

PHYSICS
Paper – 2
(PRACTICAL)

Three hours and a quarter

(The first 15 minutes of the examination are for reading the paper only.

Candidates must NOT start writing during this time).

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

Read the questions carefully and follow the given instructions.

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

*Marks are given for clear record of observations actually made and correct significant
figures and units wherever applicable.*

*A statement of the method is NOT 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.

*All workings, including rough work, should be done on the same sheet as, and adjacent
to, the rest of the answer in the answer booklet.*

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.

Question 1.

[10]

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

Determine the approximate focal length of the given convex lens by projecting the image of a distant object on the opposite wall. Measure and record the focal length of the lens, f' in cm up to three significant figures. Now arrange the object pin O, the image pin I and

the lens L on a optical bench as shown in figure 1. Adjust the distance x between pin 'O' and pin 'I' such that $x = 4f' + 10\text{cm}$

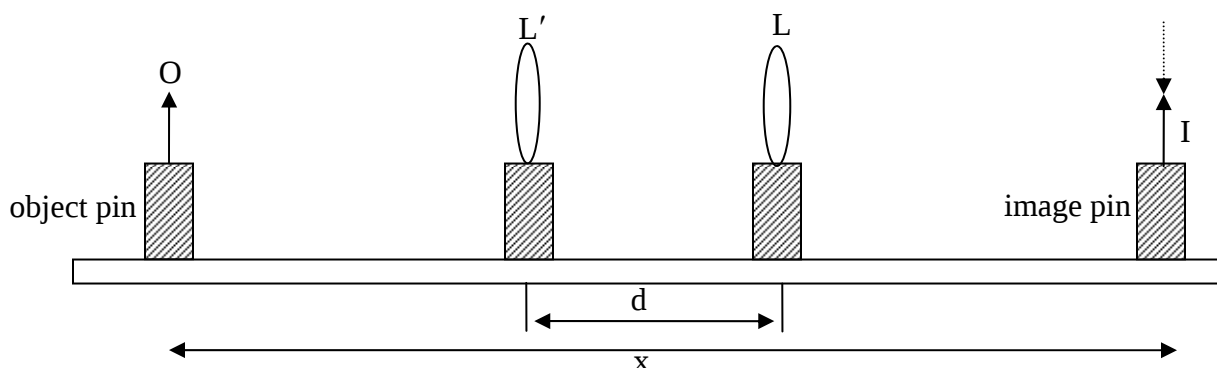


Figure 1

Move the lens near to the image pin I and adjust its position L on the optical bench until the diminished image of O coincides with the image pin I. Now move the lens towards the object pin (without altering the positions of O and I) and locate its position L' when the magnified inverted image of O coincides with I. Record the value of x and positions L and L' of the lens on the optical bench.

Repeat the experiment for four more values of x in the range $(4f' + 10)\text{ cm}$ to 100 cm (increasing x by 3 cm each time).

Tabulate your observation showing L, L' , x, d and y.

$$d = L - L'$$

$$y = \frac{x^2 - d^2}{200}$$

Plot a graph of y against x, origin need not be (0,0). Calculate the slope $s = \frac{\Delta y}{\Delta x}$,

hence focal length f with proper unit and three significant figures.

$$f = \sqrt[3]{1000s}$$

Question 2.

Set-up the circuit as shown in figure 2.

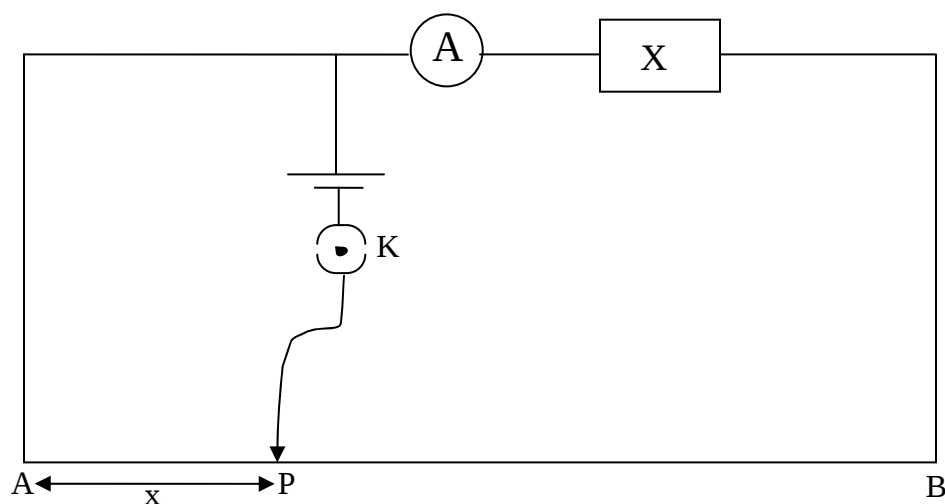


Figure 2

AB is a 100 cm wire of uniform resistance mounted on a meter scale with terminals at the ends. X is the resistance box. Record the least count and range of the ammeter. Place the jockey at point B and introduce a resistance from the resistance box X such that the ammeter gives maximum reading.

Initially start with $AP = x = 10\text{cm}$ and record the corresponding ammeter reading I.

Repeat the experiment to obtain four more sets of $x (= AP)$ and I by changing values of x in the range of 10 cm to 50 cm (i.e. increasing by 10 cm each time).

Now disconnect the resistance box X and replace it with a coiled resistor R. Insert the key K in the circuit. Locate its position (say Q) such that the ammeter shows the same values of current I, as obtained in the previous set of observation. Record $y = AQ$. Tabulate five sets of I, x and y with proper units.

Plot a graph of y against x and determine its slope.

$$S = \frac{\Delta y}{\Delta x}$$

Question 3.

This experiment is to measure the resistance of a coil.

Set-up the circuit as shown in figure 3.

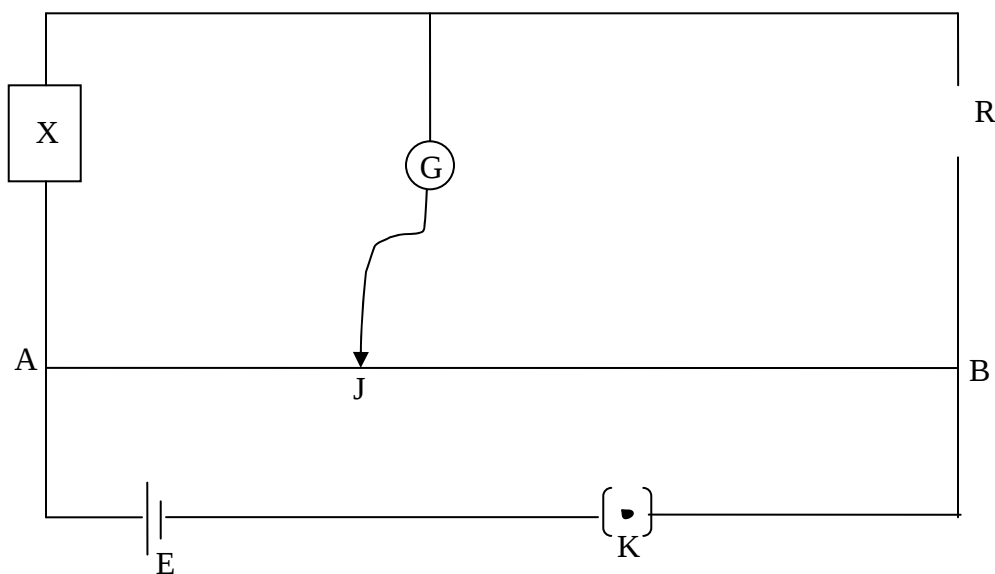


Figure 3

Introduce the same resistance X from the resistance box as used in Question 2. Record X.

Insert the key K in the circuit and find out the point J on the wire AB such that there is no deflection in the galvanometer.

Record AJ with proper unit.

- Calculate the resistance R of the coiled resistor.
- If we interchange the coiled resistor R and resistance box X, what will happen to point J?
- Identify and write two pairs of currents from figure 3 which are equal.