Date

VSA TQ

(1) $h_1 = 1m$ $m = 4$

$m = \frac{h_2}{h_1}$ &

$4 = \frac{h_2}{1}$ $h_2 = 4m$

(2) $u = -20cm$ $f = -30$

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

$\frac{1}{v} + \frac{1}{-20} = \frac{1}{-30}$

$\frac{1}{v} = \frac{1}{-30} - \frac{1}{-20}$

$\frac{-20+30}{600} = \frac{10}{60} = \frac{1}{60}$

$\frac{1}{v} = \frac{1}{6}$ $v = 6cm = 60cm$

(3) (a) The nature of the image formed by a concave mirror is virtual and erect

(b) The nature of image formed by a concave mirror is real and inverted.

Date:.....

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

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

v = distance of 'I' from mirror

u = distance of 'O' from mirror

f = focal length

(6) Magnification

(7) m = $\frac{\text{Height of image}}{\text{Height of object}}$

(8) a) $m = \frac{h_2}{h_1}$ b) $m = \frac{-v}{u}$

(9) $u = -20$ $f = -15$

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

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

$\frac{1}{v} = \frac{-f}{300}$

60

$v = -60\,cm$

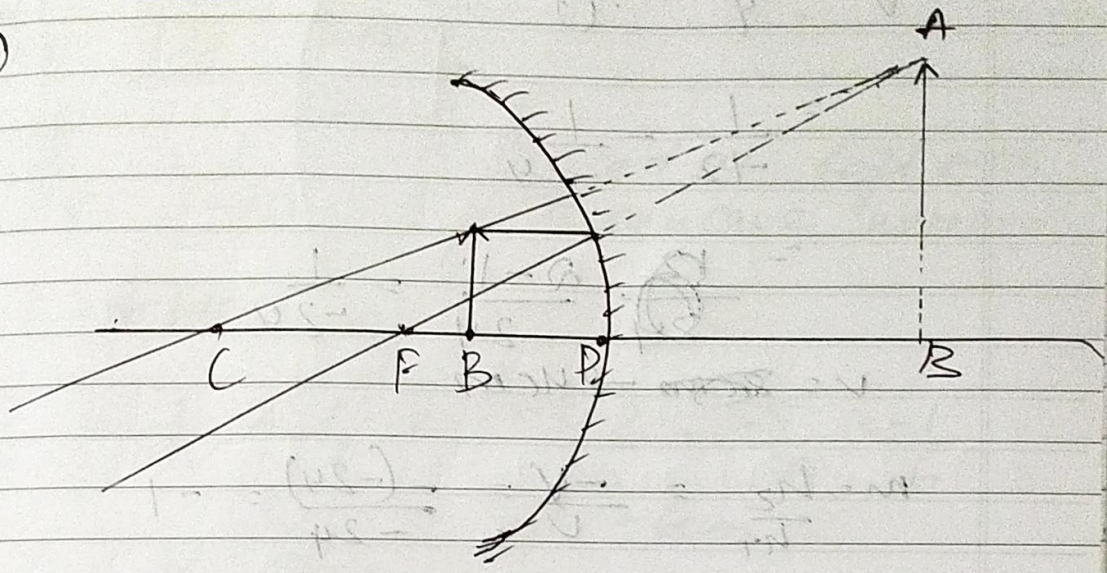
I = real & inverted

Date:.....

(10) a) plus (b) minus

(11) SA TQ

(12) (a)



(b) $f = -15cm$ $U = -10cm$

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

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

$$= \frac{-3}{150}$$

$$30$$

$v = -30cm$

(c) Characteristics of image formed is virtual and erect

Date:.....

(12) $h = 10cm$ $\quad v = -24$ $\quad f = -12cm$

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

$$= \frac{1}{-12} - \frac{1}{-24}$$

$$= \frac{2-1}{-24} = \frac{1}{-24}$$

$v = -24cm$

$$m = \frac{h_2}{h_1} = \frac{-v}{u} = \frac{-(-24)}{-24} = -1$$

$$\frac{h_2}{h_1} = -1$$

$$h_2 = -h_1$$

$$h_2 = -10\ cm$$

Image is inverted in nature

(13) $$m = \frac{h_2}{h_1} = \frac{6}{2} = 3$$

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

$$3u = -v$$

$$v = -3u$$

Date:

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

$\frac{1}{-30} + \frac{1}{u} = \frac{1}{-10}$

$\frac{2}{30} = \frac{1}{-10}$ ∴ placed at left side of concave mirror

$v = -6.66cm$

(14) $\frac{1}{f} = \frac{1}{-10} + \frac{1}{-5} = \frac{-3-2}{30} = \frac{-5}{30} = \frac{-1}{6}$

$f = -6cm$

(15) $R = 2f = 12cm$

(16) $m = \frac{h_2}{h_1} = \frac{-v}{u}$

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

$m = \frac{4.5}{3} = 1.5$

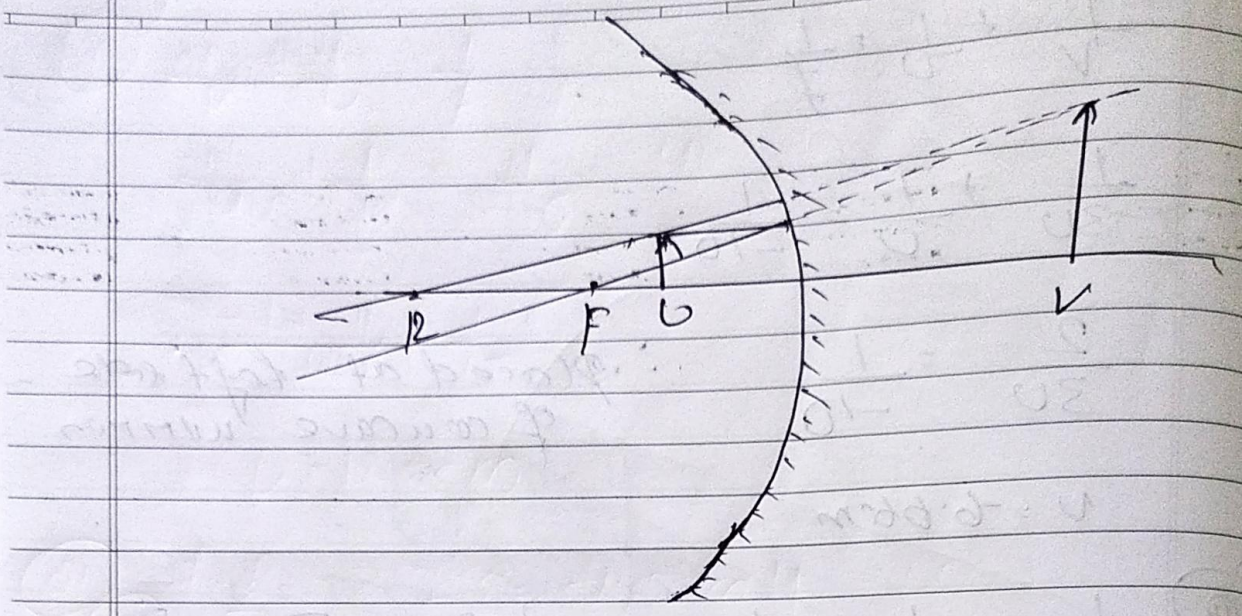
$m = \frac{-v}{u} = 1.5$

$v = -1.5 \times u = -1.5 \times -8 = 12cm$

$\frac{1}{f} = \frac{1}{12} - \frac{1}{8} = \frac{2-3}{24} = \frac{-1}{24}$

$f = -24$

Date:.....



(16) $m = \frac{h_2}{h_1} = \frac{-v}{u}$

(i) $\frac{-4}{2} = \frac{v}{+20}$

$v = -40$

(ii) $\frac{1}{-40} + \frac{1}{-20} = \frac{1}{f}$

$\frac{1}{f} = \frac{-1-2}{80} = \frac{-3}{80}$

$f = 26.6\,cm$

(iii) $\frac{1}{v} = \frac{1}{-8} + \frac{1}{-24} = \frac{-3+2}{24} = \frac{-1}{24}$

$v = -24\,cm$

Date:

(8) $m = \frac{-54}{+24} = \frac{h_2}{4}$

$h_2 = -18$

Image is real & inverted

(18) $u = 10 \quad f = 20 \quad h = 3cm$

$v = +20$

Image is virtual & erect 6cm high

(9) $f = 4cm \quad h = 20m$ (b) $u = 9cm \quad v = -7.2m$

The image is real & inverted at a distance of 7.2cm in front of concave mirror & 6cm high

(20) (a) $m = \frac{v}{u}$ (b) $-4 = \frac{-v}{-20} = -80cm$

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

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

$f = 16cm$

(7) (a) $m = \frac{-v}{u}$ (b) $4 = \frac{-v}{u} \quad v = -4u$

Date:

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

$$\frac{1}{-40}+\frac{1}{v}=\frac{1}{-15}$$

$$\frac{-1+4}{40}=\frac{1}{15}$$

$$v=11.25\text{cm}$$

(21) $f=\frac{R}{2}=\frac{-3}{2}=-1.5\text{cm}$

$m=6=\frac{-v}{u} \Rightarrow u=-6v$

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

$$\frac{1}{-6v}+\frac{1}{v}=\frac{1}{-1.5}$$

$$v=-\frac{5\times 1.5}{6}=-1.25\text{cm}$$

(22) $u=100\text{cm}$ $f=0.75\text{m}$

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

$$\frac{1}{v}=\frac{3-40}{30}=\frac{-37}{30}$$

$$v=\frac{-30}{37}=-0.81\text{m}$$

Date:.....

(23) $R = 30cm$

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

$\frac{1}{V} = \frac{1}{20} - \frac{1}{15} = \frac{5}{-300} = \frac{1}{-60}$

$V = -60cm$

(24) (a) ~~$K = 600$~~

$m = \frac{h_2}{h_1} = \frac{-V}{U}$ (b)

$\frac{h_2}{5} = \frac{-60}{20}$

$h_2 = -15cm$

(25) $m = \frac{-V}{U}$ $\quad V = 30cm$

$3 = \frac{-V}{-10}$ (a)

$\frac{1}{f} = \frac{1}{30} + \frac{1}{-10} = \frac{-20}{300} = \frac{-1}{15}$

$f = -15cm$

(28) $\frac{1}{V} = \frac{1}{300} - \frac{1}{200} = \frac{-2}{600} = \frac{-1}{150}$

$V = -150cm$

$m = \frac{-V}{U} = \frac{h_2}{h_1}$

$\frac{-150}{300} = \frac{h_2}{100}$ $\quad h_2 = -50mm$

Date:.....

(26) $m = \frac{-v}{u}$

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

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

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

$v = -25\,cm$ $\quad v = -25 \times 4 = -100\,cm$

(27) Case-1

$u = -50\,cm$

$m = \frac{-1}{2}$

$m = \frac{-v}{u}$ $\quad v = -25\,cm$

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

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

$f = \frac{-50}{3}\,cm$

Case-2

$m = \frac{-1}{8}$ $\quad f = \frac{-50}{3}\,cm$

$m = \frac{-1}{8} = \frac{-v}{u}$

Date:.....

$u = \frac{v}{8}$

$\frac{8}{v} + \frac{1}{v} = \frac{-30}{50}$

$\frac{9 \times 50}{-3} = v$

$v = -150cm$

(28) (a) The image from the pole is -30cm the nature and position of image formed in each case is that image is formed at a distance of 30cm in front of mirror; Real and inverted

(b) The image distance from the pole is +60cm the nature and position of the image formed in each case is that image is formed at a distance of 60cm behind the mirror; Virtual and erect.

(29) $m = \frac{-u_2}{u_1} = \frac{-10}{2.5} = -4$

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

$-4 = \frac{-v}{-50}$

$v = -200mm$

$v = -20cm$

Date:.....

(29) $\frac{1}{-20} + \frac{1}{-5} = \frac{1}{f}$

$\frac{1}{f} = \frac{-25}{100}$

$f = -4\,cm$

$R = 2f = -8\,cm$

(30) $R = 60\,cm \quad f = \frac{R}{2} = \frac{60}{2} = 30\,cm \quad u = -15\,cm$

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

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

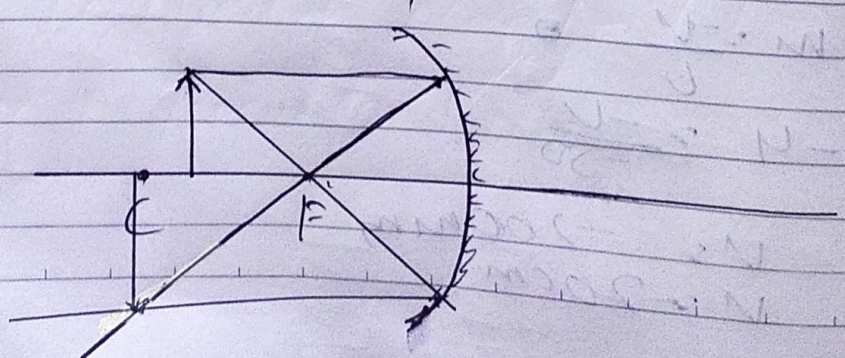
$v = 30\,cm$

$m = \frac{-v}{u} = \frac{-30}{-15} = 2\,cm$

So, the image is formed 30cm behind the mirror and magnification of +2 cm

(31) LATQ

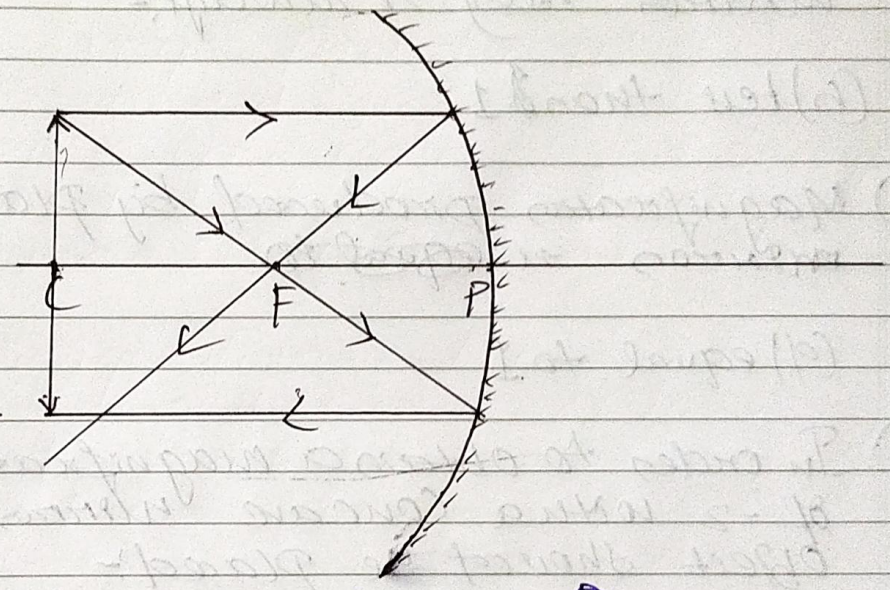
(31) (a)



Date:.....

The image is formed beyond the centre of curvature of the mirror and the nature of the image is real, inverted and magnified

(b) i) the object is moved further away from the mirror, the image is formed nearer to the mirror and its size goes on decreasing



(c) $u = -24cm$ $v = -16cm$

$$\frac{1}{f} = \frac{1}{-16} + \frac{1}{-24}$$

$$\frac{1}{f} = \frac{-5}{48}$$

$$f = \frac{-48}{5} = -9.6cm$$

$$R = 2f = -9.6 \times 2 = -19.2cm$$

Date

MCQ's

(33) Linear magnification produced by a concave mirror may be

(c) less than 1, more than 1 or equal to 1

(34) Magnification produced by convex mirror is always:-

(b) less than 1.

(34) Magnification produced by plane mirror is

(d) equal to 1

(35) In order to obtain a magnification of -2 with a concave mirror, the object should be placed:-

(b) between focus and centre of curvature

(36) A concave mirror produces a magnification of +4. The object is placed:-

(c) between the focus and pole