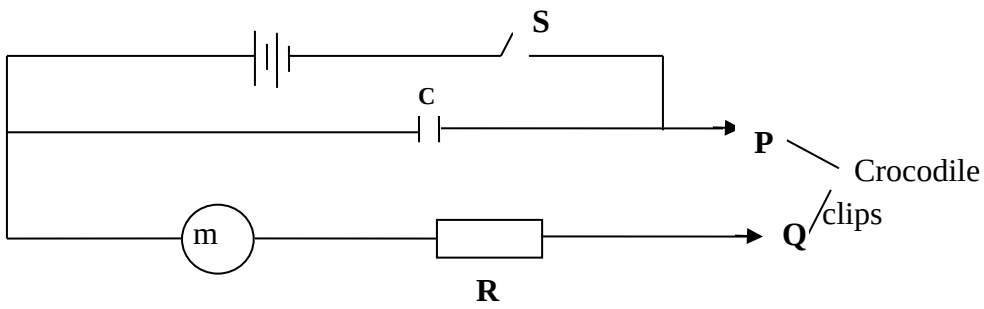
QUESTION ONE

You are provided with the following:

- 2 new dry cells size D
- A cell holder
- A switch
- A milliammeter of range 0 to 1 mA
- A capacitor labeled C
- 8 connecting wires; at least four with crocodile clips on one end
- A stopwatch
- A carbon resistor labeled **R**

Proceed as follows

a. Connect the circuit as shown in the **figure 1**below, where **P** and **Q** are crocodile clips.



b. Close the switch **S**

c. Name the process which takes place when the switch **S** is closed

…… **(1 mark)**

d. Connect the crocodile clips P and Q. Observe and record the highest reading of the milliammeter $\mathbf{I_o}$ **(** This is the current at $t_0 = 0$)

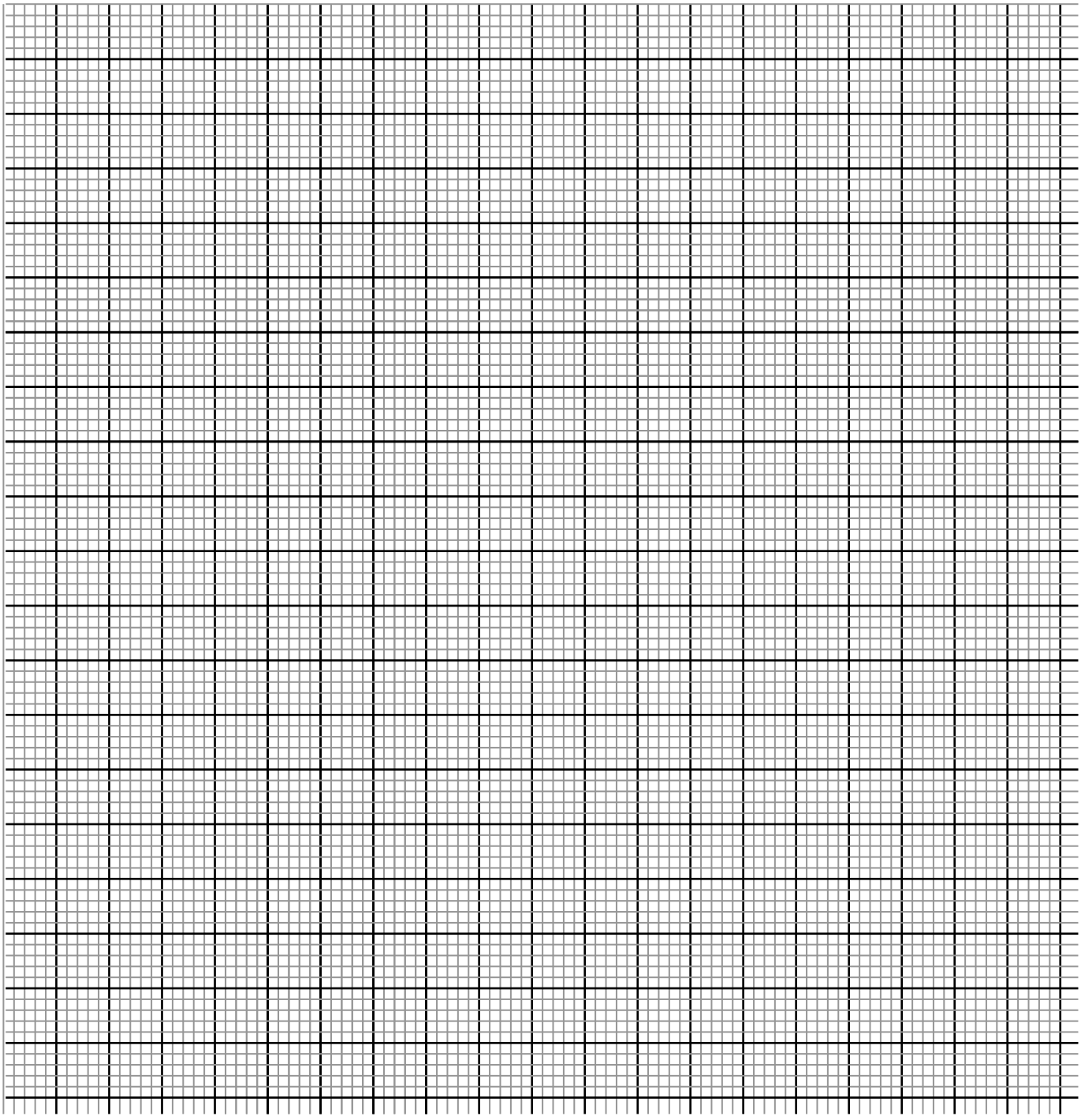
$\mathbf{I_o}$ **= …… mA (1 mark)**

e. While the milliammeter show the maximum value of current I_o, open the switch S and start the stop watch simultaneously. Stop the stop watch when the current has dropped from I_o to 0.5 mA. Read and record in the table below the time taken

f. Reset the stop watch and close the switch. Repeat the procedure in (e) to measure and record the time taken for the current to drop from $\mathbf{I_o}$ to each of the other values shown in the table below. **(5 marks)**

Current **I** (mA)	**0.5**	**0.4**	**0.3**	**0.2**	**0.1**
Time **t** (s)					

g. Plot a graph of Current **I** (y – axis)(mA) against time **t** (s) **(5 marks)**



h. From your graph, find **W** the value of **I** when **t = 10s**. **(3 marks)**

i. Given that **A = 10W**, determine the value of **A.** **(3 marks)**

j. Determine the voltage across **R** at **t = 10s** given that R = 4.7kΩ **(2 marks)**

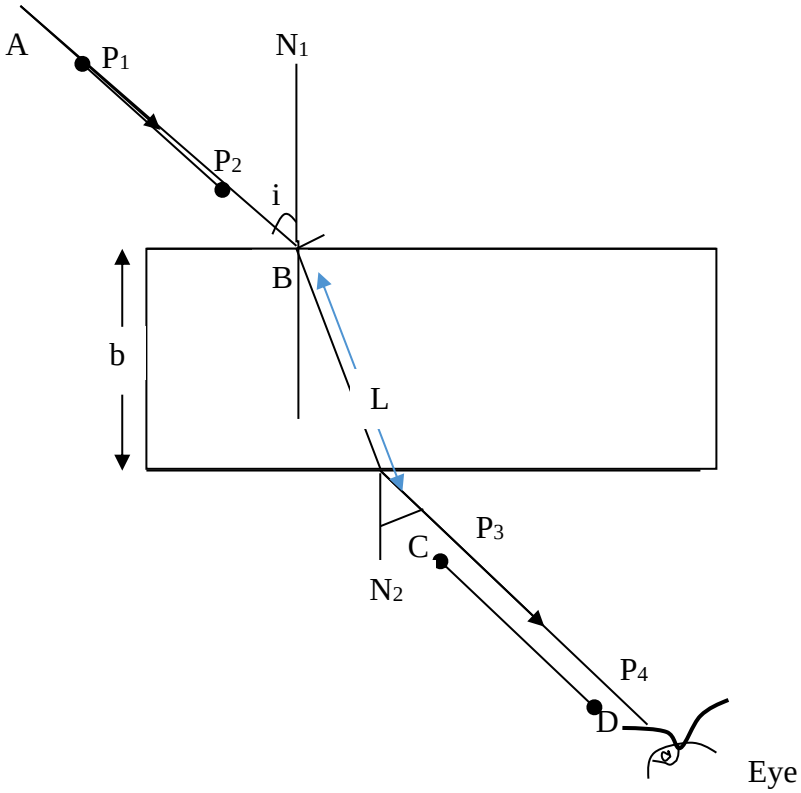
QUESTION TWO

You are provided with the following;

- a rectangular glass block
- 4 optical pins
- 2 thumb pins
- a soft board
- a plain paper

Proceed as follows:

(a) Place the glass block on the plain paper with one of the largest face upper most. Trace round the glass block using a pencil as shown below.



(b) Remove the glass block and construct a normal at B. Construct an incident ray AB of angle of incidence, i = 20^0.

(c) Measure the breadth **b** of the glass block

breadth b =…… (1 mark)

(c) Replace the glass block and trace the ray ABCD using the optical pins.

(d) Remove the glass block and draw the path of the ray ABCD using a pencil.

(e) Measure the length L and record it in the table below

Angle i^0	L (cm)	L^2 $(cm)^2$	$\frac{1}{L^2}$ (cm^{-2})	$Sin^2 i$
20				0.1170
30				0.25

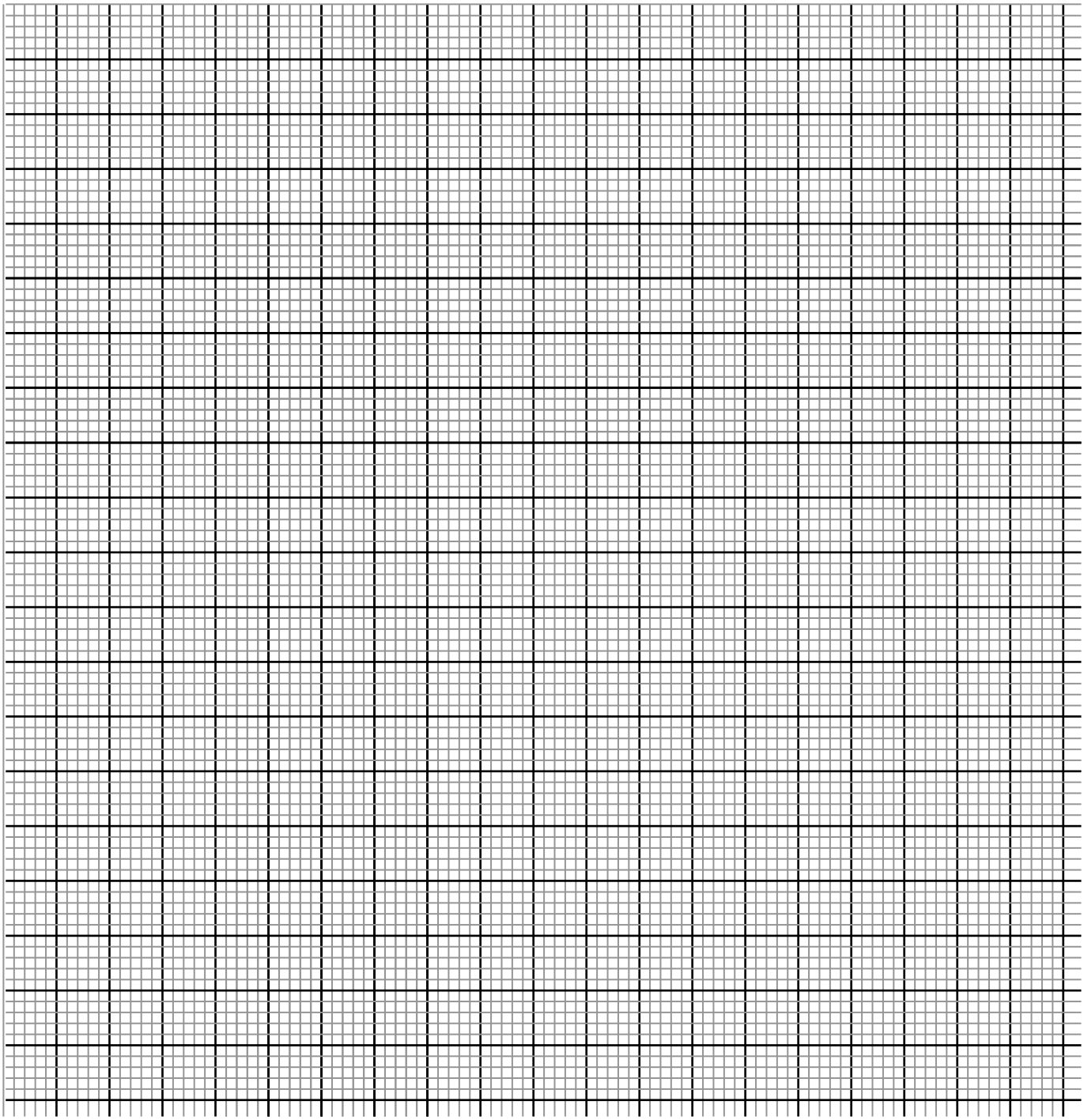
40				0.4312
50				0.5868
60				0.75
70				0.8830

(6 marks)

(f) Repeat the procedure above for the angles of incidence given.

(g) Calculate the values of $\frac{1}{L^2}$ and record in the table above.

(h) Plot a graph of $\frac{1}{L^2}$ (y-axis) against Sin^2i. **(5 marks)**



(i) Calculate the gradient **S** of the graph **(3 marks)**

Given that the equation of that graph is; $\frac{1}{L^2} = \left(- \right) \frac{1}{n^2 b^2} \ \text{Sin}^2 i + \frac{1}{b^2}$

(j) Determine the value of ***n*** **(3 marks)**

(k) Present your work sheet; attached to the exam paper **(2 mark)**

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 8

Confidential

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INSTRUCTIONS TO SCHOOLS:

QUESTION ONE

-stopwatch
-250ml beaker
-Rubber bung
-Thermometer
- 150 ml of boiling water
-Tripod
- Gauze
- Retort stand and clamp
- Hot water

QUESTION 2

PART A

- One resistor labelled R = 40Ω
- A wire labelled W mounted on millimetre scale (32 gauge)
- A wire labelled S mounted on a millimetre scale (28 gauge)
- One dry cell and a cell holder
- One jockey
- One centre zero galvanometer
- Eight connecting wires, four with crocodile clips at both ends
- A micrometer screw gauge
- A switch

PART B

-Lens and a lens holder (f=10cm)
- Half metre rule
- White screen

KCSE FINAL PREDICTION

PHYSICS

TRIAL 8 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

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e) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINERS USE ONLY

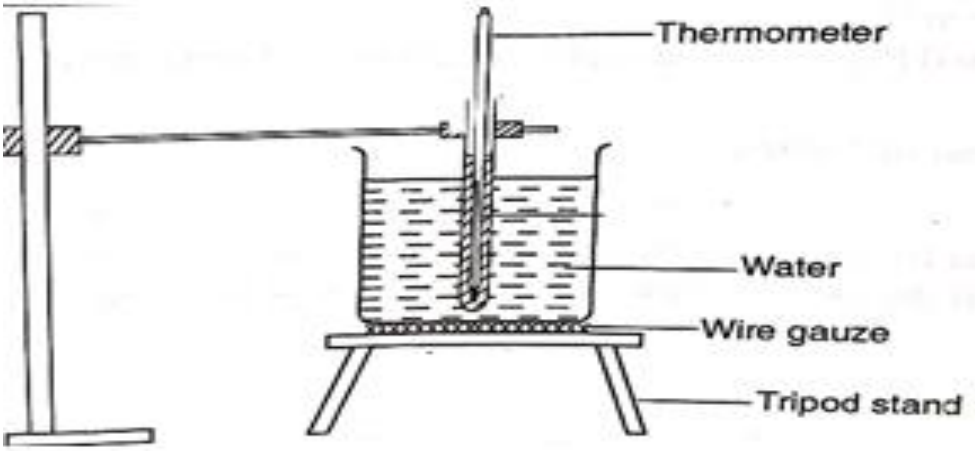
QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

QUESTION ONE

Apparatus

-stopwatch
-250ml beaker
-Rubber bung
-Thermometer
- Bunsen burner
-Tripod
- Gauze
- Retort stand and clamp
- Hot water

Figure 2.



Procedure

(a) (i) Measure and record the ambient temperature, T_A =……..^{0}**C (1 mark)**

(ii) Fill an empty beaker with exactly 150ml of hot water (check the side scale of the beaker)

(iii)Set up the apparatus as shown in **figure 2**. Ensure the thermometer is about 2cm above the bottom of the beaker.

Record the initial highest temperature of water T_H=…….. ^{0}C **(1 mark)**

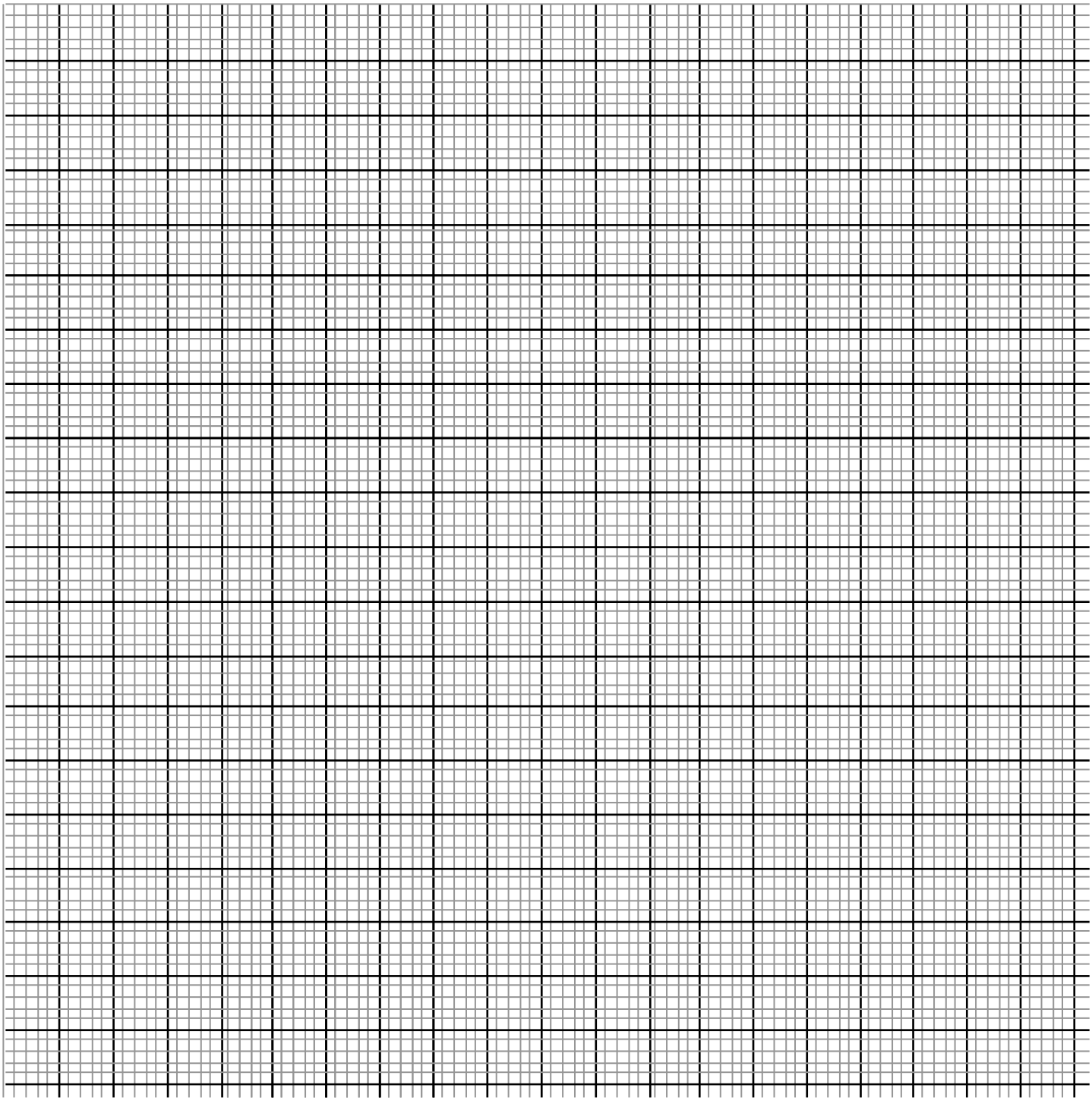
(b) Start the stopwatch and time for every 2.0 minutes the temperature T of water.

Record the temperature in **Table 2** for 20 minutes

Time (t) in minutes	2	4	6	8	10	12	14	16	18	20
Temperature (T) in ^{0}C										
$(T-T_A)^0$C										
$Log_{10}(T-T_A)$ (2 d.p)										

(6 mark)

(c) Plot a graph of $Log_{10}(T-T_A)$ against time (5 mark)



(d) From the graph determine:

(i) The Slope S **(3marks)**

……

……

……

……

……

(ii) The cooling constant , K of water given S=-0.4343K **(2 mark)**

……

……

……

(e) Given that the specific heat capacity of water is 4.2J/g/^{0}C determine the heat lost when the water cools to the temperature of the surrounding **(2 mark)**

……

……

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2. PART A

You are provided with the following apparatus :

- One resistor labelled R = 40Ω
- A wire labelled W mounted on milliameter scale
- A wire labelled S mounted on a milliameter scale
- One dry cell and a cell holder
- One jockey
- one centre zero galvanometer
- Eight connecting wires, four with crocodile clips at both ends
- A micrometer screw gauge
- A switch

Proceed as follows

a) Determine the average diameter D, of the wire labelled W using the micrometer screws gauge provided.

D_1 = ... mm (½ mark)

D_2 = ... mm (½ mark)

$D = \frac{D_1 + D_2}{2}$ (in cm) **(1 mark)**

……

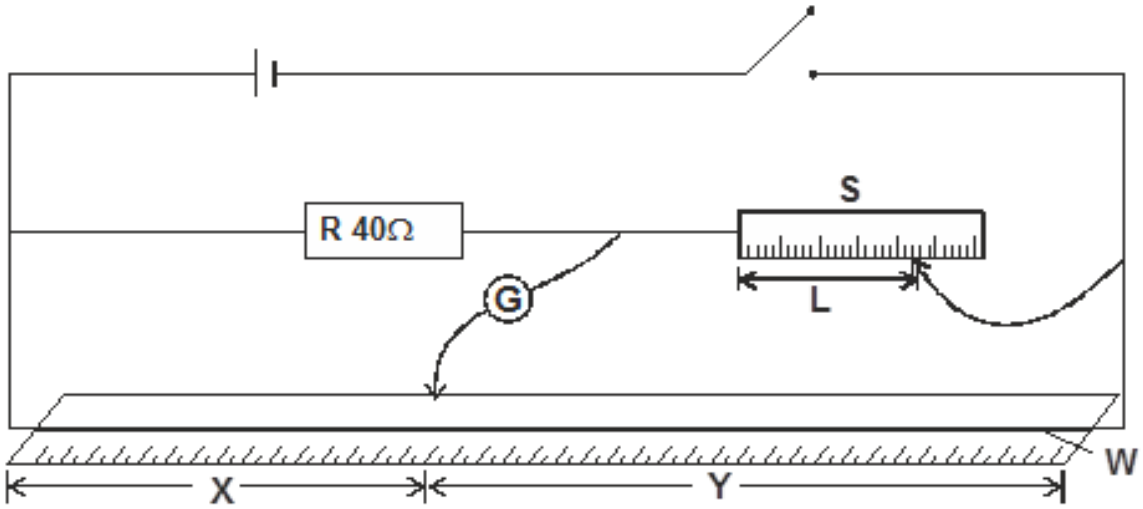
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b) Set up the apparatus as shown in the circuit diagram in **figure 3** below.
Use the crocodile clips to fix length L, of wire labelled S at 50cm from the end connected to the galvanometer G.



c) Close the switch and use the jockey to touch one end of the wire W, and then the other end. The deflections on the galvanometer should be in opposite directions, if not check the circuit. Adjust the positions of the jockey along the wire W until there is no deflection in the galvanometer. Record the value of x and y.

x = ... cm **(½ mark)**

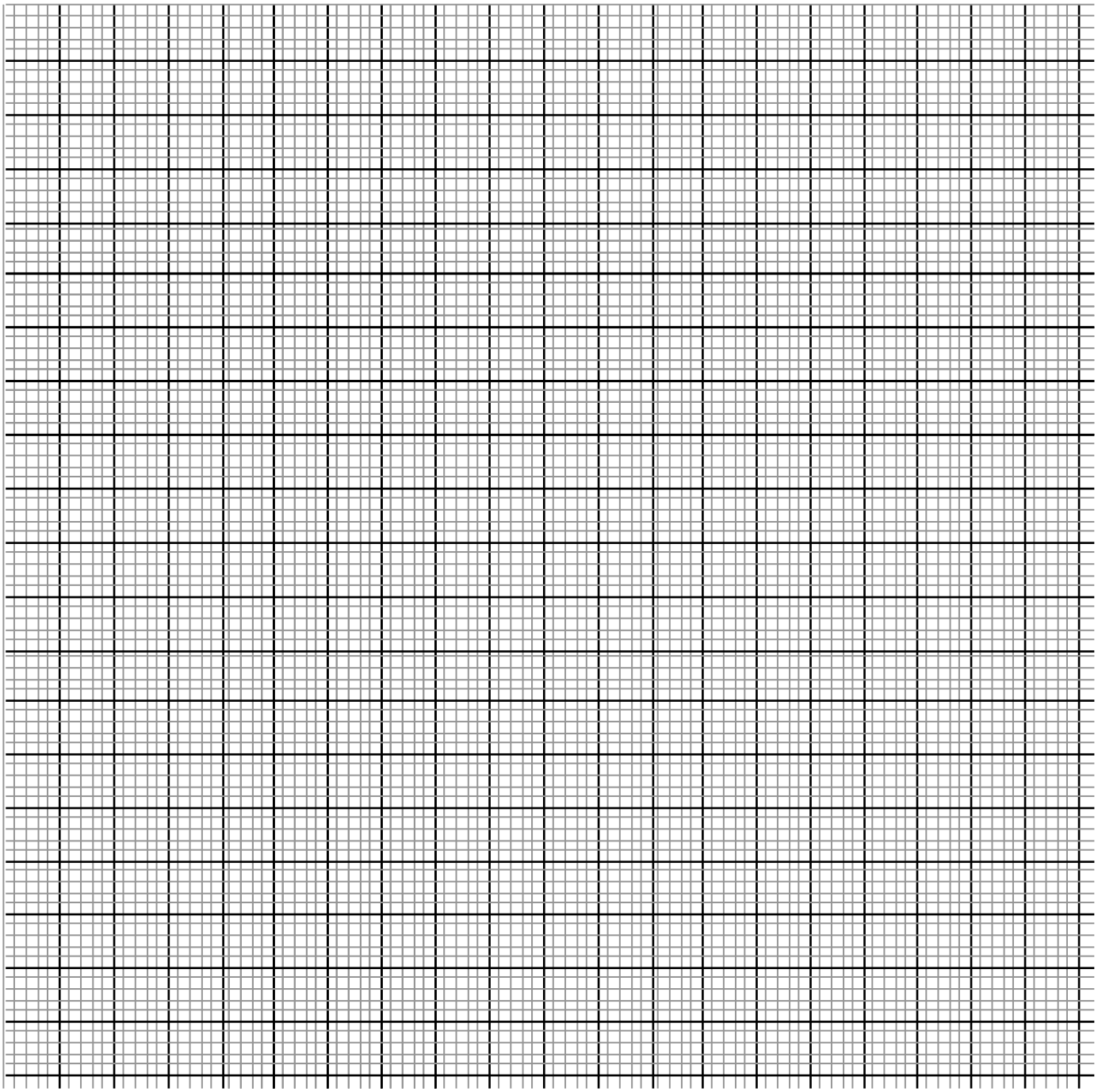
y = ... cm **(½ mark)**

d) Record for other values of L in **table 3** below

L (cm)	45	40	35	30	25	20
X (cm)						
Y (cm)						
y/x (3 d.p)						

(4 marks)

e) i) Plot a graph of $^{y}/_{x}$ (y-axis) against L. **(5 marks)**



ii) Determine the slope, m of the graph. **(2 marks)**

……

……

……

iii) Given that K = $\underline{100}$D, determine the value of K. **(2 marks)**

……

……

……

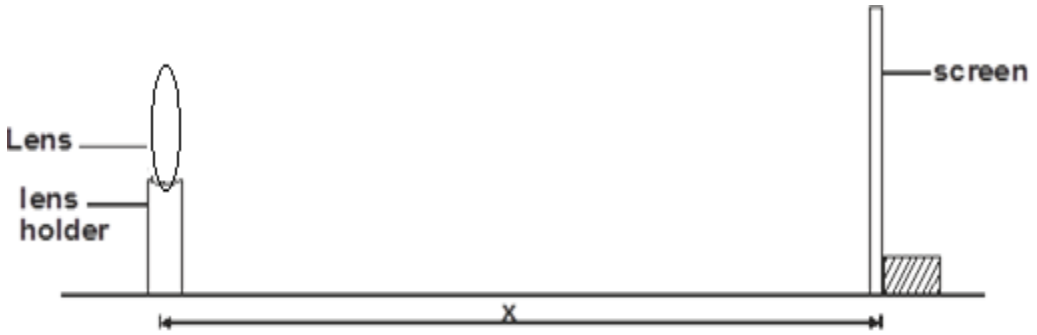
……

PART B

b) You are provided with a lens P a lens holder a white screen and half metre rule.

Procedure

i)Set the apparatus as shown in **figure 4** below. Focus a sharp image of a distant object on the screen (e.g window frame). The object should be 10cm away.The object should be at least 10cm away.



a) Measure the distance x in cm between the lens and the screen at which a sharp image is obtained repeat this two times, using different objects and record your readings in **table 4** below.

Object	Distance X, (cm)
1	
2	

(2 marks)

ii) Calculate the average value of x **(1 mark)**

……

……

……

iii) What is the physical significance of the result obtained in (iii) above? **(1 mark)**

……

……

……

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 9

Confidential

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INSTRUCTIONS TO SCHOOLS:

QUESTION 1

Each candidate should have:-

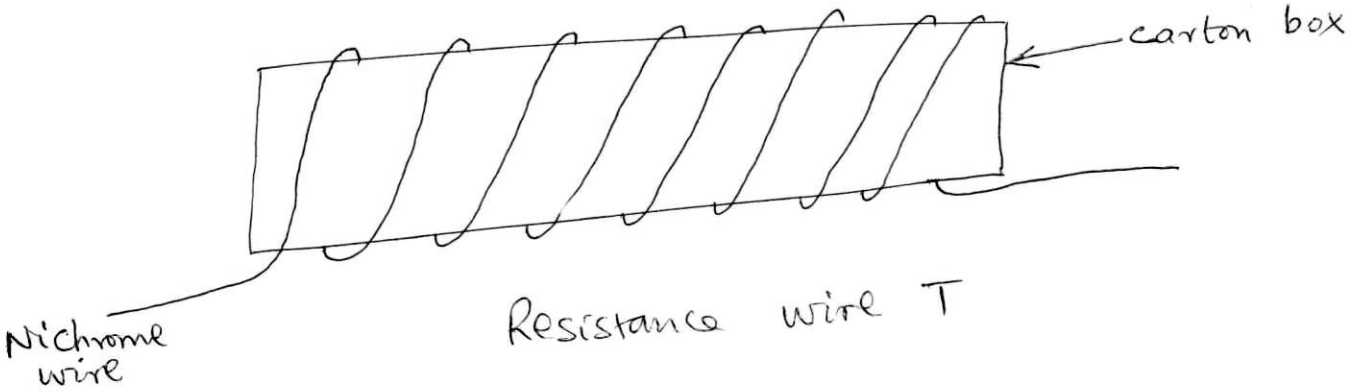
- A retort stand, clamp and boss
- A spiral spring
- A stop watch
- Three 100g masses
- A 250ml glass beaker
- A Bunsen burner
- A thermometer (-10 to 110^0C)
- A tripod stand and wire gauze
- A measuring cylinder 100mll
- A source of heat
- Some water in a container about 500ml

QUESTION 2

Each candidate is required to have the following apparatus:

- A voltmeter (0 – 5V)
- A candle
- A white screen
- Two new dry cells
- Six connecting wires, each with a crocodile clip at one end.

- A switch.
- A lens and a lens holder. NB: Focal length = 20cm.
- A metre rule.
- A resistance wire labelled R mounted on a metre rule.
  The physics teacher is required to mount a nichrome wire SWG 28 on a metre rule and label the wire R. The diameter of the wire is 0.36mm.
- A resistance wire labelled T.
  The Physics teacher is required to mount a nichrome wire SWG 28 on a small piece of carbon box and label it T.
  The diameter of the wire is 0.36mm and its length is 60cm.



KCSE FINAL PREDICTION

PHYSICS

TRIAL 9 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

c) Marks will be given for clear record of the observations actually made, their suitability, accuracy and the use made of them.

d) Candidates are advised to record their observations as soon as they are made.

e) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINERS USE ONLY

QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

1. Question one

This question has two parts A and B. Answer both parts.

PART A

You are provided with the following:-

- A retort stand, clamp and boss.
- A spiral spring.
- A stop watch.
- Three 100g masses.

Proceed as follows:

(a) Suspend a 100g mass at the end of the spring as shown in figure 1.

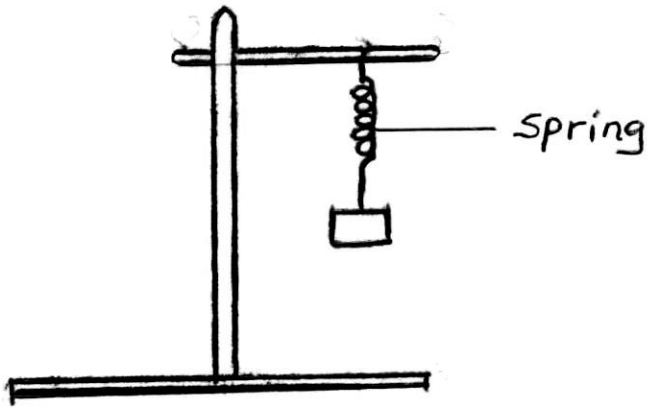


Fig. 1

Now give the mass a small vertical displacement and release so that it performs vertical oscillations. Time ten oscillations and determine the period T. Enter your results in table 1.

(b) Repeat the experiment for the other values of mass and complete the table.

Table 1

Mass m (g)	100	200	300
Time for 10 oscillations (s)			
Periodic time T(s)			

(3mks)

(c) Given that $T = \pi\sqrt{\frac{m}{k}}$, where k is the spring constant, find the average value k for the spring. **(2mks)**

PART B

You are provided with the following:-

- A 250ml glass beaker
- A Bunsen burner
- A Thermometer
- A Stop watch
- A Tripod stand and a Wire gauze
- A measuring cylinder 100ml
- Water

Set the apparatus as shown in figure 2 below.

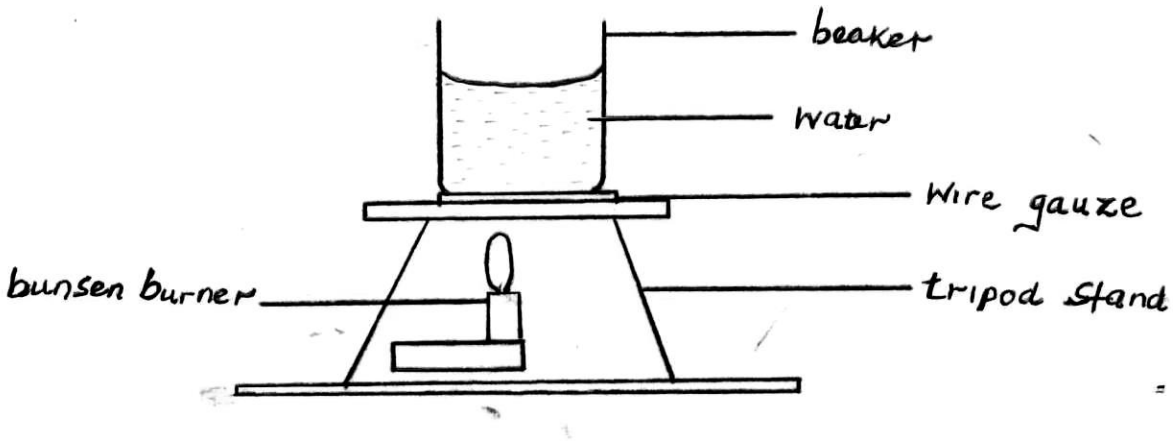


Fig. 2

(d) Measure 100cm^3 of water and pour it into the beaker. Take the initial temperature of the water.

T_0 = ……^{0}C **(1mk)**

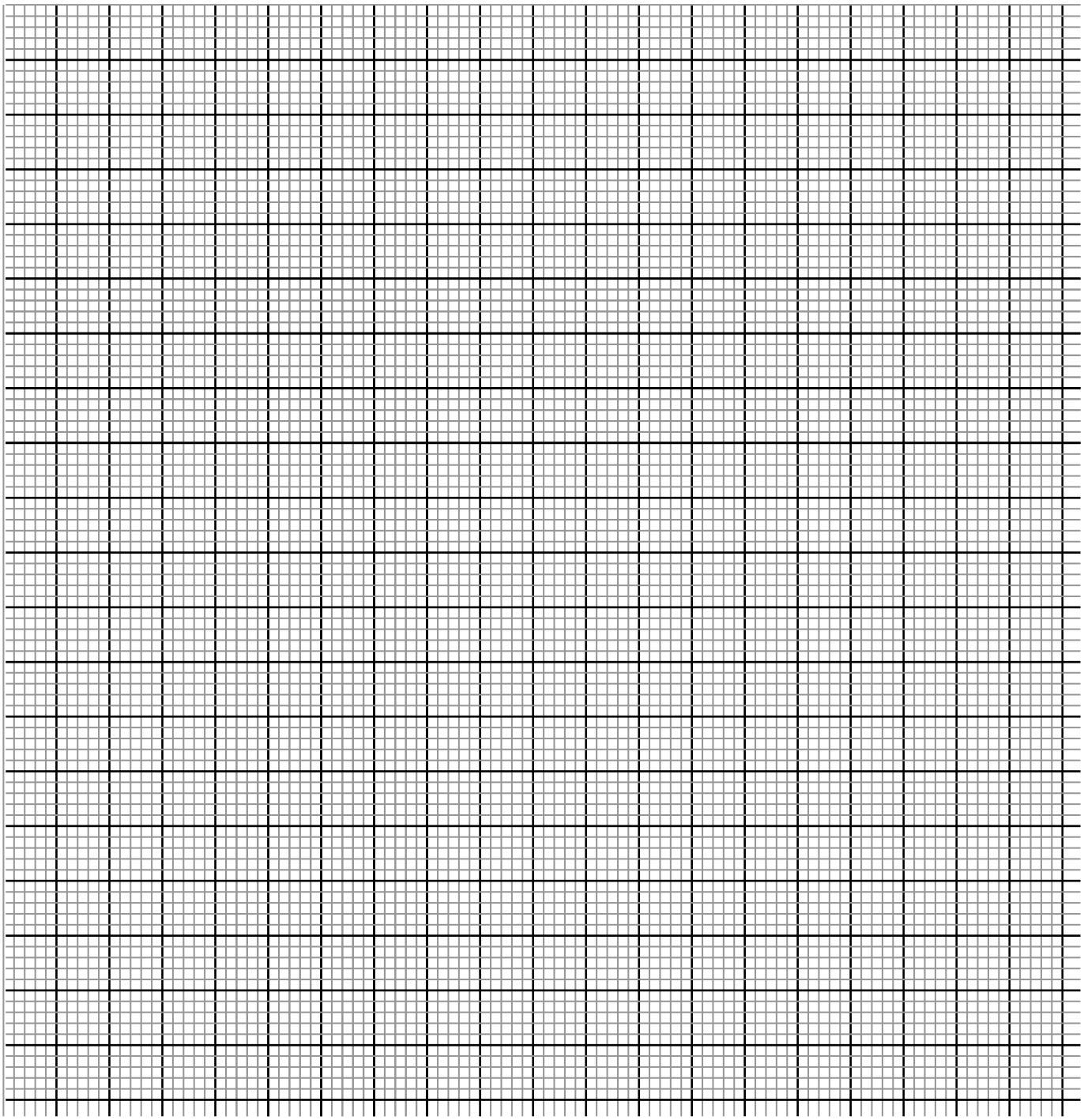
Now heat the water to a temperature of 80^{0}C. switch off the gas tap and place a thermometer into the beaker and start the stop watch when the temperature is 65^{0}C. Take the temperature T^{0}C of water ever two minutes. Record your results in the table 2 below.

Table 2

Time, t(min)	2	4	6	8	10	12	14
Temperature (T) ^{0}C							
(T - T_0)							
Log (T - T_0)							

(5mks)

(e) Plot a graph of Log $(T - T_0)$ against Time (t). **(5mks)**



(f) Find the value of P of log $(T - T_0)$ when t = 0. **(1mk)**

(g) Determine N, where N is the antilog of P. **(1mk)**

(h) Calculate the temperature of the surrounding T_R using the expression $N = 65 - T_R$ **(2mks)**

2. Question 2

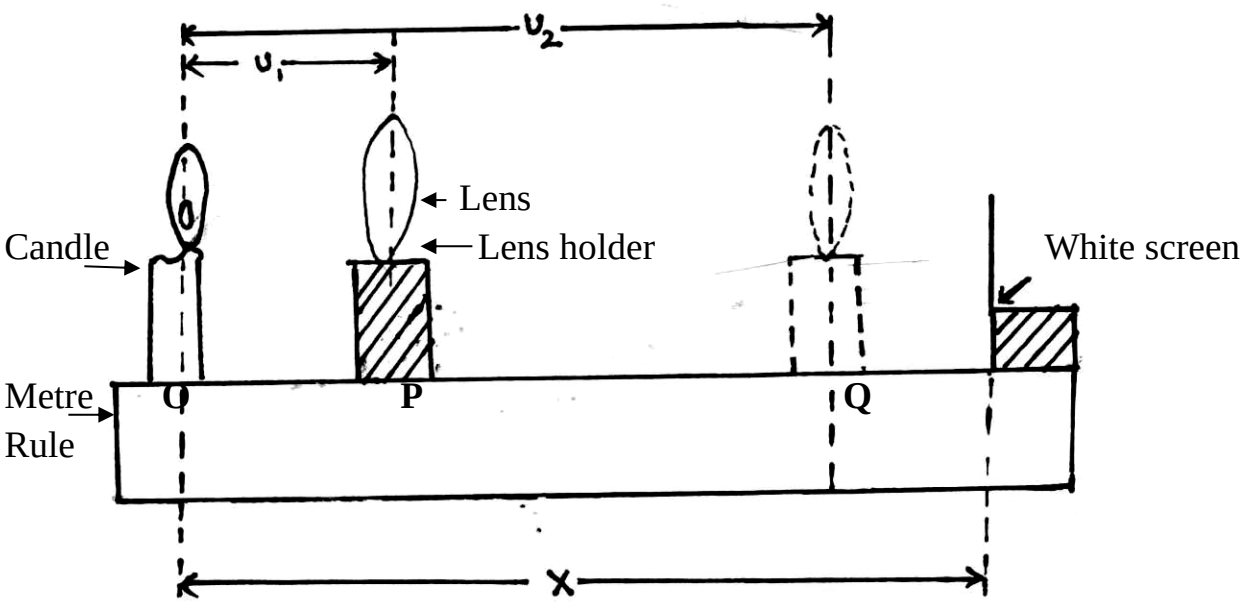
Part A

You are provided with the following:-

- A lens and a lens holder.
- A candle.
- A white screen.

Proceed as follows:

(a) Set the apparatus as shown below.



(b) Place the white screen at a distance X = 100cm from the candle. Let the lens be at position P, adjacent to the lit candle.

(c) Move the lens towards the screen until an enlarged image of the candle is formed on the screen. Measure and record the distance u_1.

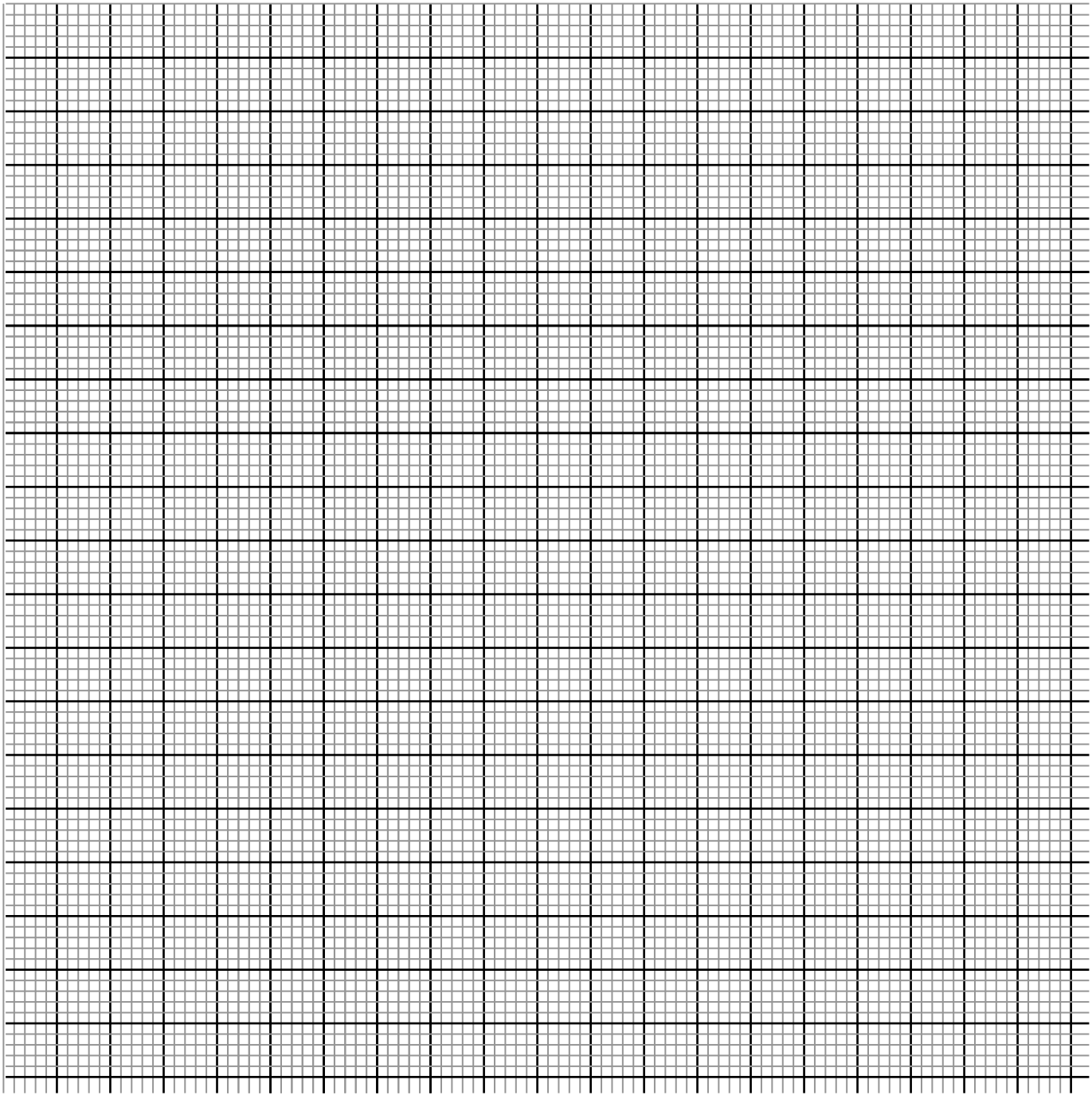
(d) Move the lens to a second position Q where the image of the candle is sharp but diminished on the screen.
Measure and record the distance u_2.
Hence determine the value of $d = u_2 - u_1$.

(e) Repeat the procedure in (c) and (d) for either values of x = 95, 90, 85, 80cm. Complete table 2 shown below.**Table 2**

x (cm)	100	95	90	85	80
u_1(cm)					
U_2(cm)					
$d = u_2 - u_1$(cm)					
$y = {}^{d2}/_{x}$(cm) (2d.p)					

(8mks)

(f) On the grid provided, plot a graph of y against x. **(5mks)**



(g) Determine the value of $x = x_0$, when $y = 0$. **(1mk)**

x_0 = ... cm

(h) Given that $k = \frac{x_o}{4}$, determine the value of k. **(1mk)**

PART B

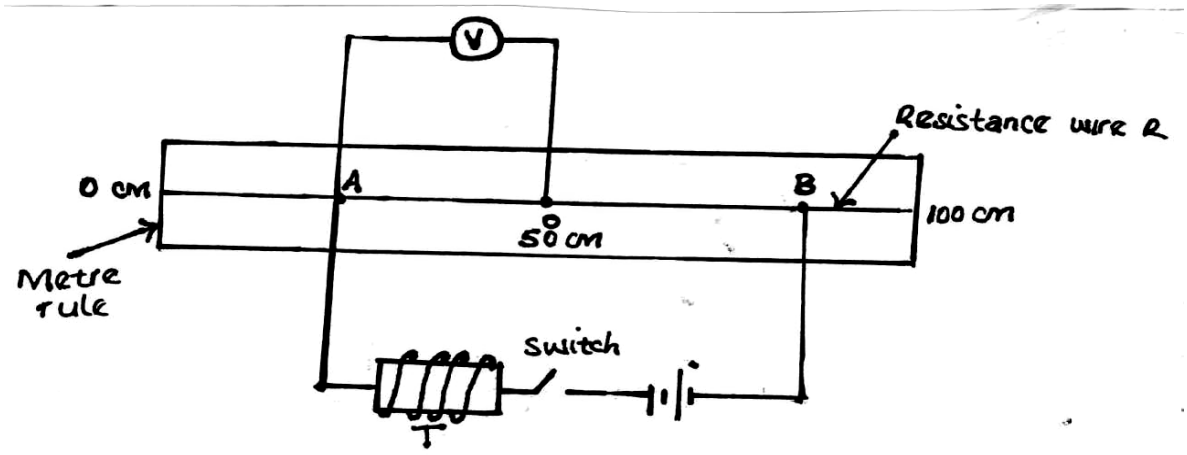
You are provided with the following:-

- A voltmeter
- A resistance wire labelled R mounted on a metre rule.
- A metre rule.
- A resistance wire labelled T mounted on a small piece of carton.
- Two dry cells and a cell holder.
- Six connecting wires, each with a crocodile clip at one end.
- A switch.

Proceed as follows;

(i) Measure and record the e.m.f. E_0 of the cells connected in series, E_0 = ____ v. (1mk)

(j) Connect the circuit as shown below. Point O on resistance wire P is at 50cm mark of the metre rule. A and B are points on resistance wire P such that AO = OB = X = 30cm.



(k) Close the switch. Read and record the potential difference V across AO

V = ... Volts.

(1mk)

(l) The relationship between V and x is given by:

$$\frac{I}{V} = \frac{35}{x} + \frac{1}{y}$$

Determine the value of y. **(2mks)**

(m) Use the e.m.f. E_0 to determine the constant k, given that:

$$k = \frac{8}{35E_0}$$ **(1mk)**

KCSE FINAL PREDICTION

PHYSICS EXAM

PRACTICAL TRIAL 10

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INSTRUCTIONS TO SCHOOLS:

Question 1

Each candidate should have the following.

- Two dry cells (1.5v) D - size
- Cell holder(s) to enable parallel connection
- A bulb (1.5v)
- A voltameter
- An ammeter
- A switch
- Mounted resistance wire labelled AB

(The wire is SWG 32 mounted on a metre rule on a mm sale.)

Question 2

- Complete stand
- Copper wire (length of about 30cm)
- A stop watch
- A protractor
- A meter rule
- Corked optical pin

KCSE FINAL PREDICTION

PHYSICS

TRIAL 10 PRACTICAL

TIME: 2 ½ HOURS

NAME…… INDEX NO……..…

SCHOOL…….. SIGN……

DATE……....

INSTRUCTIONS TO CANDIDATES

a) Answer all the questions in the spaces provided in this question paper.

b) You are supposed to spend the first **15 minutes** of the **2 ½ hrs** allowed for this paper reading the whole paper carefully before commencing your work.

c) Marks will be given for clear record of the observations actually made, their suitability, accuracy and the use made of them.

d) Candidates are advised to record their observations as soon as they are made.

e) Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINERS USE ONLY

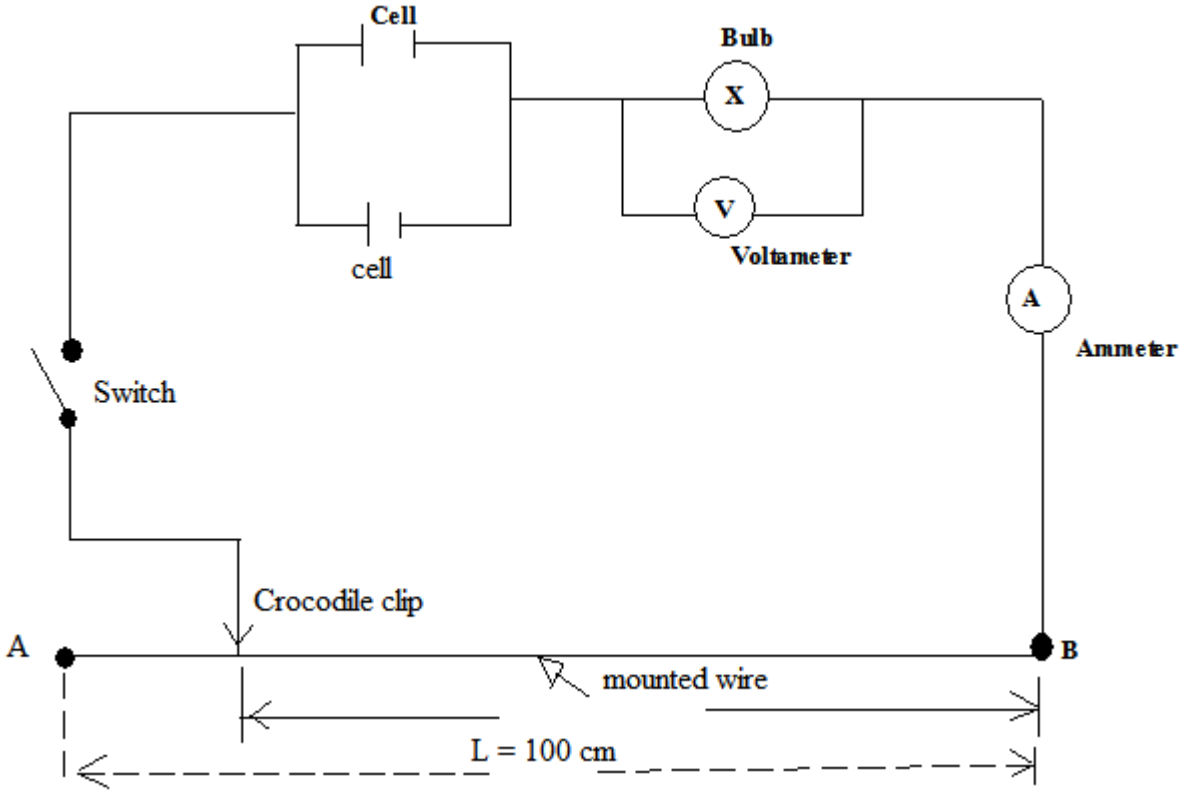
QUESTION	MAX. SCORE	CANDIDATES SCORE
1	20	
2	20	
TOTAL	40	

Question 1

You are provided with the following apparatus

- Two dry cells
- A cell holder
- A bulb
- A voltameter
- An ammeter
- A switch
- Amounted resistance wire labelled AB

a) Set up the apparatus as shown in the circuit below.



b) With the crocodile clip at A (ie L = 100cm) take the voltameter reading (V) and the ammeter reading (I). Record V and I in the table below.

Length l(cm)	100	80	60	40	20	0
Voltage (V)						
Current I (A)						

(7 marks)

c) Repeat the procedure in (b) above for the lengths shown and complete the table above.

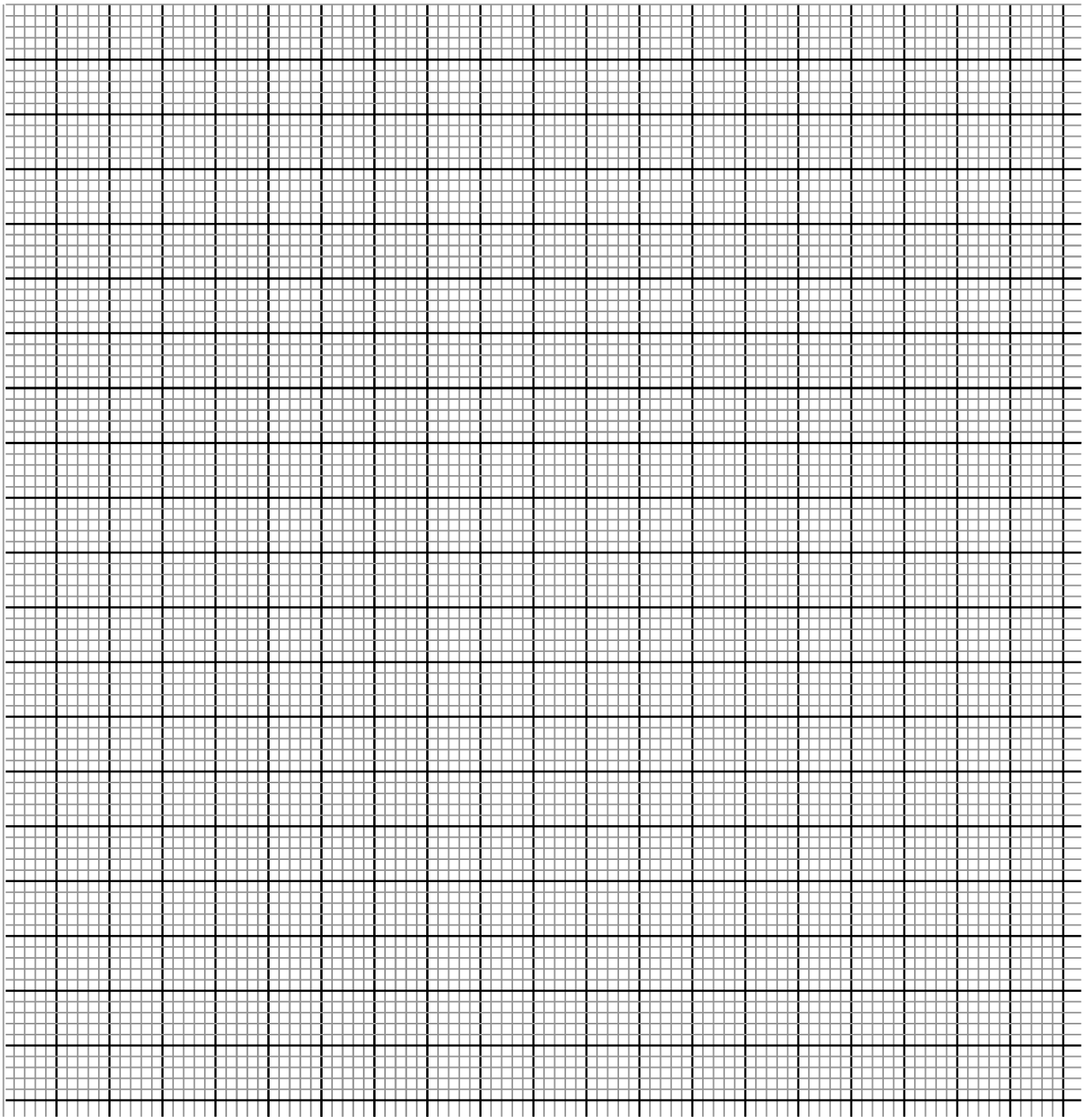
d) State the changes you observe on the bulb as L decrease from A. **(2 marks)**

……

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……

e) Plot a graph of voltage against length (cm) **(5 marks)**



f) What physical quantity does the slope of the graph represent at any given point.
(2 marks)

g) From your graph determine the value of voltage at length L = 70cm. **(2 marks)**

h) Use your graph to describe how the physical quantity in (e) above is affected as the current increases. Explain why. **(2 marks)**

Question 2

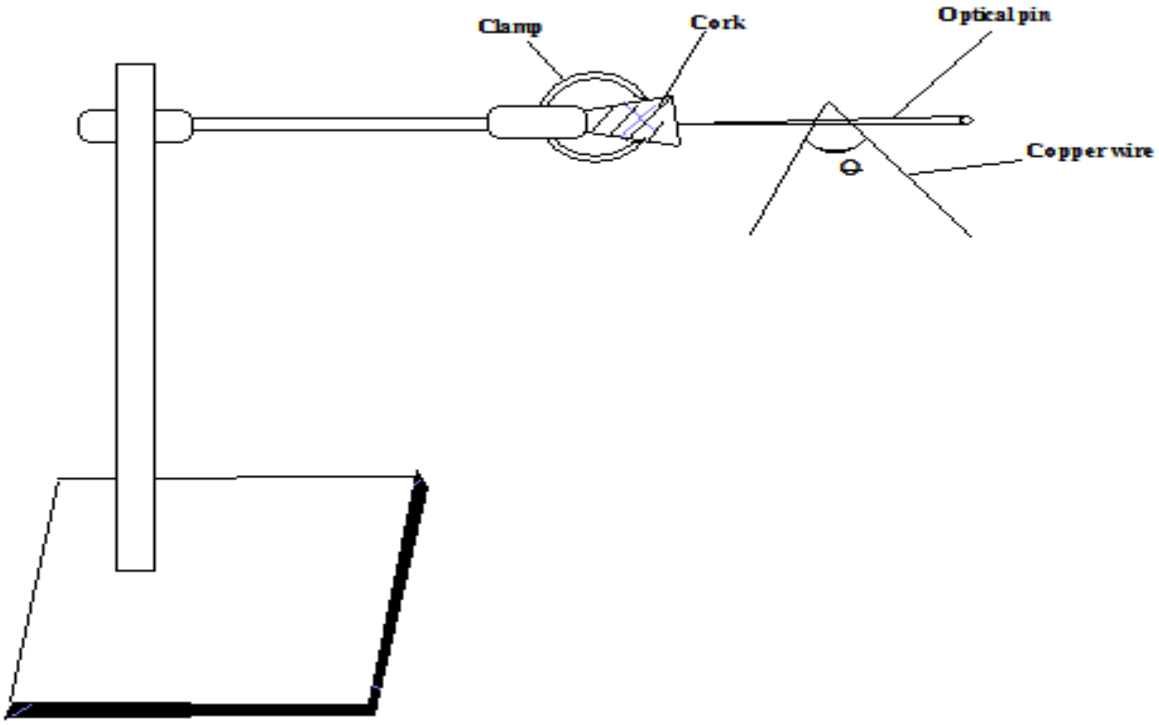
You are provided with the following apparatus

- A complete stand
- Copper wire (wire length about 30cm)
- A stop watch
- A protractor
- A meter rule
- Corked optical pin

Procedure

a) Measure the length L of the copper wire.
L = ... m **(1 mark)**

b) Bend the wire to form an angle Θ of 60^0, suspend it from the corked optical pin as shown in the diagram below.



c) Give it a small displacement so that it oscillates about a point on the pin. Measure the time, t(s) for 10 oscillations of the wire.

t = ... (s) **(1 mark)**

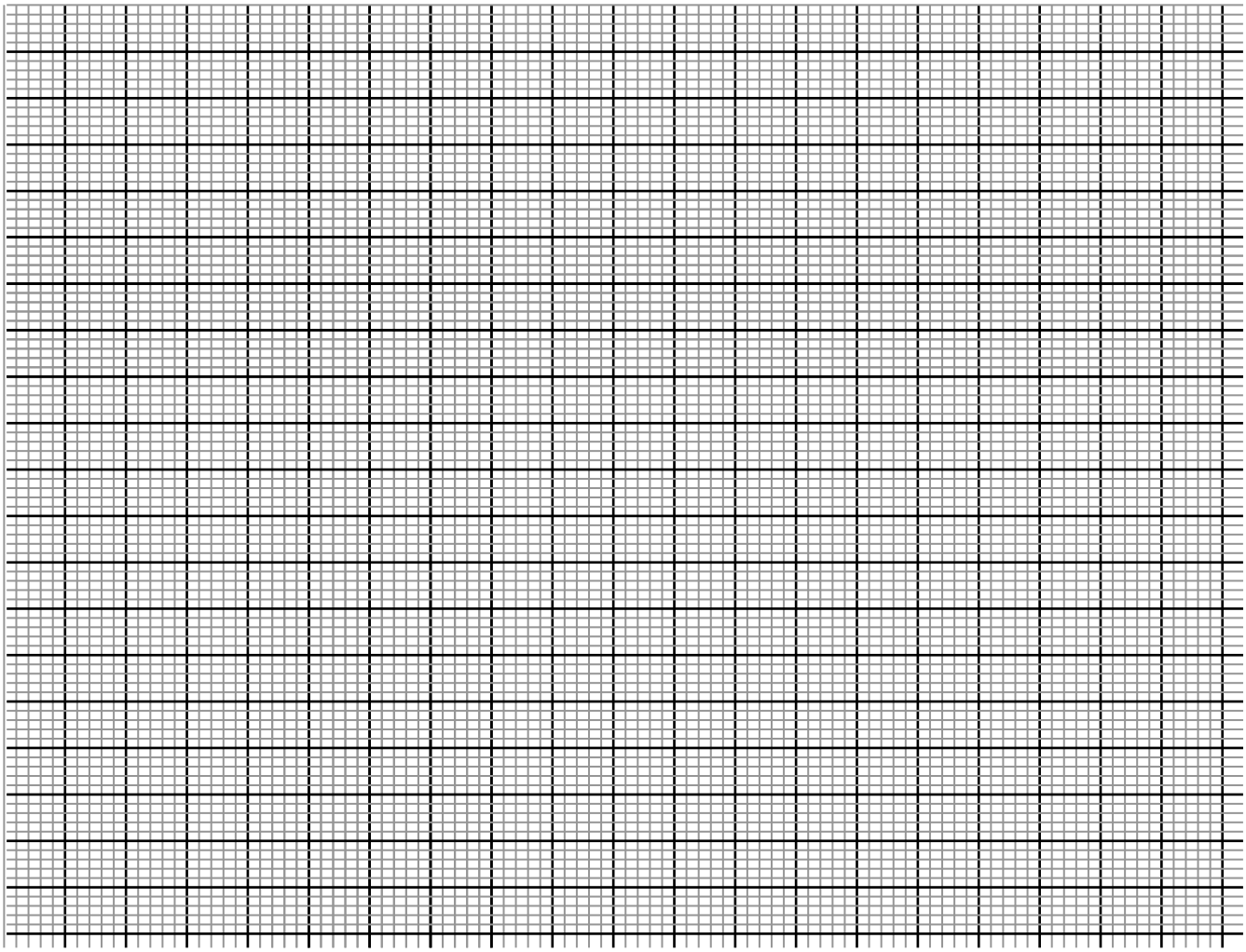
d) Repeat the procedure (b) above for the values of $\Theta = 70^0, 80^0, 90^0, 100^0, 110^0$.

e) Record and complete the results in the table below.

Θ (^{0})	60	70	80	90	100	110
Cos $^1/_2\Theta$						
Time for 10 oscillations, t (s)						
Periodic time T (s)						
T^2 (s^2)						
$^1/_{T^2}$ (s^{-2})						

(7 marks)

f) On the grid provided, plot a graph of $^1/_{T^2}$ (s^2) against Cos$^1/_2\Theta$. **(5 marks)**



g) Determine the slope. **(3 marks)**

h) Given that the graph is related by the equation $^{1}/_{T}{}^{2} = \frac{8\pi^2 L}{g}\text{Cos } {}^{1}/_{2}\Theta$, determine the value of constant g.

(3 marks)

THE END

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