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PHYSICS

Paper – 2

(PRACTICAL)

(Three hours)

*Candidates are allowed additional 15 minutes for **only** reading the paper.*
They must NOT start writing during this time)

ALL ANSWERS MUST BE WRITTEN IN THE ANSWER BOOKLET PROVIDED SEPARATELY.

If squared paper is used, it must be attached to the answer booklet.

Marks are given for a clear record of observations actually made, for their suitability and accuracy, and for the use made of them.

A brief statement of the method may be given if necessary. The theory of the experiment is not required unless specifically asked for.

Candidates are advised to record their observations as soon as they have been made.

Diagrams, including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.

Mathematical tables and squared paper are provided. The intended marks for questions or parts of questions are given in brackets [ ].

Answer **all** *questions.*

You should not spend more than one and a half hours on Question 1.

1 **[10]**

This experiment determines the focal length of a convex lens by the displacement method.

Determine the approximate focal length *f* of the given convex lens (marked L) by projecting the image of a distant object on a wall or a screen. Record the value of *f* in cm.

[Illegible] reserved.

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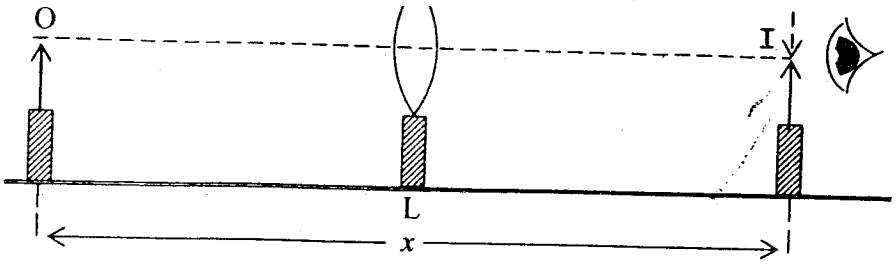

Figure 1(a)

Now arrange the object pin O, the image pin I and the lens on the optical bench a table top as shown in figure 1(a) so that the tips of O and I lie on the principal axis the lens. Adjust the distance x between O and I to be nearly equal to $(4f + 10)$ cm Ensure that this separation is maintained constant throughout this particular setting.

Move the lens towards the pin I and adjust its position until the diminished an inverted image of O coincides with the image pin I. Record the position L_1 of th lens.

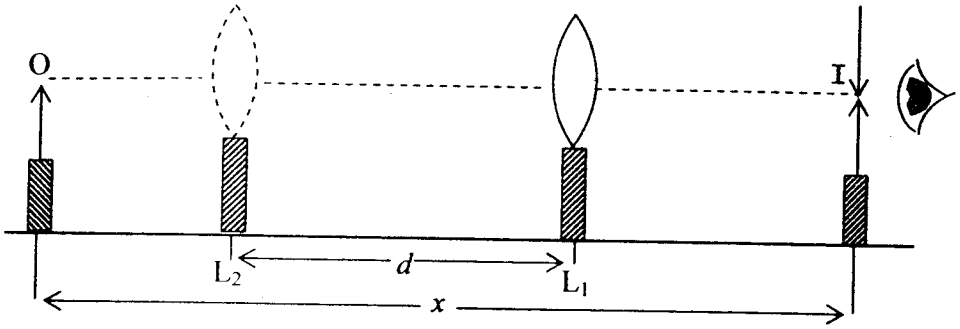

Figure 1(b)

Now move the lens towards the object pin O and adjust its position as shown in figure 1(until the magnified and inverted image of O coincides with I. Record the new position of the lens. The difference between the two positions L_1 and L_2 of the lens is th displacement d of the lens. Determine d and record its value.

Repeat the experiment to obtain four more sets of x and d, taking values of x in the rang $(4f + 10)$ cm and 100 cm.

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[illegible] for each set, the positions of O and I are maintained constant and the parallax [illegible] the image of object pin and image pin is removed by moving the lens only.

[illegible] five sets of positions of the lens i.e. L_1 and L_2 and the corresponding [illegible] of d and $y = \frac{x^2 - d^2}{40}$.

[illegible] upto three significant figures.

[illegible] graph of y against x. Draw the line of best fit and determine its [illegible] (change in y ÷ change in x).

[illegible] the value of Q upto 1 decimal place where

Q = 10 S.

[illegible]

[7]

[illegible] experiment determines resistivity of the material of a wire. You are provided with [illegible] long uniform wire AB stretched along a metre scale and provided with binding [illegible] at the two ends. You are also provided with a resistance box RB, a piece of [illegible] wound on a wooden bobbin and provided with binding terminals, a jockey 'J', [illegible] power supply (E), a plug key 'K', a centre-zero galvanometer 'G' and a few [illegible] wires.

[illegible] the circuit as shown in Figure 2 below. Ensure that all connections are [illegible]

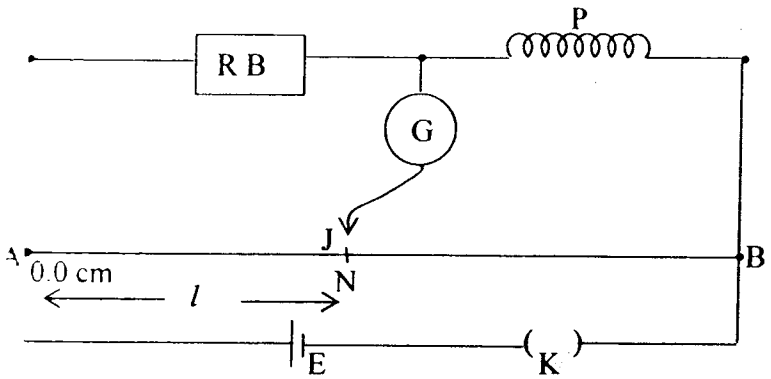

Figure 2

[illegible] out R = 1Ω plug from the resistance box RB. By touching the jockey at various [illegible] on the wire AB, find the null point N for which the galvanometer shows no [illegible]. Record l = AN in cm. Repeat the experiment for five more values of R in [illegible] 1Ω – 10Ω, each time finding and recording the value of l.

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Plot a graph of y *vs* R and draw the line of best fit. Determine the slope S of the li
using $S = \frac{Change\ in\ y}{Change\ in\ R}$.

Record the value of S upto three significant figures. From the graph, read and reco
the value Y_o of Y when $R = 0$.

Question 3

Find the least count of the given micro meter screw gauge. Using it, determine th
diameter 'd' of the sample wire 'W'. Find and record the radius r of the wire in cm
your answer paper. Using this value of r and the value of Y_o of Question 2, find th
value of K where:

$$K = \pi r^2 Y_o \times 10^4.$$