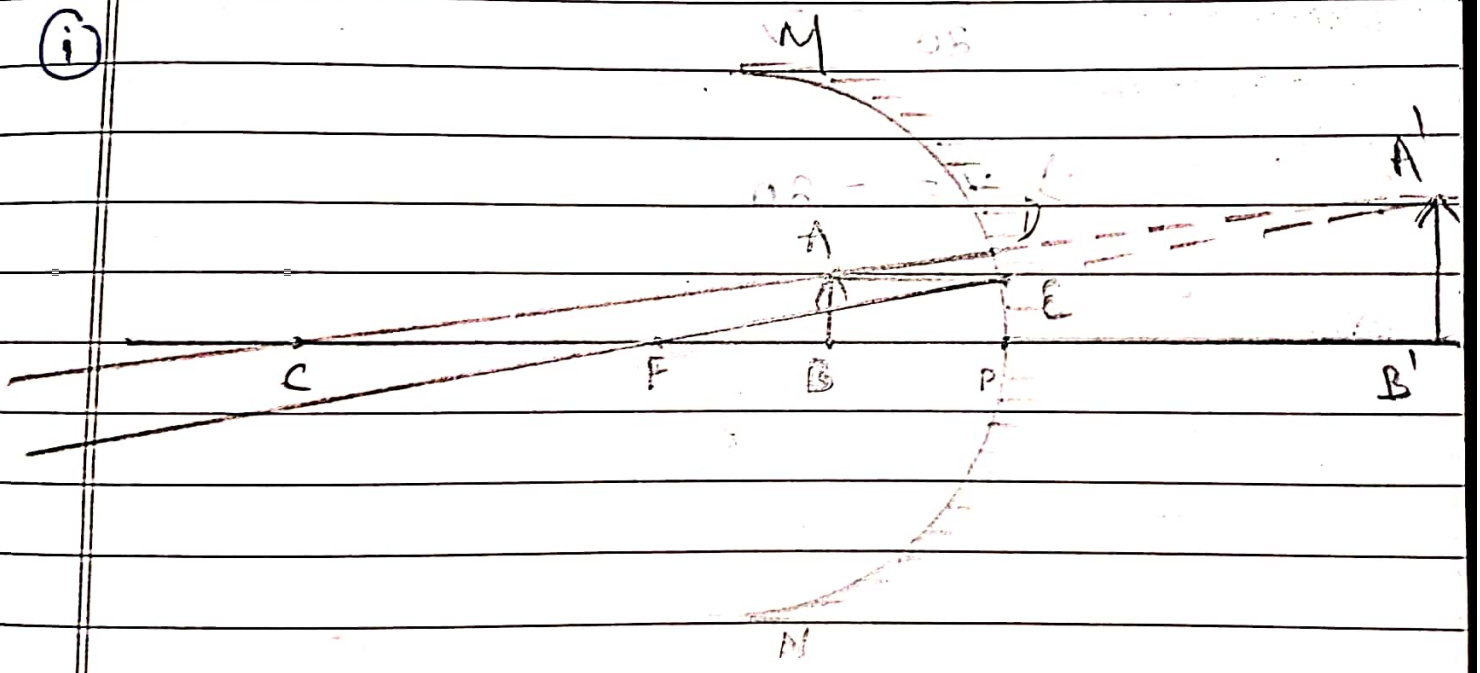
Home Assignment

Q $u = -10\,cm$

$f = -20\,cm$

(i)



Scale - 1 unit = 5 cm (x axis only)

(Not for Image height)

(ii) $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

$\Rightarrow \frac{1}{-10} + \frac{1}{v} = \frac{1}{-20}$

$\Rightarrow \frac{1}{v} = \frac{1}{-20} + \frac{1}{10}$

$\Rightarrow \frac{1}{v} = \frac{-1+2}{20}$

$\Rightarrow \frac{1}{v} = \frac{1}{20}$

$\Rightarrow v = 20$

$\therefore$ Image distance = 20cm.

(iii) Charecterstics of Image formed →

* Image formed is a virtual image and erected.
* Image formed is enlarged than that of object.

(2) $h = 10\,cm$

$u = -36\,cm$

$f = -12\,cm$

★ Position of the mirror =

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

$$\Rightarrow \frac{1}{v} + \frac{1}{-36} = \frac{1}{-12}$$

$$\Rightarrow \frac{1}{v} = \frac{-1}{12} + \frac{1}{36}$$

$$\Rightarrow \frac{1}{v} = -\frac{3+1}{36}$$

$$\Rightarrow \frac{1}{v} = -\frac{4}{36}$$

$$\Rightarrow \frac{1}{v} = -\frac{1}{18}$$

$$\Rightarrow v = -18$$

18 cm infront of the concave mirror.

★ height of image.

Through magnification formula - $m = \frac{h'}{h} = -\frac{v}{u}$

$$m = \frac{h'}{h} = -\frac{v}{u}$$

⑤ (Placing the value of h, v, u)

$$\Rightarrow \frac{h'}{10} = \frac{-(-18)}{+36} \times 2$$

$$\Rightarrow \frac{h'}{10} = -\frac{1}{2}$$

$$\Rightarrow h' = -\frac{1}{2} \times 10^{5}$$

$$\Rightarrow h' = -5$$

∴ height of the image is 5 cm and it is inverted.

Through all these we can say about it's nature (i.e.)

- It is a real image
- It is inverted.
- It is diminished.

(13) $f = -10\ cm$

$h = 2\ cm$

$h' = 6\ cm$

$$M = \frac{-v}{u} = \frac{h'}{h}$$

$$\Rightarrow M = \frac{h'}{h}$$

$$\Rightarrow M = \frac{6}{2}$$

$$\Rightarrow M = 3$$

$$M = \frac{-v}{u}$$

$$\Rightarrow 3 = \frac{-v}{u}$$

$$\Rightarrow 3u = -v$$

$$\Rightarrow v = -3u$$

We know that- $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

$$\Rightarrow \frac{1}{u} + \frac{1}{-3u} = \frac{1}{-10} \quad (\text{Putting } v = -3u)$$

$$\Rightarrow \frac{3-1}{3u} = \frac{-1}{10}$$

$$\Rightarrow \frac{2}{3u} = \frac{-1}{10}$$

$$\Rightarrow \frac{1}{u} = \frac{-1}{10} \times \frac{3}{2}$$

$$\Rightarrow \frac{1}{u} = -\frac{3}{20}$$

$$\Rightarrow u = -\frac{20}{3}$$

∴ we should keep the object at $\frac{20}{3}$ cm infront of the mirror in order to get an erect image 6cm tall.

(14) $u = -15$ cm

$v = -10$ cm

we know that - $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

(Puting the value of u & v)

$$\frac{1}{-15} + \frac{1}{-10} = \frac{1}{f}$$

$$\Rightarrow \frac{-2-3}{30} = \frac{1}{f}$$

$$\Rightarrow \frac{-5}{30_6} = \frac{1}{f}$$

$$\Rightarrow -\frac{1}{6} = \frac{1}{f}$$

$$\Rightarrow f = -6$$

∴ The focal length of the mirror = 6cm, infront of it's.

(15) $h = 3\,cm$

$u = -8\,cm$

$h' = -4.5\,cm$

(i) Through the magnification formula -

$$M = \frac{h'}{h} = \frac{-v}{u}$$

$$\Rightarrow \frac{h'}{h} = -\frac{v}{u}$$

Placing the value of h', h & u

$$\Rightarrow \frac{4.5}{3} = +\frac{v}{+8}$$

$$\Rightarrow 1.5 = \frac{v}{8}$$

$$\Rightarrow \frac{15}{10} \times 8 = v$$

$$\Rightarrow 1.5 \times 8 = v$$

$$\Rightarrow v = 12$$

As we get $v = -12$ so we must apply it in the mirror formula; i.e)

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

$$\Rightarrow \frac{1}{-8} + \frac{1}{12} = \frac{1}{f}$$

$$\Rightarrow \frac{-3+2}{24} = \frac{1}{f}$$

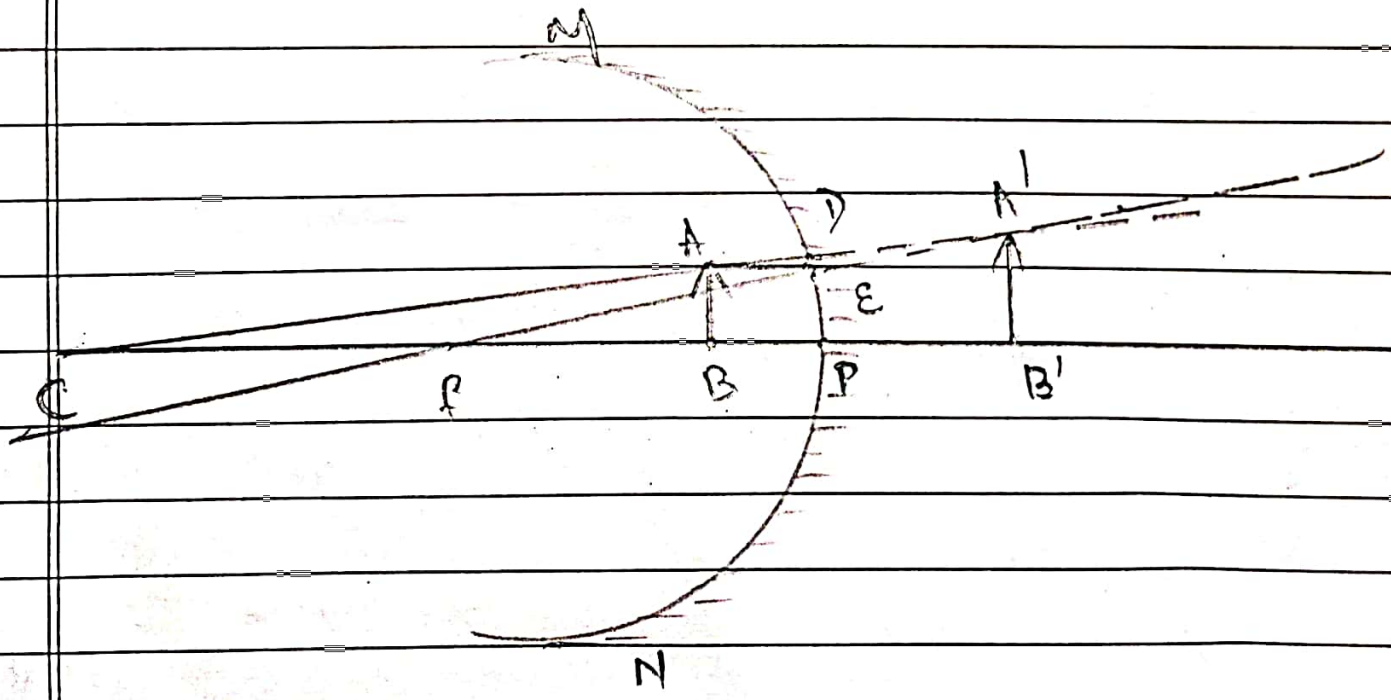
$\Rightarrow -\frac{1}{24} = \frac{1}{f}$

$\Rightarrow f = -24$

∴ The focal length = 24 cm infront the mirror.

(ii) The image was 12 cm behind the mirror.

(iii)



Scale for x axis - 1 unit = 4 cm
Scale for y axis - 1 unit = 3 cm.

(16) $h' = -4$ cm (real image)

$h = 1$ cm

$u = -20$ cm

i) Through the magnification formula.

$$M = \frac{h'}{h} = \frac{-v}{u}$$

(Placing the value of h', h & u)

$$\Rightarrow \frac{-4}{1} = \frac{-v}{-20}$$

$$\Rightarrow -4 \times 20 = v$$

$$\Rightarrow v = -80 \text{ cm}$$

∴ The image distace is 80 cm.

(ii) Through the mirror formula

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

$$\Rightarrow \frac{1}{-20} + \frac{1}{-80} = \frac{1}{f}$$

$$\Rightarrow \frac{-4-1}{80} = \frac{1}{f}$$

$$\Rightarrow \frac{-1}{16} = \frac{1}{f}$$

$$\Rightarrow f = -16$$

$\therefore$ The focal length = 16 cm infront of the converging mirror.

(17) $h = 7$ cm

$u = -27$ cm

$f = -18$ cm

Through the mirror formula.

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

$$\Rightarrow \frac{1}{-27} + \frac{1}{v} = \frac{1}{-18}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-18} + \frac{1}{27}$$

$$\Rightarrow \frac{1}{v} = \frac{-3+2}{54}$$

$\Rightarrow \frac{1}{v} = \frac{-1}{54}$

$\Rightarrow v = -54$

∴ A screen should be placed 54cm infront of the mirror inorder to get a shrap image.

Through the Magnification formula.

$$m = -\frac{v}{u} = \frac{h'}{h}$$

(Placing the value of u, v and h)

$\Rightarrow -\frac{(-54)}{-27} = \frac{h'}{7}$

$\Rightarrow \frac{h'}{7} = -2$

$\Rightarrow h' = -2 \times 7$

$\Rightarrow h' = -14$

∴ Size of the image = 14cm below.

From the above we can say the nature of the image :-

* It is a real and inverted image.
* The image is enlarged.

(18) $h = 3\,cm$

$u = -10\,cm$

$f = -20\,cm$

Through the mirror formula.

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

$$\Rightarrow \frac{1}{-10} + \frac{1}{v} = \frac{1}{-20}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-20} + \frac{1}{10}$$

$$\Rightarrow \frac{1}{v} = \frac{-1+2}{20}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{20}$$

$$\Rightarrow v = 20$$

Position of the image is 20 cm behind the mirror.

Through the magnification formula:

$$m = -\frac{v}{u} = \frac{h'}{h}$$

$$\Rightarrow -\frac{20}{-10} = \frac{h'}{3}$$

$$\Rightarrow 2 = \frac{h'}{3}$$

$$\Rightarrow h' = 2 \times 3$$

$$\Rightarrow h' = 6$$

∴ The height of the image is 6 cm ~~towards~~ upwards.

Nature of the image formed:

* The image is a virtual and erect.
* The image is enlarged from the object.

(19) $f = -4\ cm$

$h = 2\ cm$

$u = -9\ cm$

Through the mirror formula.

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

$$\Rightarrow \frac{1}{-9} + \frac{1}{v} = \frac{1}{-4}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-4} + \frac{1}{9}$$

$$\Rightarrow \frac{1}{v} = \frac{-9+4}{36}$$

$$\Rightarrow \frac{1}{v} = \frac{-5}{36}$$

$$\Rightarrow v = -\frac{36}{5}$$

∴ The image distance $= -\frac{36}{5}\ cm$

Through the magnification formula.

$$M = \frac{h'}{h} = \frac{-v}{u}$$

$$\Rightarrow \frac{h'}{2} = \frac{\left(-\frac{36}{5}\right)}{+9}$$

$$\Rightarrow \frac{h'}{2} = -\frac{36}{5} \times \frac{1}{9}$$

$$\Rightarrow \frac{h'}{2} = -\frac{4}{5}$$

$$\Rightarrow \frac{h'}{2} = \frac{-4}{5} \times 2$$

$$\Rightarrow h' = -\frac{8}{5}$$

∴ Size of the image $= -\frac{8}{5}$ cm $=$ -1.6 cm

Nature of the Image :-

- The image formed is real and inverted.
- The image formed is diminished.

(20) $u = -20\ cm$

$m = -3$

i) Through the formula of magnification.

$$m = \frac{-v}{u}$$

$$\Rightarrow -3 = \frac{-v}{-20}$$

$$\Rightarrow v = -3 \times 20$$

$$\Rightarrow v = -60$$

So, Image distance $= -60\ cm$.

By using mirror formula:-

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

$$\Rightarrow \frac{1}{-20} + \frac{1}{-60} = \frac{1}{f}$$

$$\Rightarrow \frac{-3-1}{60} = \frac{1}{f}$$

$$\Rightarrow \frac{-4}{60} = \frac{1}{f}$$

$\Rightarrow f = -15$

$\therefore$ The focal length = 15 cm in front of the mirror

If $m = +3$, then

$$M = -\frac{v}{u}$$

$$\Rightarrow 3 = -\frac{v}{u}$$

$$\Rightarrow 3u = -v$$

$$\Rightarrow v = -3u$$

By using mirror formula :-

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

$$\Rightarrow \frac{1}{u} + \frac{1}{-3u} = \frac{1}{-15}$$

$$\Rightarrow \frac{3 - 1}{3u} = \frac{1}{-15}$$

$$\Rightarrow \frac{2}{3u} = \frac{1}{-15}$$

$$\Rightarrow \frac{1}{u} = \frac{1}{-\frac{1}{5}} \times \frac{2}{2}$$

$$\Rightarrow \frac{1}{u} = \frac{1}{-10}$$

$$\Rightarrow u = -10$$

∴ The object must be placed 10 cm infront of the mirror to give an magnified virtual image that will be three times bigger than the object.

(21) $C = -3$ cm

$f = \frac{-3}{2}$ cm

$M = +5$

$$M = \frac{-v}{u}$$

$$\Rightarrow 5 = \frac{-v}{u}$$

$$\Rightarrow -5u = -v$$

$$\Rightarrow v = -5u$$

By using the mirror formula.

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

$$\Rightarrow \frac{1}{u} + \frac{1}{-5u} = \frac{1}{\frac{-3}{2}}$$

$$\Rightarrow \frac{5-1}{5u} = -\frac{2}{3}$$

$$\Rightarrow \frac{4}{5u} = -\frac{2}{3}$$

$$\Rightarrow \frac{1}{u} = -\frac{2}{3} \times \frac{5}{4_2}$$

$$\Rightarrow \frac{1}{u} = -\frac{5}{6}$$

$$\Rightarrow u = -\frac{6}{5}$$

$\therefore$ The mirror must be kept $\frac{6}{5}$ cm = 1.2 cm ahead of the cavity to get an virtual image 5 times the cavity.

(42) $C = -1.5\,m$

$f = -\frac{1.5}{2}\,m = -0.75\,m$

$u = -10\,m$

- through the mirror formula;

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

$$\Rightarrow \frac{1}{-10} + \frac{1}{v} = \frac{1}{-0.75}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-0.75} + \frac{1}{-10}$$

$$\Rightarrow \frac{1}{v} = -\frac{1}{\frac{75}{100}} + \frac{1}{10}$$

$$\Rightarrow \frac{1}{v} = -\frac{100}{75} + \frac{1}{10}$$

$$\Rightarrow \frac{1}{v} = -\frac{4}{3} + \frac{1}{10}$$

$$\Rightarrow \frac{1}{v} = \frac{-40+3}{30}$$

$$\Rightarrow \frac{1}{v} = -\frac{37}{30}$$

$\Rightarrow v = -\frac{30}{37}$ cm

∴ The person's image is 30/37 cm infront of the mirror.

(23) $h = 5$ cm

$u = -20$ cm

$f = -15$ cm

by using the mirror formula:-

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

$$\Rightarrow \frac{1}{-20} + \frac{1}{v} = \frac{1}{-15}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-15} + \frac{1}{20}$$

$$\Rightarrow \frac{1}{v} = \frac{-4+3}{60}$$

$$\Rightarrow \frac{1}{v} = -\frac{1}{60}$$

$$\Rightarrow v = -60$$

∴ We must place a screen 60 cm infront of the Mirror to get a Shrap image.

(24) $M = 3$

$u = -10$ cm

through the magnification formula :-

$$M = \frac{-v}{u}$$

$$\Rightarrow 3 = \frac{+v}{+10}$$

$$\Rightarrow 30 = v$$

The image would formed 30 cm behind the mirror.

by using the mirror formula :-

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

$$\Rightarrow \frac{1}{-10} + \frac{1}{30} = \frac{1}{f}$$

$$\Rightarrow \frac{-3+1}{30} = \frac{1}{f}$$

$$\Rightarrow \frac{-2}{30} = \frac{1}{f}$$

$\Rightarrow f = -15$

So, the focal length = 15 cm infront of the mirror

we know that

$$C = 2f$$

$$\Rightarrow 2 \times (-15) = C$$

$$\Rightarrow C = -30$$

∴ The Radius of Curvature is -30 cm infront of the mirror.

(21) $h = 50\,mm = 5\,cm$

$R = -100\,mm = -10\,cm$

$u = -300\,mm = -30\,cm$

through the mirror formula ⇒

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

$$\Rightarrow \frac{1}{-30} + \frac{1}{v} = \frac{1}{-10}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-10} + \frac{1}{30}$$

$$\Rightarrow \frac{1}{v} = \frac{-3+1}{30}$$

$$\Rightarrow \frac{1}{v} = \frac{-2}{30}$$

$$\Rightarrow \frac{1}{v} = \frac{-1}{15}$$

$$\Rightarrow v = -15$$

Image Distance = -15 cm

through the magnification formula $\Rightarrow$

$$M = \frac{-v}{u} = \frac{h'}{h}$$

$$\Rightarrow \frac{-(-15)}{-30} = \frac{h'}{5}$$

$$\Rightarrow h' = \frac{5}{2}$$

$$\Rightarrow h' = 2.5 \text{ cm}$$

$\therefore$ The image would be 2.5 cm big. or 250 mm big.

(26) $f = -20\,cm$

$M = -\frac{1}{4}$ (real image)

By using the magnification formula →

$$M = -\frac{v}{u}$$

~~$\Rightarrow M =$~~

$$\Rightarrow -\frac{1}{4} = -\frac{v}{u}$$

$$\Rightarrow -u = -4v$$

$$\Rightarrow u = 4v$$

then by using the mirror formula →

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

$$\Rightarrow \frac{1}{4v} + \frac{1}{v} = \frac{1}{-20}$$

$$\Rightarrow \frac{1+4}{4v} = -\frac{1}{20}$$

$$\Rightarrow \frac{5}{4v} = -\frac{1}{20}$$

$$\Rightarrow \frac{1}{v} = \frac{-1}{2f} \times \frac{4}{5}$$

$$\Rightarrow \frac{1}{v} = \frac{-1}{25}$$

$$\Rightarrow v = -25$$

Hence $u = 4v$

So $u = 4 \times (-25)$

$u = -100$ cm

∴ The object must be kept 100 cm far from pole of the mirror to get an image $\frac{1}{4}$th of the object.

(27) $u = -50$ cm

$M = -\frac{1}{2}$ (real image)

through the magnification formula →

$$M = \frac{-v}{u}$$

$$\Rightarrow \frac{-1}{2} = \frac{+v}{+50}$$

$\Rightarrow \frac{-1}{2} = \frac{V}{50}$

$\Rightarrow V = \frac{-50}{2}$

$\Rightarrow V = -25$

Image distance = -25 cm infront of the Mirror.

By using the mirror formula.

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

$\Rightarrow \frac{1}{-50} + \frac{1}{-25} = \frac{1}{f}$

$\Rightarrow \frac{-1-2}{50} = \frac{1}{f}$

$\Rightarrow -\frac{3}{50} = \frac{1}{f}$

$\Rightarrow f = -\frac{50}{3}$

So, the focal length = $\frac{50}{3}$ cm infront of the mirror.

When $M = -\frac{1}{5}$, then ⇒

$$M = -\frac{v}{u}$$

$$\Rightarrow \frac{-1}{5} = -\frac{v}{u}$$

$$\Rightarrow u = 5v$$

by using the mirror formula ⇒

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

$$\Rightarrow \frac{1}{5v} + \frac{1}{v} = \frac{1}{-\frac{50}{3}}$$

$$\Rightarrow \frac{1+5}{5v} = -\frac{3}{50}$$

$$\Rightarrow \frac{6}{5v} = -\frac{3}{50}$$

$$\Rightarrow \frac{1}{v} = -\frac{1}{50} \times \frac{1}{10}$$

$$\Rightarrow \frac{1}{v} = -\frac{1}{20}$$

$$\Rightarrow v = -20$$

And we know that $u = 5v$

$$\Rightarrow u = 5 \times (-20) \text{ cm}$$

$$\Rightarrow u = -100 \text{ cm}$$

∴ We should keep the object 100 cm infront of the mirror to get a ~~Magnified~~ Magnification of $-\frac{1}{5}$

(28) a) $u = -20$ cm
$f = -12$ cm

through the mirror formula →

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

$$\frac{1}{-20} + \frac{1}{v} = \frac{1}{-12}$$

$$\Rightarrow \frac{1}{v} = \frac{-1}{12} + \frac{1}{20}$$

$$\Rightarrow \frac{1}{v} = \frac{-5+3}{60}$$

$$\Rightarrow \frac{1}{v} = \frac{-2}{60_{30}}$$

$$\Rightarrow \frac{1}{v} = \frac{-1}{30}$$

$$\Rightarrow v = -30$$

Position of the image formed = 30 cm infront of the mirror

through the magnification formula →

$$M = -\frac{v}{u}$$

$$\Rightarrow M = +\frac{(-30)}{+20}$$

$$\Rightarrow M = -1.5$$

So the Nature of the image →

* Image formed is Real and inverted
* Image formed is enlarged.

(b) $u = -4\,cm$
$f = -12\,cm$

by using the mirror formula →

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

$$\Rightarrow \frac{1}{-4} + \frac{1}{v} = \frac{1}{-12}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-12} + \frac{1}{4}$$

$$\Rightarrow \frac{1}{v} = \frac{-1+3}{12}$$

$$\Rightarrow \frac{1}{v} = \frac{2}{12}$$

$$\Rightarrow v = 6$$

Position of the image = 6 cm behind the mirror

by using the magnification formula →

$$M = \frac{-v}{u}$$

$$\Rightarrow M = \frac{+6}{+4}$$

$$\Rightarrow M = 1.5$$

Thus, the nature of the image formed →

* Virtual and erect
* enlarged

(29) $h = +2.5\ mm$ ~~(real image)~~

$h' = ~~10\ mm~~ - 1\ cm = -10\ mm$ (real image)

$u = -5\ cm = -50\ mm$

by using the magnification formula

$$M = \frac{-v}{u} = \frac{h'}{h}$$

$$\Rightarrow \frac{+v}{+50} = \frac{-10}{2.5}$$

$$\Rightarrow v = \frac{-10}{\frac{25}{10}} \times 50$$

$$\Rightarrow v = \frac{-100}{25} \times \frac{2}{50}$$

$$\Rightarrow v = -200$$

Position of the image formed = 200 mm or 20 cm infront of the mirror

By using the mirror formula

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

$$\Rightarrow \frac{1}{-50} + \frac{1}{-200} = \frac{1}{f}$$

$$\Rightarrow \frac{-4-1}{200} = \frac{1}{f}$$

$$\Rightarrow -\frac{5}{40} = \frac{1}{f}$$

$$\Rightarrow \frac{1}{f} = -\frac{1}{40}$$

$\Rightarrow f = -40$

So the fiscal length is 40 mm or 4 cm infront of the image.

(30) $C = -60$ cm

$f = -30$ cm

$u = -15$ cm

By using the Mirror formula $\Rightarrow$

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

$$\Rightarrow \frac{1}{v} + \frac{1}{-15} = \frac{1}{-30}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{-30} + \frac{1}{-15}$$

$$\Rightarrow \frac{1}{v} = \frac{-1+2}{30}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{30}$$

$\Rightarrow v = 30$

Position of the image → 30 cm behind the mirror.

By using the magnification formula,

$$M = \frac{-v}{u}$$

$$\Rightarrow M = \frac{-30}{-15}$$

$$\Rightarrow M = 2$$

So the image is magnified twice from the object.

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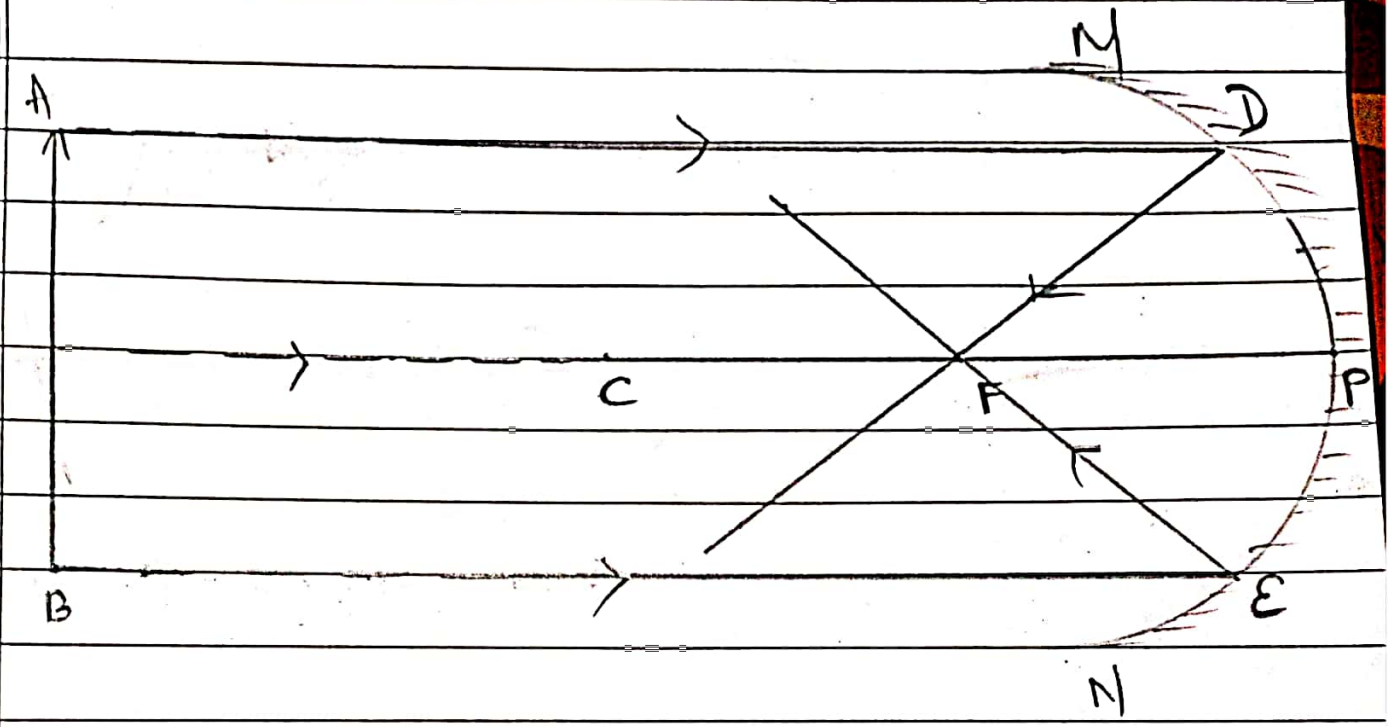
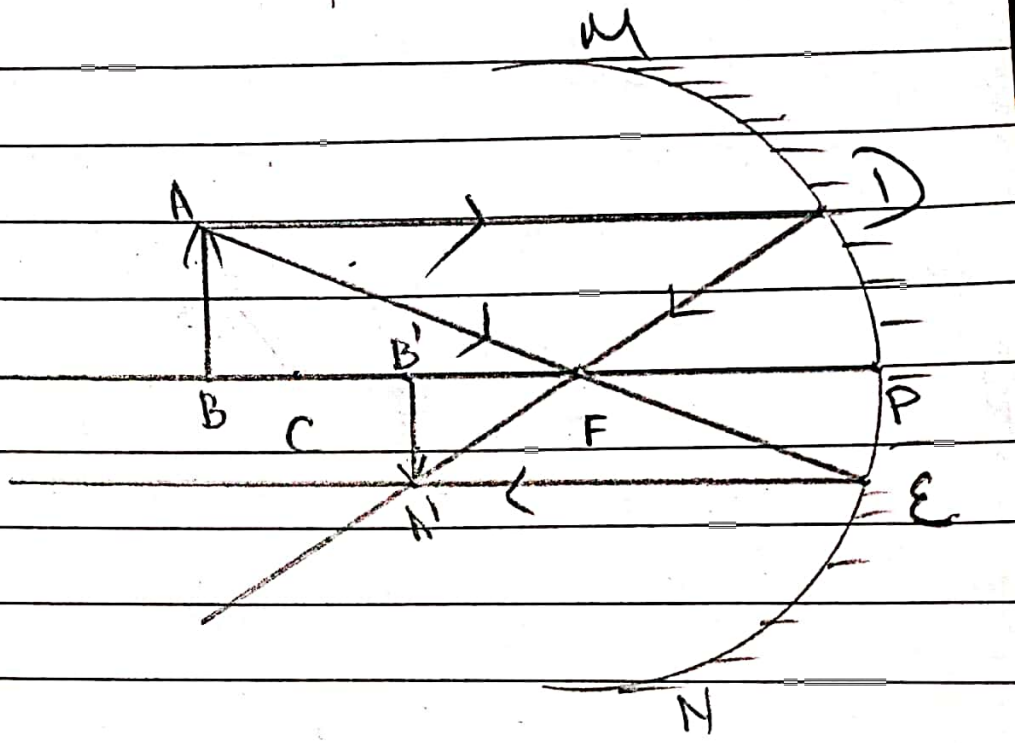
Ray Diagrams - Concave Mirror

Case - I (Object at infinity)



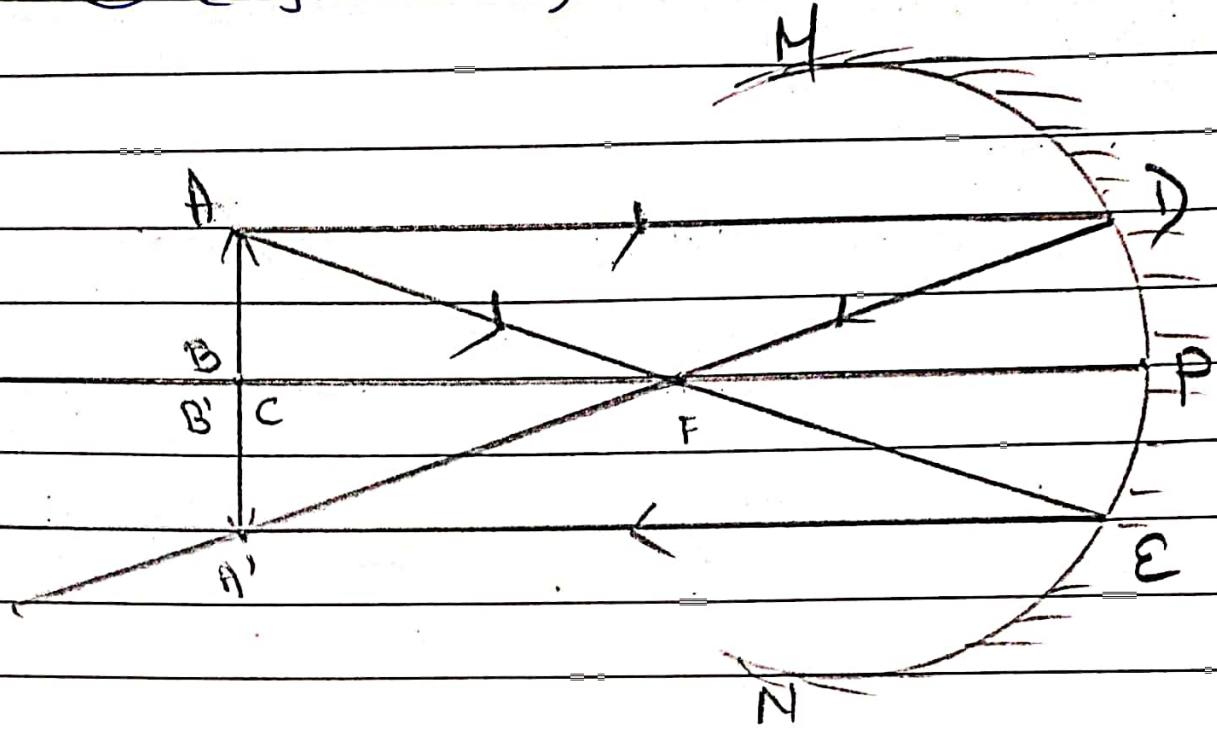
Position of the ~~image~~ object → At the infinity.
Position of the image → At the Focus (F).
Size of the image → Highly diminished, Point Sized
Nature of the image → Real and Inverted

Case-(II) (Object beyond C)



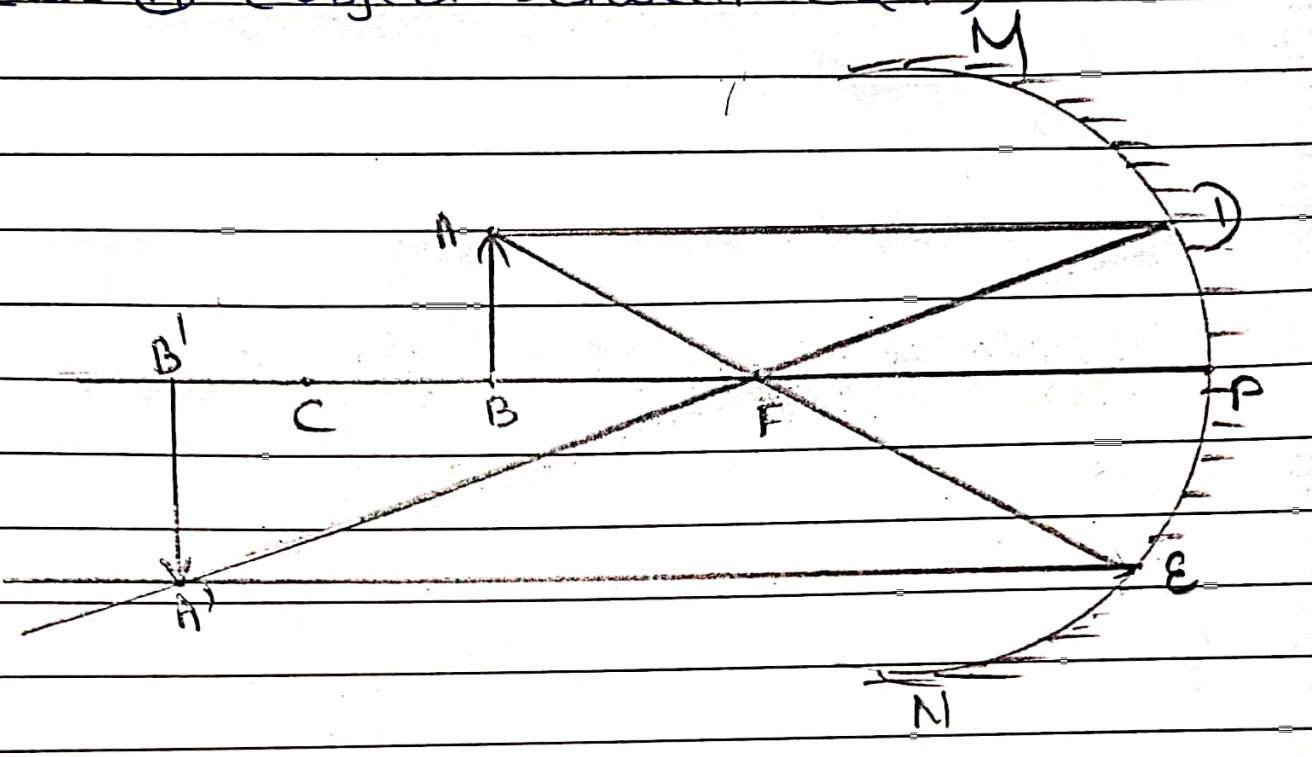
Position of the object → beyond C
Position of the image → between C and F.
Size of the image → diminished
Nature of the image → Real and inverted

Case (III) (Object at C)



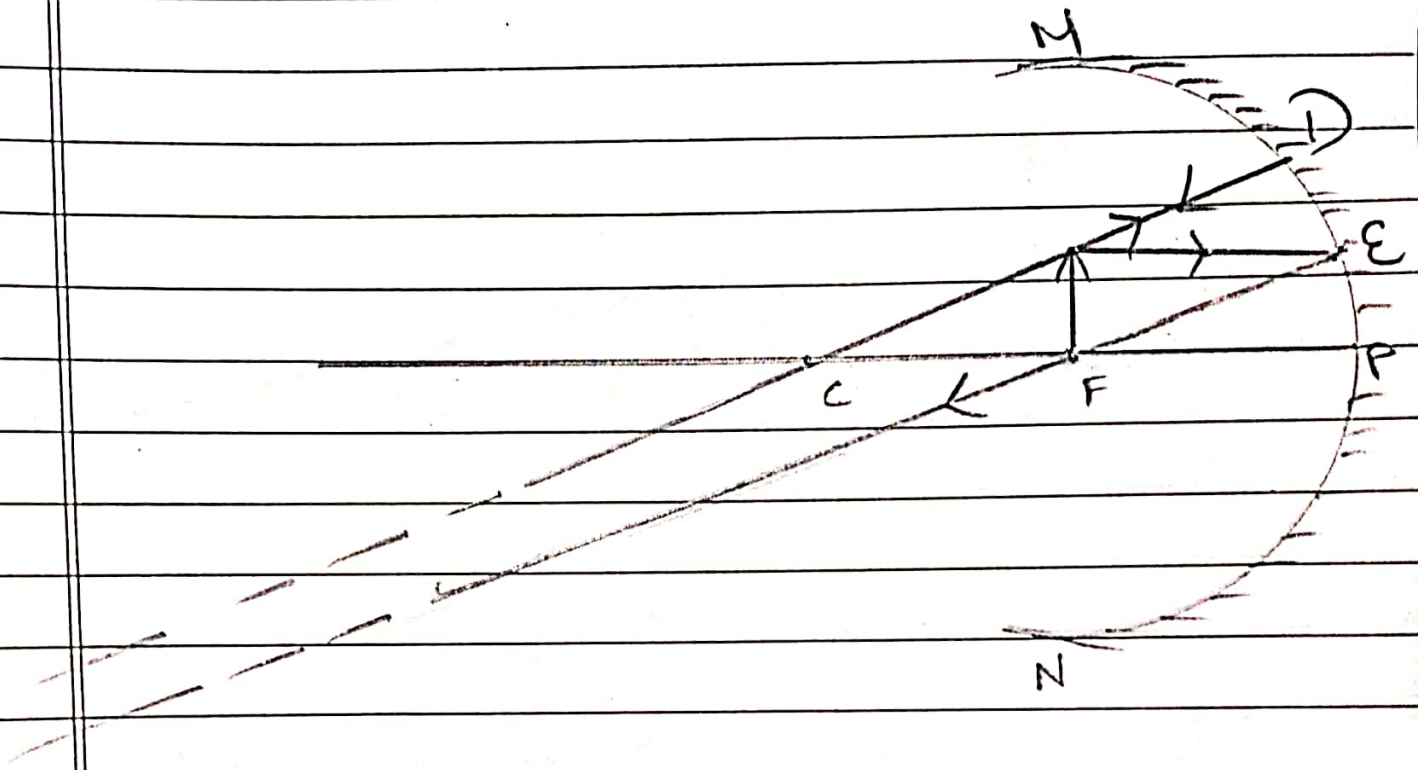
Position of the object → at C
Position of the Image → at C
Size of the Image → Same as the object
Nature of the Image → Real and Inverted

Case (IV) (Object between C & F)



Position of the object → between C and F
Position of the image → beyond C.
Size of the image → Enlarged
Nature of the image → Real and inverted.

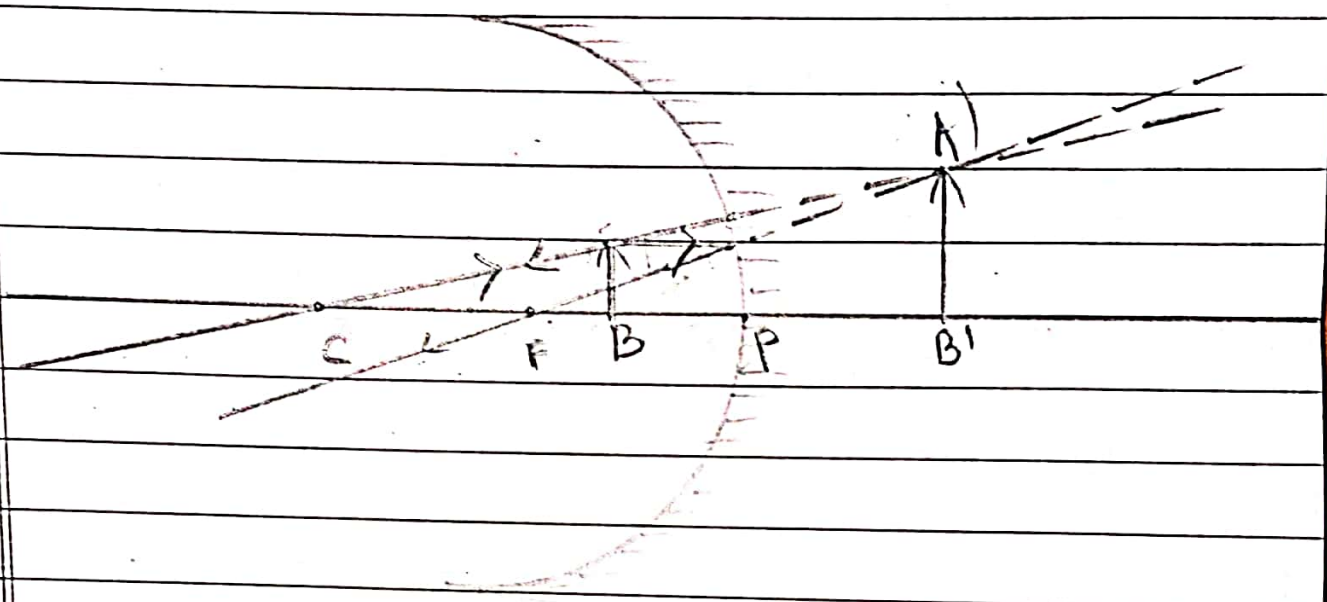
Case (V) (Object at F)



Position of the object → at F
Position of the Image → at ∞
~~Position of~~
Size of the Image → Highly Enlarged
Nature of the Image → Real and Inverted

Date
Page

Case (VI) (Object between P and F)



Position of the Object → between C and f
Position of the Image → behind the mirror
Size of the Image → Enlarged
Nature of the Image → Virtual and Erect.