

CHAPTER 4. (LIGHT)

1. A concave lens has focal length of 20 cm. At what distance from the lens a 5 cm tall object be placed so that it forms an image at 15 cm from the lens? Also calculate the size of the image formed.

Answer:-

$$f = -20 \text{ cm}, h_o = 5 \text{ cm}, v = -15 \text{ cm.}$$

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

$$\frac{1}{u} = \frac{1}{v} - \frac{1}{f} = \frac{1}{-15} - \frac{1}{(-20)}$$

$$\frac{1}{u} = \frac{-20+15}{300} = -\frac{5}{300}$$

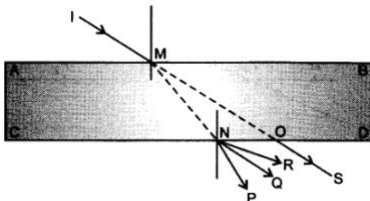
$$u = -60 \text{ cm.}$$

Since,  $m = \frac{h_i}{h_o} = \frac{v}{u}$ , we get

$$h_i = \frac{v}{u} \cdot h_o = \frac{(-15)}{(-60)} \times 5$$
$$= \frac{5}{4} = 1.25 \text{ cm.}$$

Image is diminished and virtual.

2. 4. If a light ray IM is incident on the surface AB as shown, identify the correct emergent ray.



Answer. Ray NQ, as it has to be parallel to ray OS.