Level 1:

1) d , $i = r$

$i = 0 , r = 0°$

2) Glass is transparent

3) Denser to rarer, the speed of light decreases. Thus, it bends towards the normal.

4) Dispersion

5) vision

6) (b)

$i = 60, r = 30°$

$\therefore i > r$ i.e. $\sin i > \sin r$ as $\frac{n_B}{n_A} = \frac{\sin i}{\sin r}$

$\therefore n_B > n_A$

7) Thick layer of water is translucent as it absorb a part of incident light.

8) Lateral inversion means right side of the object will be left side of the image.

9) (a)

angle of deviation (δ) = 2 × glancing angle (g)

$\delta = 2 \times 30$

$\delta = 60°$

10) (d)

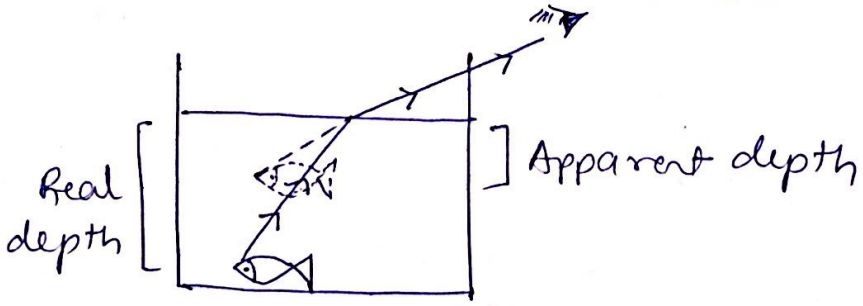
As per law of reflection, $i = r$

11) (a)

12) Due to diffused reflection (d)

13) Air has the minimum density compared to other substances specified.

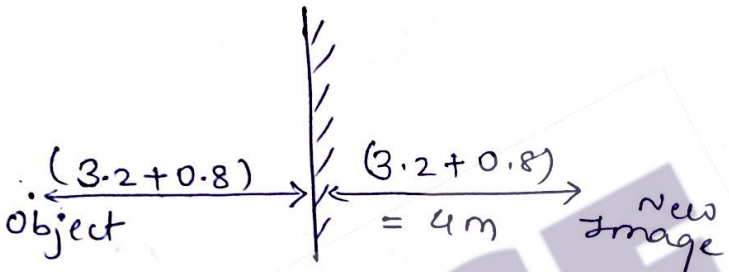
14) (b)



15) (b) Light wave's speed and wavelength changes keeping the frequency constant during refraction.

Level II :

1) (b)



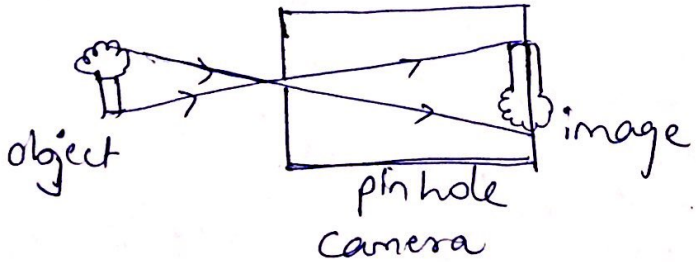
∴ Distance between object and image = 4 + 4
= 8 m

2) (c)

Concave mirror forms a virtual, enlarged and erect image of the object when placed near to the mirror (i.e. between focus and pole of the mirror).

3) (a)

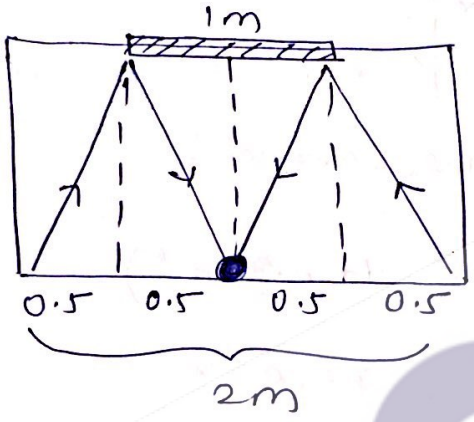
Due to rectilinear propagation of light, ~~shadow~~ image in a pin-hole camera is inverted.



4) (a)
Red colour is painted.

5) (d)
angle of deviation (δ) = $180 - 2i$
$= 180 - 2 \times 50$
$= 180 - 100$
$= 80°$

6) (b)



7) (d)
slide projector forms a real, inverted and magnified image.

8) (d)
One incident ray can be reflected back only once in any type of mirror.

9) (b)
Refraction creates an apparent depth which is less than real depth due to variable speeds of light in air and water.

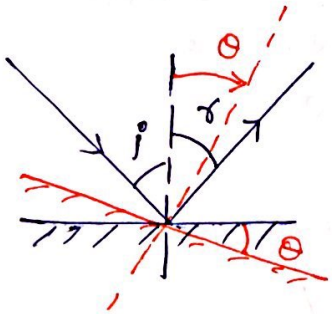
10) (d). Scattering produces no image.

11) (d)

12) (a) Wood reflects part of light that enters our eyes.

13) (b) Clearly, it is seen that object B is at more distance from ~~obj~~ the mirror as compared ~~at~~ to object at A.

14) (b)



$i = r$

New angle of incidence $= i + \theta$

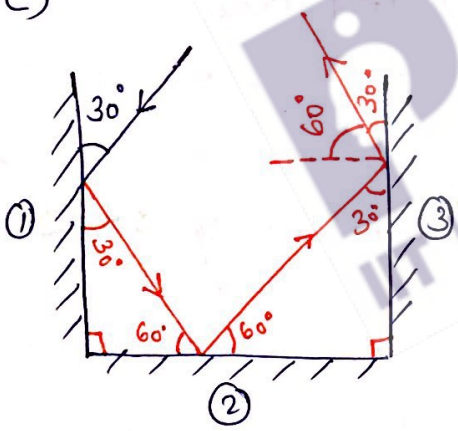
New angle of reflection $= r + \theta$ (w.r.t new normal)

New angle of reflection $= r + 2\theta$ (w.r.t. old normal)

$\therefore$ change in angle of reflection $= r + 2\theta - r$

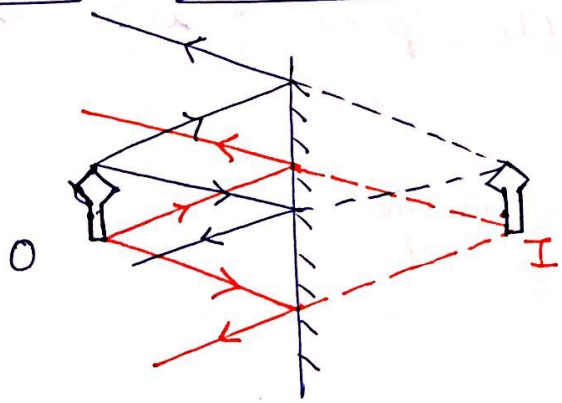
$= 2\theta$

15) (c)



Subjective Questions :

1)



2) (a) New distance between object and mirror = 25+5
= 30 cm

∴ New distance between image and mirror = 30 cm

∴ Distance between object and image = 30+30
= 60 cm

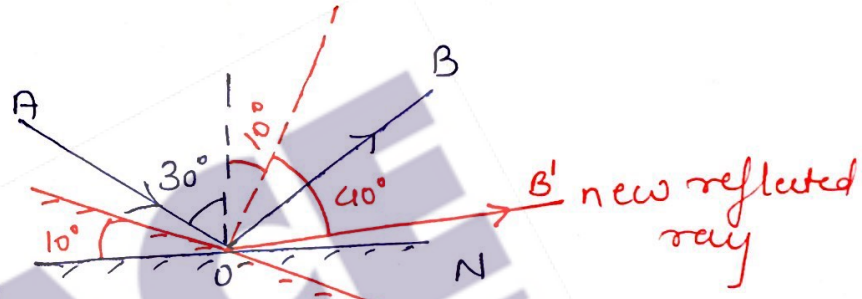
(b) Initial image distance = 25 cm

Final image distance = 30 cm

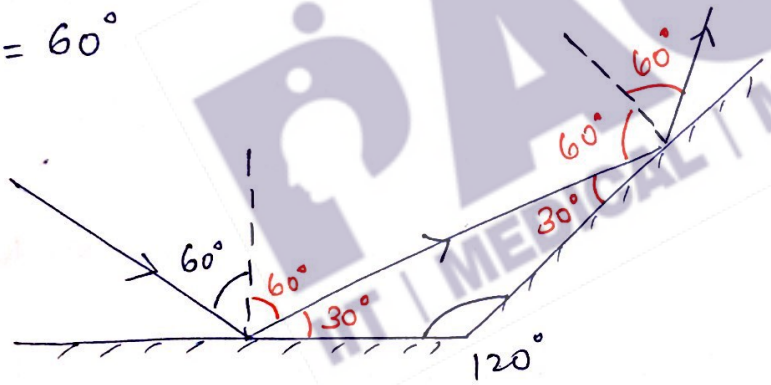
Distance between two image positions = 30−25
= 5 cm

3) (a) $180 - 80^\circ = 100^\circ$

(b) 40°



5) $\theta = 60^\circ$



6) $\theta = 130^\circ$