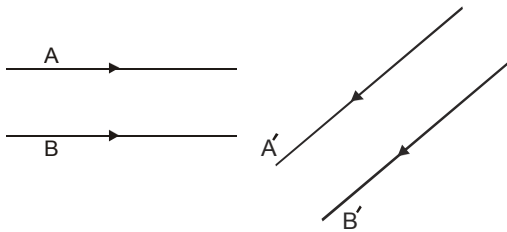
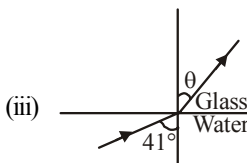
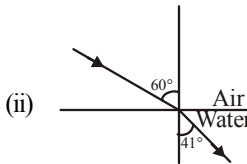
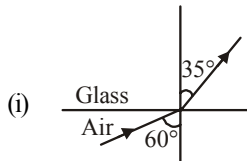


Diagram Based Questions :

1. Figure shows two rays A and B being reflected by a mirror and going as A' and B'. The mirror

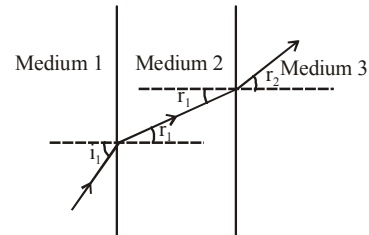


- (a) is plane
 (b) is convex
 (c) is concave
 (d) may be any spherical mirror
2. Refraction of light from air to glass and from air to water are shown in figure (i) and figure (ii) below. The value of the angle θ in the case of refraction as shown in figure (iii) will be



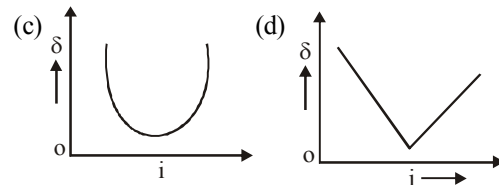
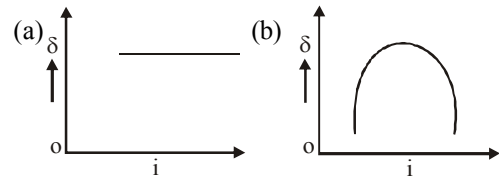
- (a) 30° (b) 35°
 (c) 60° (d) 41°

3. The following figure shows refraction of light at the interface of three media.

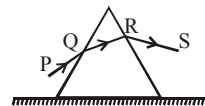


Correct the order of optical density of the three media is

- (a) $d_1 > d_2 > d_3$ (b) $d_2 > d_1 > d_3$
 (c) $d_3 > d_1 > d_2$ (d) $d_2 > d_3 > d_1$
4. The graph between angle of deviation (δ) and angle of incidence (i) for a triangular prism is represented by

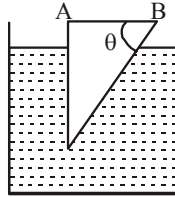


5. An equilateral prism is placed on a horizontal surface. A ray PQ is incident onto it. For minimum deviation



- (a) PQ is horizontal
- (b) QR is horizontal
- (c) RS is horizontal
- (d) Any one will be horizontal

6. A glass prism of refractive index 1.5 is immersed in water (refractive index $\frac{4}{3}$). A light beam incident normally on the face AB is totally reflected to reach on the face BC if



- (a) $\sin \theta \geq \frac{8}{9}$
- (b) $\frac{2}{3} < \sin \theta < \frac{8}{9}$
- (c) $\sin \theta \leq \frac{2}{3}$
- (d) None of these

Solution

1. (a)

2. (b) ${}^a\mu_g = \frac{\sin 60^\circ}{\sin 35^\circ}$... (i)

${}^a\mu_w = \frac{\sin 60^\circ}{\sin 41^\circ}$... (ii)

${}^w\mu_g = \frac{\sin 41^\circ}{\sin \theta}$... (iii)

${}^a\mu_w \times {}^w\mu_g = {}^a\mu_g$

$\frac{\sin 60^\circ}{\sin 41^\circ} \times \frac{\sin 41^\circ}{\sin \theta} = \frac{\sin 60^\circ}{\sin 35^\circ}$ (Using (i),

(ii) and (iii)) $= \sin \theta = \sin 35^\circ$ $\theta = 35^\circ$

3. (d) As $r_1 < i_1$ i.e., the incident ray bends towards the normal \Rightarrow medium 2 is denser than medium 1.

Or $r_2 < i_1 \Rightarrow$ medium 3 is denser than medium 1.

Also, $r_2 > r_1 \Rightarrow$ medium 2 is denser than medium 3.

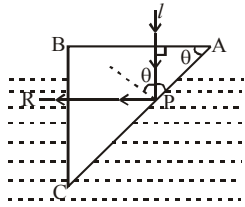
4. (c) For the prism as the angle of incidence (i) increases, the angle of deviation (δ) first decreases goes to minimum value and then increases.



5. (b) For minimum deviation, incident angle is equal to emerging angle.
 \therefore QR is horizontal.
6. (a) The phenomenon of total internal reflection takes place during reflection at P.

$$\sin \theta = \frac{1}{{}^g \mu_{\omega}} \quad \dots (i)$$

When θ is the angle of incidence at P



$$\text{Now, } {}^g \mu_{\omega} = \frac{{}^a h_g}{{}^g \mu_{\omega}} = \frac{1.5}{4/3} = 1.125$$

$$\text{Putting in (i), } \sin \theta = \frac{1}{1.125} = \frac{8}{9}$$

\therefore $\sin \theta$ should be greater than or equal to $\frac{8}{9}$.