

NAME; ADM; STREAM;

SCHOOL; DATE; SIGN;

232/3

PHYSICS

PAPER 3

JULY 2024

TIME: 2 ½ HOURS

NYAHOKAKIRA CLUSTER 2

Kenya Certificate of Secondary Education (K.C.S.E.)

Physics

Paper 3

INSTRUCTIONS TO CANDIDATES:

- Write your **NAME** and **ADMISSION NUMBER** in the spaces provided above.
- Sign and write the **DATE** of the examination in the spaces provided above.
- 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 observation 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 **may be** used.
- This paper consists of **8** printed pages
- Candidates should check the question paper to ascertain that all the pages are printed and that no questions are missing.

For examiner's use

QUESTION	MAX SCORE	CANDIDATE'S SCORE
1	20	
2	20	
TOTAL	40	

QUESTION 1

You are provided with the following:

- ✓ Two new dry cells
- ✓ Cell holder
- ✓ A torch bulb
- ✓ A bulb holder
- ✓ A voltmeter (0-3v)
- ✓ An ammeter (0-1A)
- ✓ A switch
- ✓ 8 connecting wires, one with a jockey and some with crocodile clips
- ✓ A wire attached on a millimetre scale

Proceed as follows;

- a) Set up the circuit as shown in the figure1 below

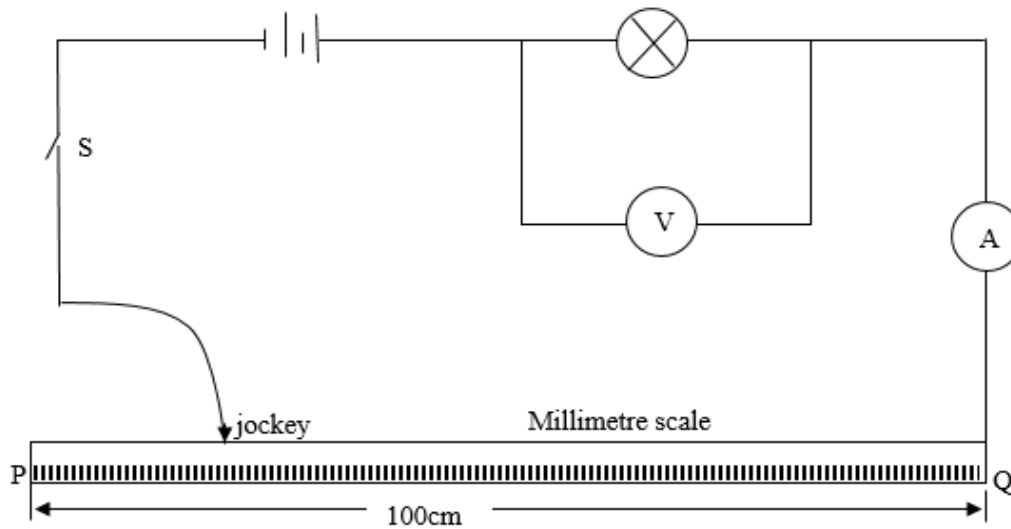


Figure 1

- b) With the jockey at P (i.e. $L = 100$ cm), take the voltmeter reading, V , and ammeter reading, A , Record V and I readings in table 1 below

- c) Repeat the procedure for other values of L and complete the table 1

(6mks)

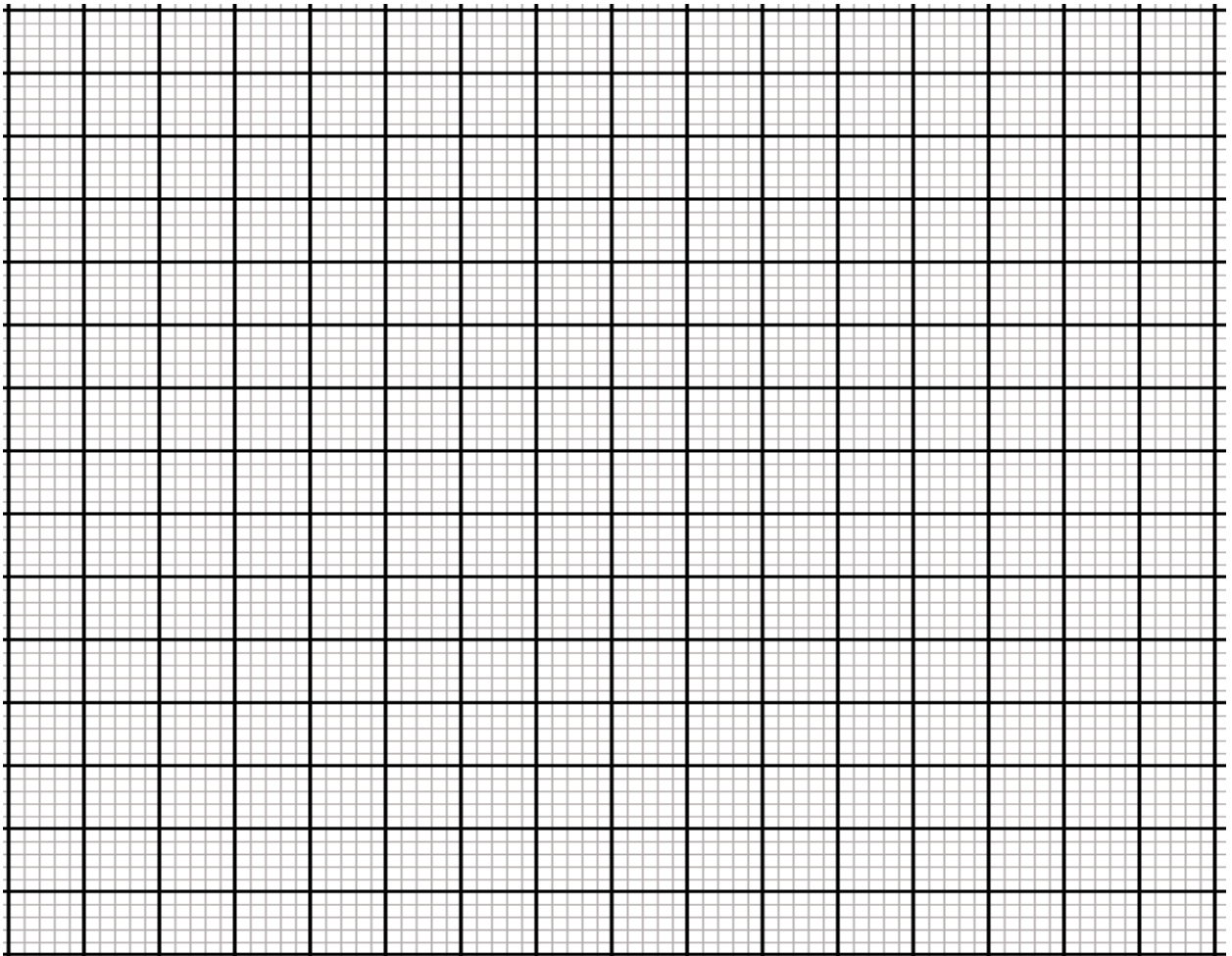
Table 1

L (cm)	100	80	60	40	20	0
V (v)						
I (A)						

d) What changes do you observe on the bulb as L decreases from P to Q ? (1mk)

.....

e) Plot a graph of voltage, against current, I. (5mks)



f) Determine the slope, S, of graph when $I = 0.17A$ (4mks)

.....
.....
.....
.....
.....
.....

g) What physical quantity is represented by the slope? (1mk)

.....
.....

h) Given that $S = 2.84 - 0.16T_1$. Calculate the value of T_1 . (3mks)

.....
.....
.....

QUESTION 2

PART A

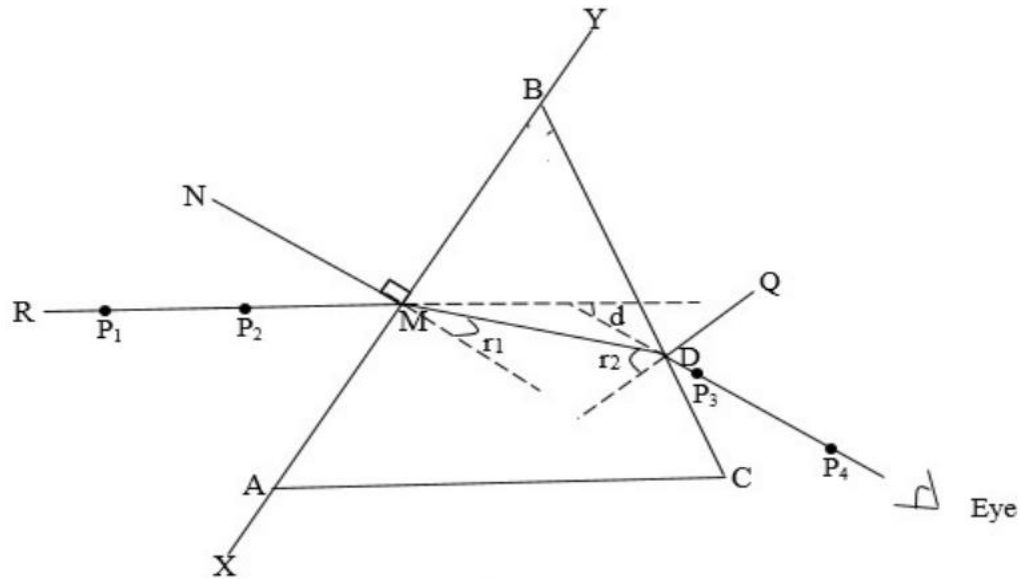
You are provided with following:

- ✓ Triangular glass prism
- ✓ Four optical pins
- ✓ Plain paper
- ✓ Soft board
- ✓ Four office pins

Proceed as follows

- a) Fix the plain paper on the soft board using the office pins.
- b) On the plain paper, draw line XY. Mark a point M on its midpoint. Draw a normal N at M to XY. Draw line RM such that angle RMN = 50°.

(This paper will be collected at the end of the experiment)..... (1mk)



c) Place the glass prism such that one edge AB of the prism is in line with XY. Accurately draw the outline ABC of the prism

d) Place optical pins **P₁** and **P₂** on the line RM

c) Through edge BC observe the images of **P₁** and **P₂**. Fix **P₃** and **P₄** so that **P₁**, **P₂**, **P₃** and **P₄** lie on straight line.

d) Remove the pins; construct straight line from **P₄** through **P₃** to meet side BC at D, join M to D.

i) Measure angle **r₁**. (1mk)

ii) Produce **P₄P₃** to meet RM produced. Measure angle **d**.

d..... (1mk)

iii) Draw the normal at D and measure the angle **r₂**.

r₂ (1mk)

e) Given that $R = r_1 + r_2$. Calculate **R**

.....
(1mk)

f) Given that $n = \frac{\sin\left(\frac{R+d}{2}\right)}{\sin\left(\frac{R}{2}\right)}$, find the value of n.

.....

(3mrks)

g) Given that $n \sin k = 1$, find the value of k

.....

(2mks)

h) What Physical property does **n** represent?

.....(1mk)

PAR B

You are provided with the following:

- ✓ a pendulum bob
- ✓ a stop-watch
- ✓ two metre rules
- ✓ two retort stands, two bosses and two clamps. - some thread.

Proceed as follows:

i). Clamp one metre rule horizontally on the two stands so that the graduations are in a vertical plane. Suspend the pendulum bob from the metre rule with two pieces of thread so that the length of each thread from the point of support on the metre rule to the pendulum bob is 50 cm. See figure 1. The length of each thread will remain 50 cm throughout the experiment. The height of the metre rule above the bench should be at least 65 cm.

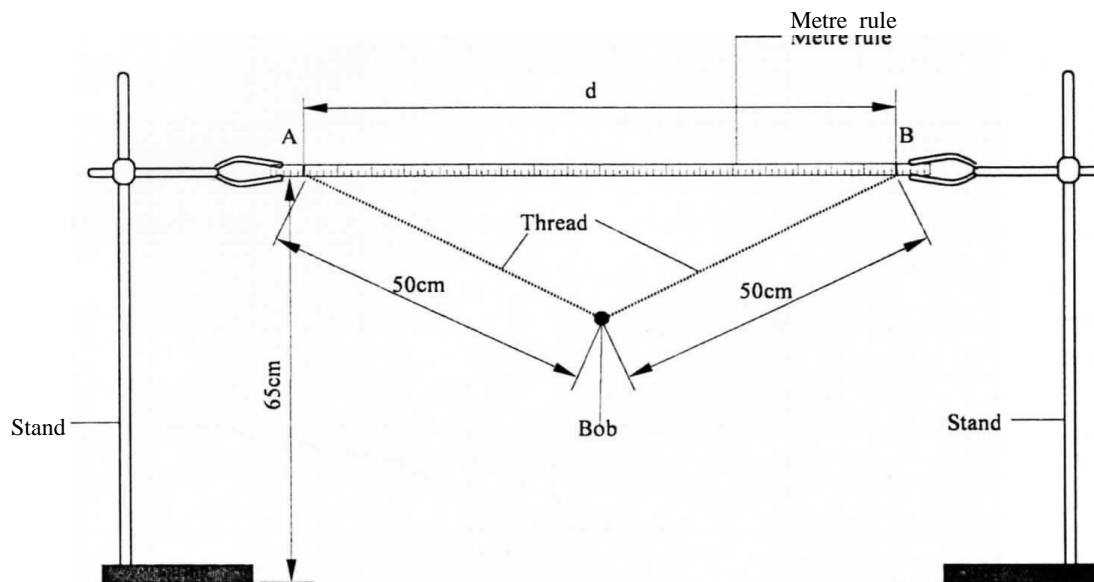


Figure 1

- j) Set the distance d between A and B to be 70 cm. Displace the pendulum bob slightly in a plane perpendicular to the length of the metre rule and release it so that it oscillates in that plane. Measure and record in table 1 the time t for 10 oscillations.
- k). Repeat the procedure in (b) for other values of d shown in table 2. Complete the table. (5mrks)

Table 2

Distance d (cm)	70	60	50
time t for 10 oscillations (s)			
Period T (s) =			
$T^4(S^4)$			
$d^2 (cm^2)$			

(d) Determine,

(i) the average value of T^4

T^4_{av}(1mrk)

(ii) average value of d^2

d^2_{av}(1mrk)

(e) Given that $s = \frac{r^2 av}{d^2 av}$, determine S

.....
.....(1mrk)

(f) Given that $s = \frac{1}{K^2}$, determine the value of K

.....
.....(1mrk)

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