

# Class X

## EXPERIMENT No: 4 (i)

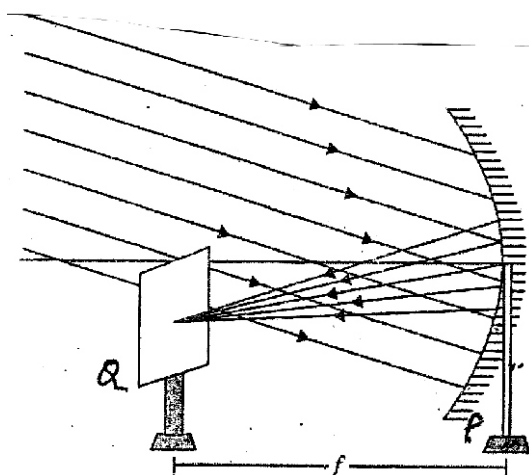
**AIM:** To determine the focal length of a concave mirror by obtaining image of distant object.

**Apparatus / Material Required :**

A concave mirror, a mirror holder or stand, a small screen (hard sheet of white paper/cardboard) fixed to stand, scale, notebook, pencil.

**Procedure :**

1. Fix the concave mirror on the mirror holder or stand and place it on the table near an open window of the laboratory.
2. Locate a distant tree / building from the open window (if an open window is not available then obtain the image of window itself of the screen).
3. Place the screen in front of the mirror.
4. Adjust the position of the concave mirror and the screen so that a sharp, inverted and diminished image of a distant object is formed on the screen.
5. Note the position of the screen and concave mirror stand with the help of meter scale.
6. Find the distance between the centre of concave mirror and the screen. This distance is equal to the focal length of concave mirror. Record the focal length.



7. Repeat the experiment a few times by changing the position of the mirror stand and note the corresponding change position of the screen.
8. Calculate the mean value of the focal length.

**Observation and Calculation:**

S.No.	Position of the concave mirror (P) (in cm)	Position of the white screen (Q) (in cm)	Focal length of the concave mirror (Q-P) (in cm)
1	<u>30</u>	<u>24.1</u>	$f_1 = \underline{\underline{13.3}}$
2	<u>33</u>	<u>23</u>	$f_2 = \underline{\underline{13.5}}$
3	<u>36</u>	<u>21.7</u>	$f_3 = \underline{\underline{13.5}}$
4	<u>39</u>	<u>20.4</u>	$f_4 = \underline{\underline{13.4}}$

Mean value of focal length of concave mirror f

$$= \frac{f_1+f_2+f_3+f_4}{4}$$

$$= \underline{\underline{13.42}} \text{ cms}$$

**Precautions :**

1. The concave mirror should be fixed in the vertical plane.
2. The base of the concave mirror stand and the screen should be parallel to the meter scale.
3. Record the position of screen only when a well defined, inverted and diminished image of the distant object is formed on the screen.