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Chapter 01

REFLECTION OF LIGHT AT CURVED SURFACES

Example- 3:

The radius of curvature of a spherical mirror is 30 cm. Find the focal length of this mirror.

Solution:

Here R = 30 cm

Using, $f = \frac{R}{2}$, we have

$$f = \frac{30\ \text{cm}}{2} = 15\ \text{cm}$$

Thus, focal length of the spherical mirror = 15 cm.

Example- 4:

An object 4.0 cm in size is placed at a distance of 25.0 in front of a convex mirror of radius of curvature 40 cm. Find (i) the position,

(ii) the size and

(iii) nature of the image.

Solution:

Here,

h = + 4.0 cm

U = -25.0 cm (sign convensions)

R = + 40 cm

$\therefore f = \frac{R}{2} = \frac{40}{2} = 20.0\,\text{cm}$

(i) Determination of the position of the image.

Using, $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$, we get

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{20} - \frac{1}{(-25)} = \frac{1}{20} + \frac{1}{25} = \frac{9}{100}$$

(or) $v = \frac{100}{9} = 11.11\,\text{cm}$

Thus, the image is at 11.11 cm behind the convex mirror.

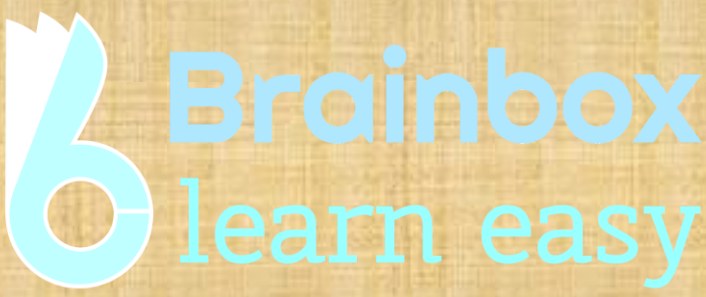
(ii) Determination of size.

Using, $m = \frac{h'}{h} = -\frac{v}{u}$ (or) $h' = -\frac{v}{u}h$

(or) $h' = \frac{(100/9)(4)}{-25} = -\frac{16}{9} = -1.78\,\text{cm}$

Thus, size of image = -1.78 cm.

(iii) Since h' is negative, so the image is inverted.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