Marking scheme

232/3

PHYSICS PAPER 3

(PRACTICAL)

TIME: 2 ½ hours

MOMALICHE JOINT EXAMINATION

Kenya Certificate of Secondary Education

PHYSICS (PRACTICAL) Paper 3

TIME: 2 ½ HOURS

Instructions

- *Write your name, index number and admission number in the spaces provided above.*
- *Sign and write the date of examination in the spaces provided above.*
- *Answer ALL questions in the spaces provided in the question paper.*
- *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.*
- *Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.*
- *Candidates are advised to record their observations as soon as they are made.*
- *Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.*
- *This paper consists of 8 printed pages.*
- *Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.*

For Examiner's Use Only

Question 1	c	d	g	H	i	(j)	(k)		**TOTAL**
Maximum Score	1	1	8	5	2	2	1		**20**
Candidate's Score									

Question 2		c	e	f	g	h	i	j	k	**TOTAL**
Maximum Score		1	6			5	3	3	2	**20**
Candidate's Score										**40**

GRAND TOTAL

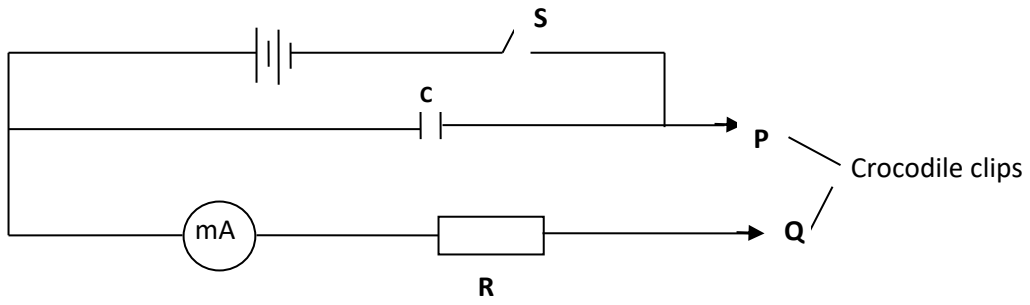
Question one

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

Charging (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 $t_0 = 0$)

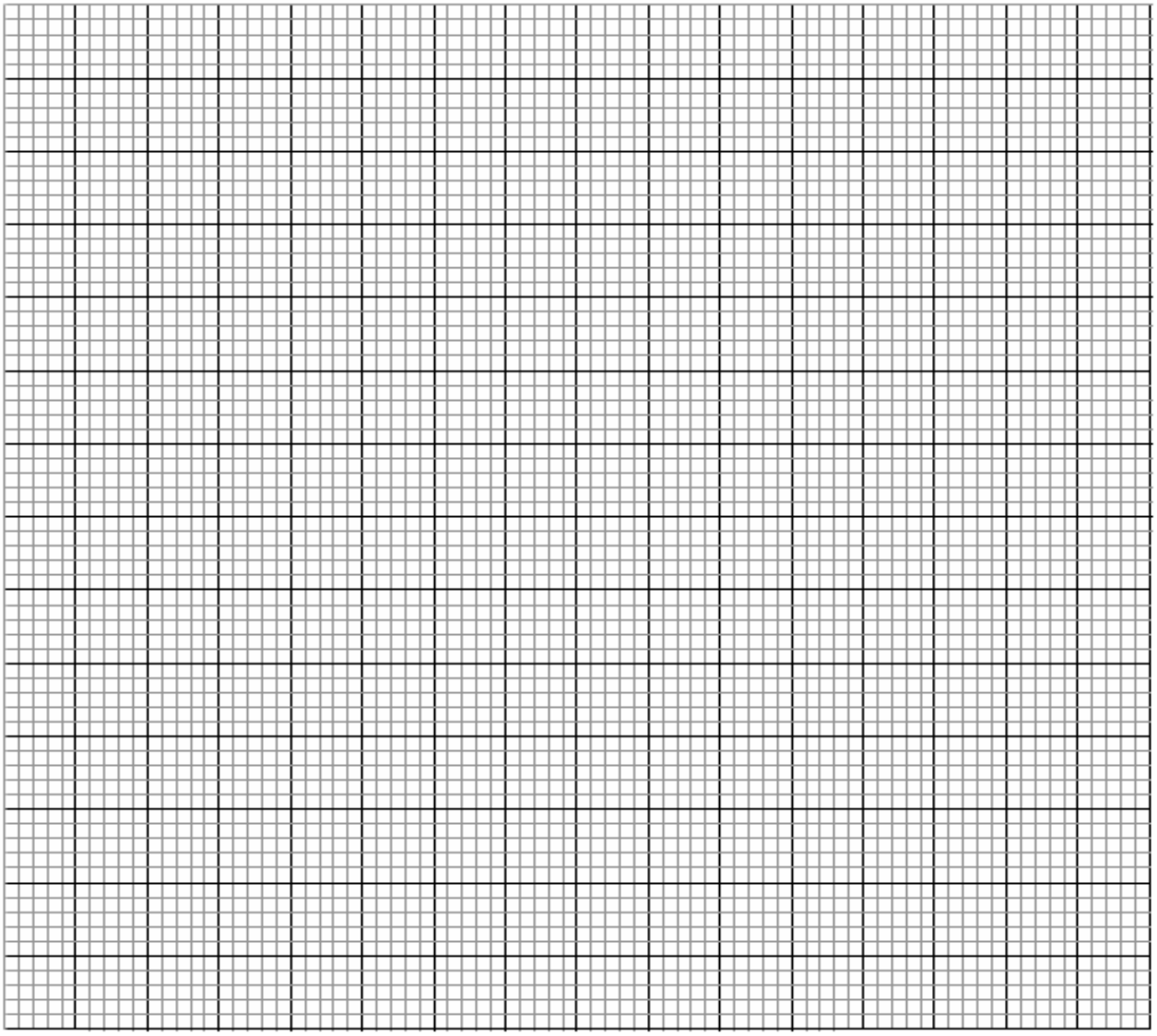
$I_o = 0.61 \ mA \pm 0.02$ (1 mark)

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. (8 marks)

Current **I** (mA)	**0.5**	**0.4**	**0.3**	**0.2**	**0.1**
Time **t** (s)	*0.20*	*0.26*	*3.7*	*6.50*	*8.6*

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)
W = 0.23
(confirm the value from graph)

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

$A = 10 \times 0.23 \times 10^{-3}$

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

V = IR

$= 2.3 \times 10^{-4} \times 4.7 \times 10^{3}$

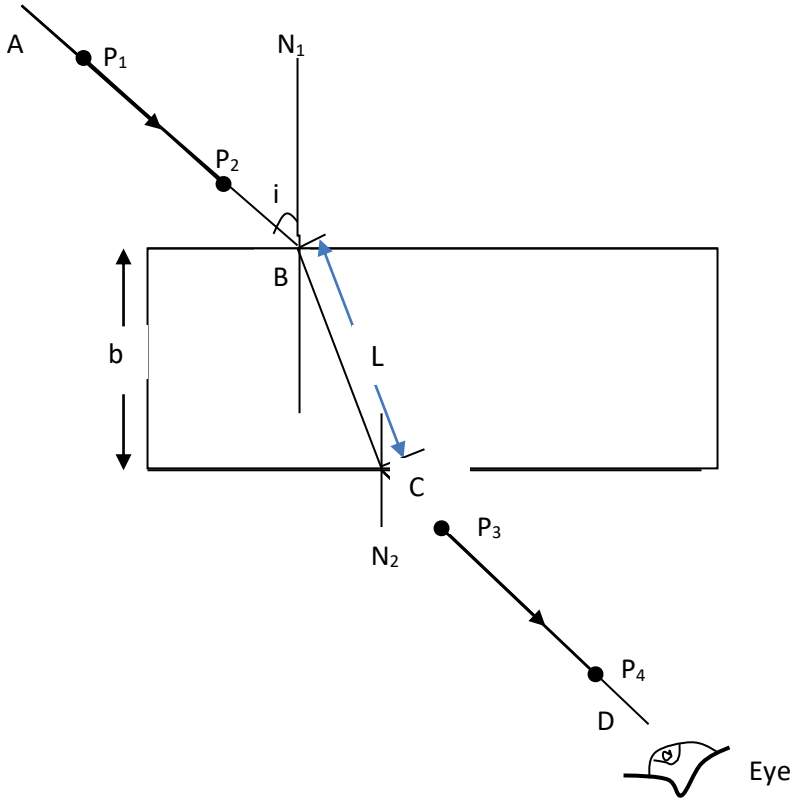
Question Two

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** = 6.0 ± 0.2 (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

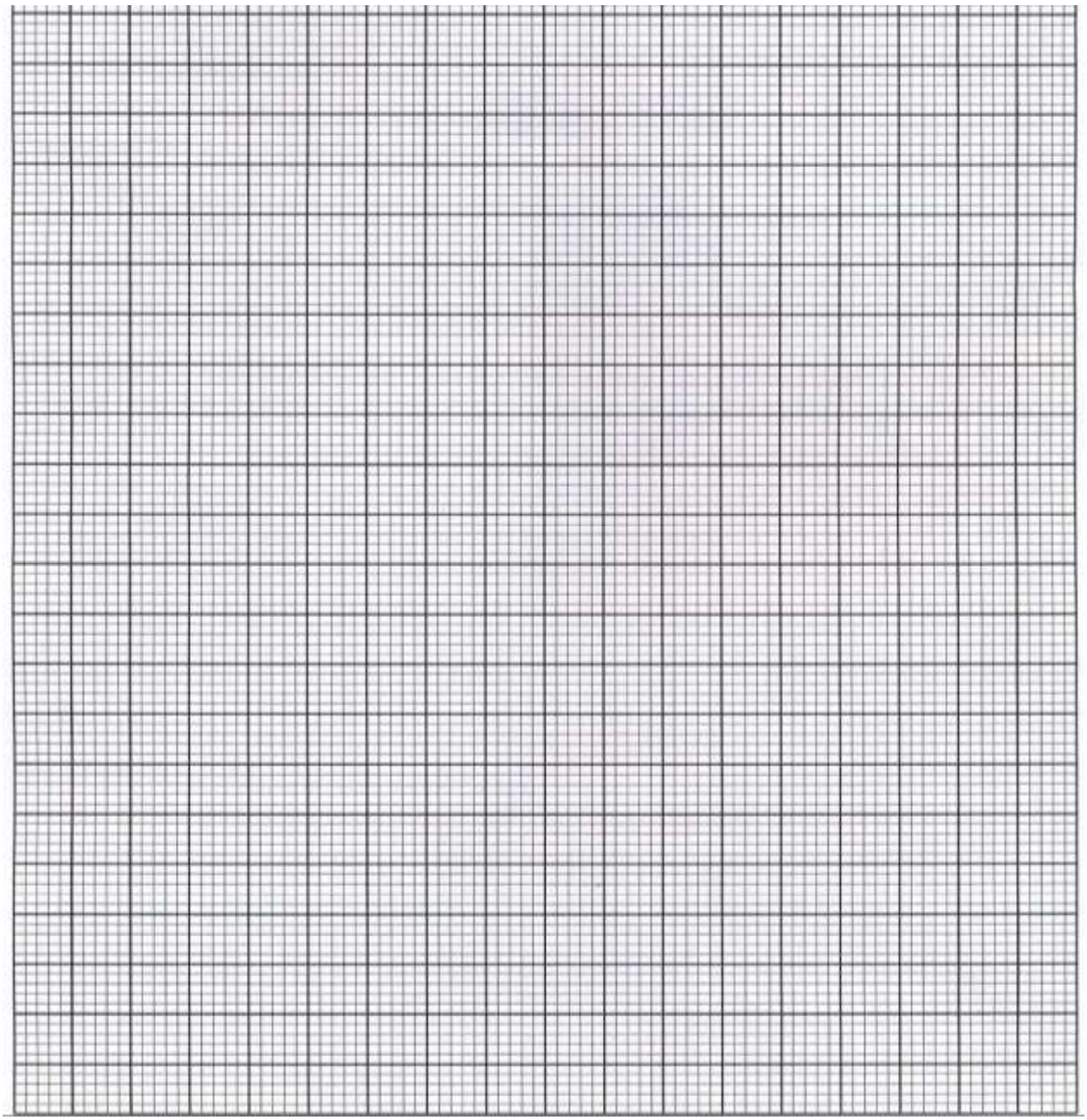
Angle i^0	L (cm)	L^2 (cm) ^{2}	$\frac{1}{L^2}$ (cm^{-2})	$\sin^2 i$
20	6.2			0.1170
30	6.4			0.25
40	6.7			0.4312
50	7.1			0.5868
60	7.4			0.75
70	7.6			0.8830

(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)**

$$Slope = \frac{\Delta\frac{1}{2}}{\Delta sin^2} = \frac{(24-10)x\ 10^{-3}}{(14-3)x\ 10^{-1}} = \frac{0.14}{1.1}$$

$= 0.0127272\ cm^{-2}$

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

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

Gradient = 0.017272 = $\frac{1}{n^2 b^2}$

$\frac{1}{n^2}$ *= 0.4581812*

n = 1.47734

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

Confirm that the student

Presents a correct worked out diagram