

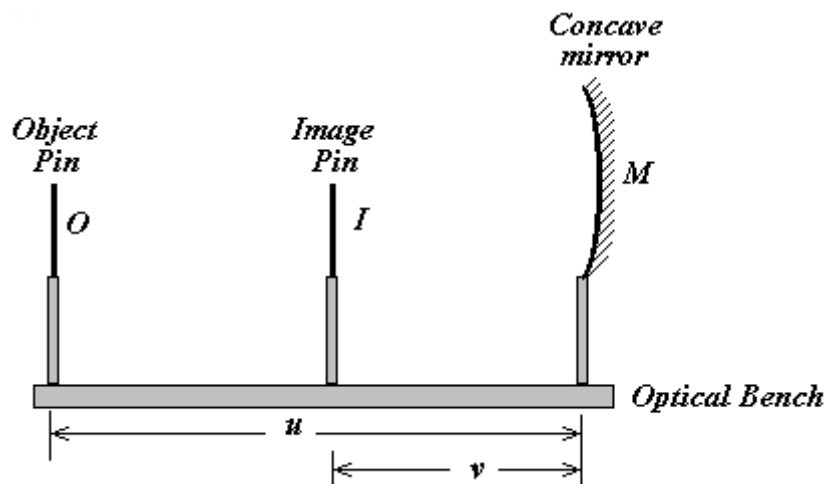
### PRACTICAL: 3

#### Focal Length of Concave Mirror

**AIM:** To determine the focal length of concave mirror.

**APPARATUS:** Concave mirror optical bench, object and image pins, meter rule.

**FIGURE:**



**PROCEDURE:**

- 1) Determine the approximate focal length of the given concave mirror by obtaining on the wall the image of a distant tree.
- 2) Mount the given concave mirror on a stand and fix one pin on the other stand, then place them on the optical bench as shown in the diagram.
- 3) Now keep the object needle  $O$  in front of the mirror  $M$  and beyond  $C$ . Take a second needle  $I$  and place it in between the mirror and the object needle. Move the is needle  $I$ , until there is no parallax between the image of  $O$  and  $I$  on moving the eye from side to side. Measure the distance  $MO$  ( $u$ ). Also measure the distance  $MI$  ( $v$ ). This gives the observed object and image distance.
- 4) Very the position of the object bringing it progressively closer to the mirror taking care to see that a real image is obtained in each case. This will be so if object is at a distance greater than the focal length from the mirror. Repeat the above mentioned procedure to find the value of  $MO$  and  $MI$  in each case. Take atleast six observations in this manner.
- 5) Plot a graph  $v$  vs  $u$ . this will be curve. Draw a line  $OP$  making an angle of  $45^\circ$ . with either axis and meeting the curve at point  $P$ .

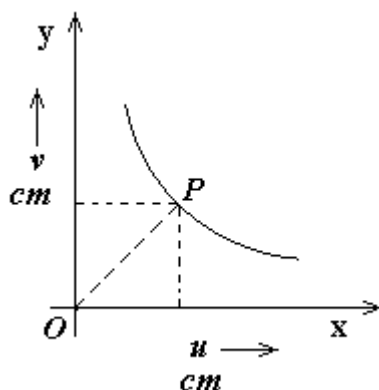
**OBSERVATION:**

- i) Range of Optical bench = \_\_\_\_\_ cm
- ii) Least count of Optical bench = \_\_\_\_\_ cm
- iii) Rough focal length of concave mirror.....FL = \_\_\_\_\_ cm.

**OBSERVATION TABLE:**

Sr. No.	Position of the mirror $M$ cm	Position of the Pin $O$ cm	Position of the Pin $I$ cm	Object Distance $u$ cm	Image Distance $v$ cm
1					
2					
3					
4					
5					

**GRAPH:  $v$  Vs  $u$  (in cm)**



**CALCULATION:**

From Graph Co-ordinates ( $u, v$ ) of point P is.....

( $u = \dots\dots, v = \dots\dots$ )

$$f = \frac{u}{2} = \frac{v}{2} = \dots c.$$

**RESULT:**

➤ **Focal Length of given Concave Mirror = \_\_\_\_\_ cm.**

**Viva:-**

1. What is a spherical mirror?
2. What is a real image?
3. For what position of object, the image formed by a concave mirror is magnified and erect?
4. Define the terms pole, principle axis and centre of curvature with reference to a spherical mirror.
5. What is the relationship between focal length and radius of curvature of a spherical mirror.
6. What is the difference between focus and principle focus?
7. Why the focal length of concave mirror is negative?
8. Why a driver doesn't use a concave mirror as a rear view mirror?
9. How will you distinguish between a plane mirror, a concave mirror and a convex mirror, without touching them?
10. What type of mirror is used to obtain a real image of an object?