PHYSICS - X-PART-4 CLASS 39

1. When an object is placed in front of a concave mirror at a distance 30 cm from an image is obtained on a screen at a distance of 20 cm from the mirror. Find the focal length of the mirror.

The distance of the object from the mirror u = - 30 cm
The distance to the image from the mirror v = - 20 cm
The focal length of the mirror f = ?

$$f = uv/(u+v)$$
$$= (-30 \times -20) / (-30 -20)$$
$$= (600) / (-50)$$
$$f = -12 \text{ cm}$$

2. An object is placed in front of a concave mirror 20 cm away from it. If its focal length is 40 cm, locate the position of image and its nature

The distance of the object from the mirror u = - 20 cm
The distance to the image from the mirror v = ?
The focal length of the mirror f = - 40 cm

$$v = uf/(u-f)$$
$$= (-20 \times -40) / (-20 +40)$$
$$= (800) / (20)$$
$$v = 40 \text{ cm}$$

Nature of the image

erect and virtual

3. When an object is placed in front of a concave mirror at a distance 15 cm an image is formed on a screen 10 cm away from the mirror. If the object is placed 30 cm away what is the distance to the image?

The distance of the object from the mirror u = - 15 cm
The distance to the image from the mirror v = - 10 cm
The focal length of the mirror f = ?

$$f = uv/(u+v)$$
$$= (-15 \times -10) / (-15 -10)$$
$$= (150) / (-25)$$
$$f = -6 \text{ cm}$$

The distance of the object from the mirror u = - 30 cm
The distance to the image from the mirror v = ?
The focal length of the mirror f = - 6 cm

$$v = uf/(u-f)$$
$$= (-30 \times -6) / (-30 +6)$$
$$= (180) / (-24)$$
$$v = -7.5 \text{ cm}$$

Nature of the image
real and inverted

Assignment

1. An object is placed in front of a concave mirror 40 cm away from it. If its focal length is 80 cm, locate the position of image and its nature