# Physicsaholics

**DPP – 4 (Geometrical Optics)**

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/67

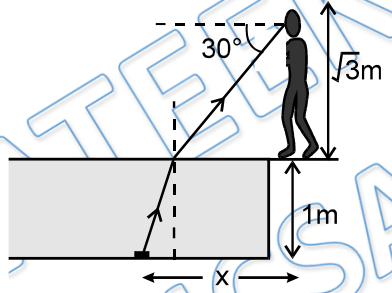
Video Solution on YouTube:- https://youtu.be/0dKA5eQKm_Y

Written Solution on Website :- https://physicsaholics.com/note/notesDetalis/68

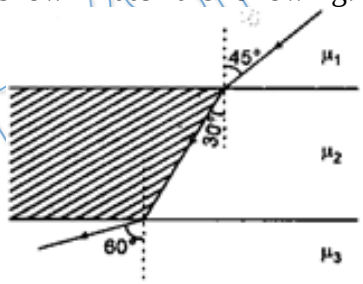
Q 1. The refractive index of air with respect to glass is 2/3. The refractive index of diamond with respect to air is 12/5. Then the refractive index of glass with respect to diamond will be

(a) 5/8 (b) 8/9 (c) 5/18 (d) 18/5

Q 2. A man is standing at the edge of a 1m deep swimming pool, completely filled with a liquid of refractive index. $\sqrt{3/2}$. The eyes of the man are $\sqrt{3}$ m above the ground. A coin located at the bottom of the pool appears to be at an angle of depression of $30^0$ with reference to the eye of man. Then horizontal distance (represented by x in the figure) of the coin from the eye of the man is _____ mm.




Q 3. For the figure shown match the following:



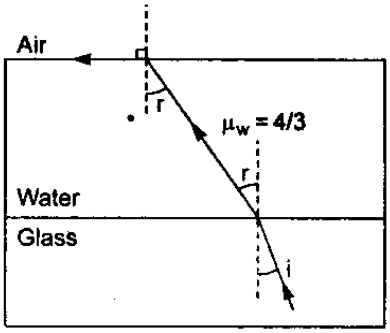

| | | | |
|---|---|---|---|
| (a) | $\mu_1/\mu_3$ | (p) | $\sqrt{2}$ |
| (b) | $\mu_2/\mu_1$ | (q) | $\sqrt{1.5}$ |
| (c) | $\mu_2/\mu_3$ | (r) | $\sqrt{3}$ |

Q 4. A light of wavelength 6000 Å in air enters a medium of refractive index 1.5. Inside the medium, its frequency is $\nu$ and its wavelength is $\lambda$.

(a) $\nu = 5 \times 10^{14}$ Hz (b) $\nu = 7.5 \times 10^{14}$ Hz

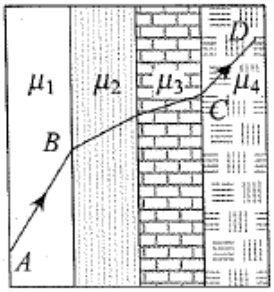
(c) $\lambda = 4000$ Å (d) $\lambda = 9000$Å

Q 5. A ray of light is incident at the glass-water interface at an angle i, it emerges finally parallel to the surface of water, then the value of $\mu_g$ would be:




(a) (4/3) sin i (b) 1/sin i (c) 4/3 (d) i

Q 6. A ray of light passes through four transparent media with refractive indices $\mu_1$, $\mu_2$, $\mu_3$ and $\mu_4$ as shown in the figure. The surfaces of all media are parallel. If the emergent ray CD is parallel to the incident ray AB, we must have.

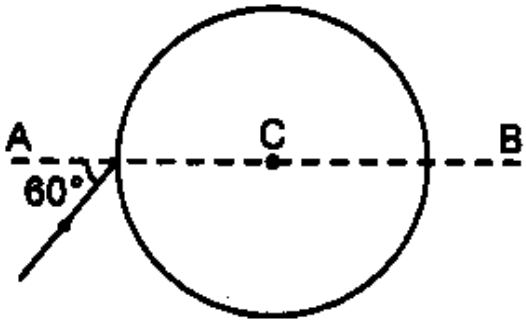



(a) $\mu_1 = \mu_2$ (b) $\mu_2 = \mu_3$ (c) $\mu_3 = \mu_4$ (d) $\mu_4 = \mu_1$

Q 7. The x-z plane separates two media A and B of refractive indices $\mu_1 = 1.5$ and $\mu_2 = 2$. A ray of light travels from A to B. Its directions in the two media are given by unit vectors $\vec{a}_1 = a\hat{\imath} + b\hat{\jmath}$ and $u_2 = c\hat{\imath} + d\hat{\jmath}$. Then:

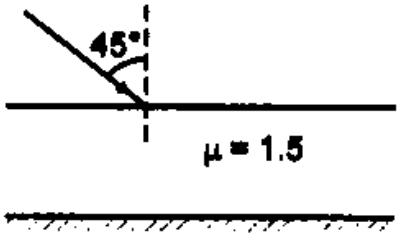
(a) $\frac{a}{c} = \frac{4}{3}$ (b) $\frac{a}{c} = \frac{3}{4}$ (c) $\frac{b}{d} = \frac{4}{3}$ (d) $\frac{b}{d} = \frac{3}{4}$

Q 8. A ray of light falls on a transparent sphere with center at C as shown in figure. The ray emerges from the sphere parallel to line AB. The refractive index of the sphere is



(a) $\sqrt{2}$ (b) $\sqrt{3}$ (c) $\frac{3}{2}$ (d) $\frac{1}{2}$

Q 9. One side of a glass slab is silvered as shown. Any of light is incident on the other side at angle of incidence i = 45°. Refractive Index of glass is given as 1.5. The deviation of the ray of light from its initial path when it comes out of the slab is:

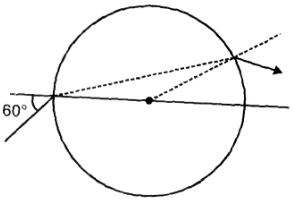



(a) 90° (b) 180° (c) 120° (d) 45°

Q 10. A ray incident at a*n* angle of incidence 60° enters a glass sphere of refractive index μ = $\sqrt{3}$ This ray is reflected and refracted at the farther surface of the sphere. The angle between reflected and refracted rays at this surface is:

(a) 90° (b) 60° (c) 70° (d) 40°

Q 11. A ray is incident at an angle 60° on a sphere which is made of material having refractive index $\sqrt{3}$ find angle by which final ray is deviated




(a) 30° (b)15° (c) 45° (d)60°



# Answer Key

| | | | | |
|---|---|---|---|---|
| **Q.1 a** | **Q.2 4000** | **Q.3 a(q), b(p), c(r)** | **Q.4 a, c** | **Q.5 b** |
| **Q.6 d** | **Q.7 a** | **Q.8 b** | **Q.9 a** | **Q.10 a** |
| **Q.11 d** | | | | |