

- Experiment Name: Focal length of a concave mirror

- Aim: To determine the focal length of the given concave mirror by distant object method.

- Theory:

- A concave mirror, like a plane mirror, obeys the laws of reflection of light.
- Rays of light from object - The rays of light coming from a distant object e.g. sun or a distant building can be parallel to each other. When these parallel rays of light fall on a concave mirror along its axis, they reflect and meet at a point in front of the mirror, which is called as the principal focus of the mirror.
- A real, inverted and very small image of the same size is formed at the focus of the mirror.
- Focus length - The distance between the pole P of the concave mirror and the focus F is the focal length of the concave mirror. Thus, the focal length of a concave mirror can be estimated by obtaining a 'Real Image' of a distant object at its focus, as shown in the figure in the next page.

- Materials Required:

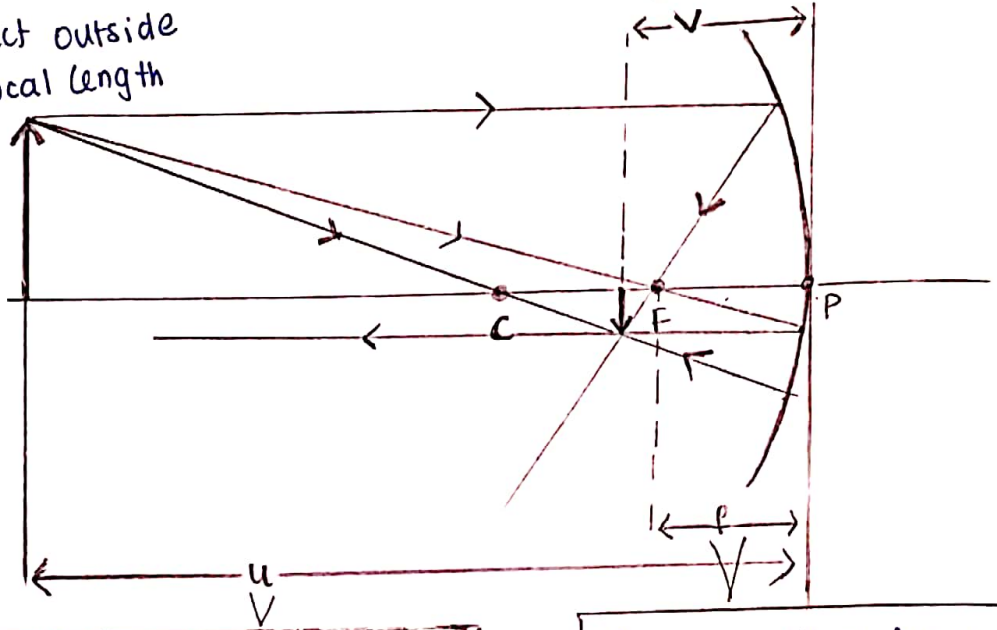
1. A concave mirror
2. A mirror holder
3. A white screen fixed on a stand or a white wall.
4. An object (candle)
5. A metre scale.

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Figure:

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

Object outside focal length



v is positive for a real image. It is in the direction of light travel from the mirror.

u is normally negative because it is measured left from the surface against the light direction.

f is positive for a converging mirror, being in the direction of light travel.

Procedure :

1. Fix concave mirror to mirror holder and place it on table. Turn the face of the mirror towards a distant object (a candle in this case). The selected object should be visible with your naked eyes.
2. Adjust the position of the screen in such a way that it forms a clear image of the candle on the screen.
3. Measure the distance between the concave mirror and the screen with a metre scale. Record your observations in the observation table.
4. Repeat the experiment two or three times and find the mean value of the focal length.
5. As performed in the simulator.
6. Drag the screen by clicking on point A of the screen till you get a sharp image of the object.
7. Measure the distance between the concave mirror and the screen with given metre scale. This measured distance is focal length of concave mirror.
8. Repeat the process two or three times. Take the mean of the measured focal length.

Result :

- The focal length of the given concave mirror is 2.96 cm.

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S. No	Focal length	value (cm)
1.	f_1	3
2.	f_2	2.8
3.	f_3	3.1
4.	$\text{mean}(f_1 + f_2 + f_3 / 3)$	2.96

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