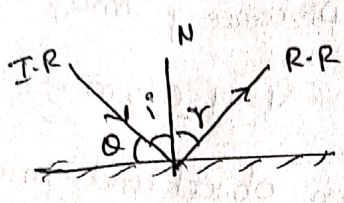
WS-8 7th foundation

Tbasic

(1)



Given angle between incident ray and reflected ray

$Li + Lr = 80^\circ$

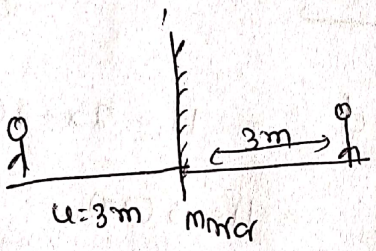
we know According to laws of reflection $Li = Lr$

$\therefore 2Li = 80 \Rightarrow Li = 40^\circ$

From fig $= O + Li = 90^\circ$

$\Rightarrow O = 90 - Li = 90 - 40 = 50^\circ$

(4)



A plane mirror always forms an image at a distance same as that of object.

$V = u = 3m.$

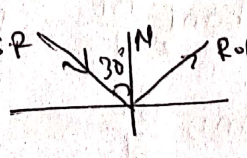
$\therefore$ distance between boy and image $= u + v = 3 + 3 = 6m$

(5)

Since focal length of mirror is $= +15$

ie +ve focal length so it is a convex mirror.

(6)



Given $Li = 30^\circ \Rightarrow Lr = 30^\circ$

Angle of deviation $= 180 - 2Li = 180 - 2 \times 30$

$= 180 - 60 = 120^\circ$

(7)

Given object distance = 0.5 m.

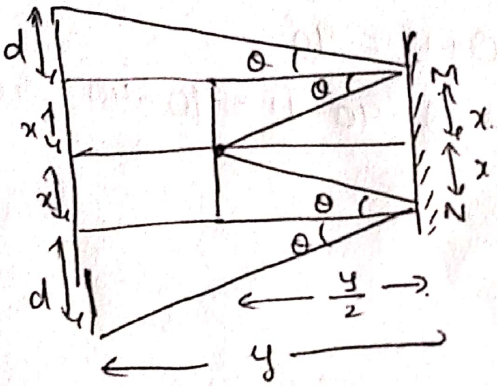
For a plane mirror Distance of image = Distance of object

$\Rightarrow v = u = 0.5\,m.$

$\therefore$ Distance between object and image is

$= u + v = 0.5 + 0.5 = 1\,m$

(8)



$MN = 2x \rightarrow$ height of mirror.

$\tan\theta = \frac{d}{y} = \frac{x}{\frac{y}{2}}$

$d = 2x.$

$H = 2x + 2d \Rightarrow H = 2x + 2(2x) \Rightarrow H = 6x.$

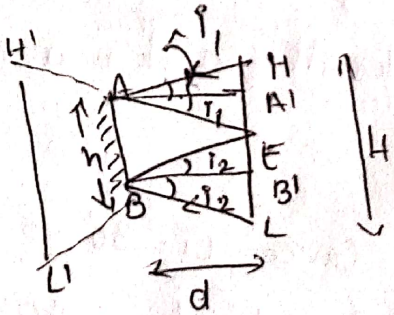
$\Rightarrow H = 3(2x) \Rightarrow \frac{H}{3} = 2x \Rightarrow MN = \frac{H}{3}$

(9)

Given size of object $= h_0 = 0.5\,m$

Size of image = Size of object $= 0.5\,m$

(12)



$\tan i = \frac{A'E}{d}$; $\tan i = \frac{A'H}{d}$

$\therefore A'E = A'H$

$\tan i_2 = \frac{B'E}{d}$ $\therefore B'E = B'L$

$\tan i_2 = \frac{B'L}{d}$

$H = 2(x+y)$; $h = x+y$

$H = 2h \Rightarrow h = \frac{H}{2}$

(15)

(a) $\theta = 60^\circ \Rightarrow n = \frac{360}{\theta} - 1 = \frac{360}{60} - 1 = 5$

(b) $\theta = 45^\circ \Rightarrow n = \frac{360}{45} - 1 = 8 - 1 = 7$

(c) $\theta = 90^\circ \Rightarrow n = \frac{360}{90} - 1 = 4 - 1 = 3$

(d) $\theta = 20 \Rightarrow n = \frac{360}{20} - 1 = 18 - 1 = 17$

(16)

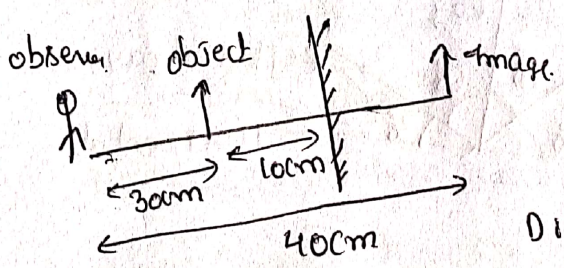
If two mirrors are perpendicular to each other

$$n = \frac{360}{\theta} - 1 = \frac{360}{90} - 1 = 4 - 1 = 3$$

For two parallel mirrors $\theta = 0^\circ$

$$n = \frac{360}{\theta} = \infty$$

(17)



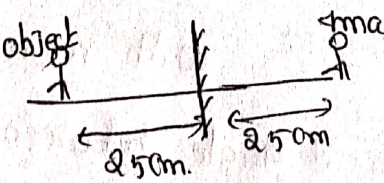
For plane mirror

Distance of object = image distance
= 10cm

Distance b/w observer and mirror
= 30cm

The distance to be focussed by observer in order to see the image is = 30 + 10 = 40cm

(18)



For a plane mirror

image distance = object distance
= 25cm

∴ Distance between object and image = 25 + 25 = 50 cm

(10)

This results in the brightness of the images getting decreased, therefore, we can say that the further images become fainter due to the light absorption. The brighter image is 2nd image.

L Task

Jee mains level

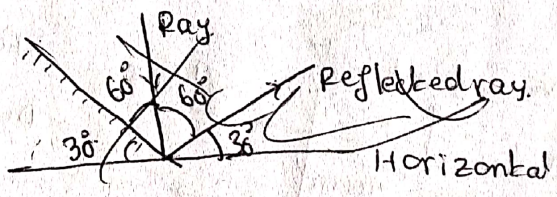
(12)

Given $\theta = 90^\circ$

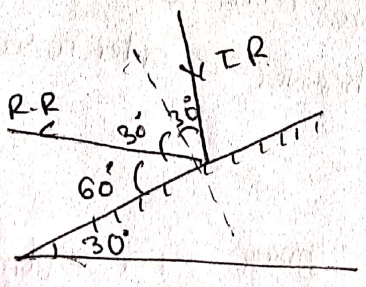
No. of images $n = \frac{360}{\theta}$ [For unsymmetrically]

$= \frac{360}{90} - 1 = 4$

(13)



(13)



The angle between mirror and Normal = 90°

Reflected ray makes an angle 30° with normal

∴ The required angle between mirror and reflected ray will be $\theta = 90 - 30^\circ = 60^\circ$

(14)

$\theta = 60^\circ$

No. of images $n = \frac{360}{\theta} - 1 = \frac{360}{60} - 1 = 5$.

(15)

when a man wearing yellow coloured glass for left eye and red coloured glass for right eye and stands in front of a plane mirror, he observes his image in the mirror as left eye coloured red and right coloured yellow due to lateral inversion.

(16)

In the first two images the comb would be in the left hand of the man. The image which appears in between those two images has the comb in its right hand. Therefore, the images in which, he will be seen using his right hand is one.

(18)

Number of images $n = \frac{360}{\theta} - 1 = \frac{360}{45} - 1$

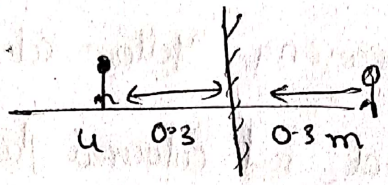
$= 8 - 1 = 7$.

(19)

Time on clock = 12 − 3.95

= 8.05.

(20)



Distance of image of his hand

- clearly the man must focus his eye at a distance $y = 0.3 + 0.3 = 0.6\,m$

Advanced

(7) The height of mirror = $\frac{h_m}{2} = \frac{1.5}{2} = 0.75\,m$

The height of mirror = $\frac{h_{wall}}{3} = \frac{6}{3} = 2\,m$.

(8)

For a plane mirror image distance (v) = object distance (u)

$v = u = 10\,cm$.

The distance between object and image = $u + v = 10 + 10 = 20\,cm$

(9)

Here the mirrors are arranged $\perp$ely $\theta = 90°$.

Number of images $n = \frac{360}{\theta} - 1 = \frac{360}{90} - 1$

$= 4 - 1 = 3$.