

ANSWERS

OBJECTIVE UNSOLVED LEVEL - I

- | | |
|---------|---------|
| 1. (c) | 2. (d) |
| 3. (d) | 4. (b) |
| 5. (b) | 6. (d) |
| 7. (c) | 8. (b) |
| 9. (b) | 10. (a) |
| 11. (d) | 12. (a) |
| 13. (a) | 14. (c) |
| 15. (d) | |

OBJECTIVE UNSOLVED LEVEL - II

- | | |
|---------|---------|
| 1. (c) | 2. (b) |
| 3. (c) | 4. (c) |
| 5. (a) | 6. (a) |
| 7. (a) | 8. (c) |
| 9. (c) | 10. (c) |
| 11. (c) | 12. (a) |
| 13. (d) | 14. (a) |
| 15. (c) | |

UNSOLVED SUBJECTIVE LEVEL - I (C.B.S.E.)

- (i) The image is -30 cm from mirror, -3 , magnified, real and inverted.
(ii) The image is 15 cm at the back of the mirror, 3 , magnified, virtual and erect.
- 54 cm is in front of the mirror, 54 , inverted and real, -5 cm, screen should move away from mirror upto, when object is at -18 cm from mirror.
- $V = 6.66$ cm; 0.55 cm, image is erect and virtual; progressively diminished in size.
- 2.8 cm².
- 5 cm; the location of slab will not effect the answer.
- $\sin^{-1} \frac{1}{3}$ and $\sin^{-1} 0.375$
- 4.89 cm from the bottom
- 2.58 cm²
- $i = \sin^{-1}(0.35)$
- $R = \infty$
- 5000 \AA , $6 \times 10^{14} \text{ Hz}$, 45°
- 400 nm , $5 \times 10^{14} \text{ Hz}$, $2 \times 10^8 \text{ ms}^{-1}$
- 600 nm
- (a) Reflected light (wavelength, frequency, speed same as incident light),
 $\lambda = 589 \text{ nm}$, $f = 5.09 \times 10^{14} \text{ Hz}$, $c = 3 \times 10^8 \text{ ms}^{-1}$
(b) Refracted light (frequency same as incident frequency)
 $f = 5.09 \times 10^{14} \text{ Hz}$, $f = 2.26 \times 10^8 \text{ ms}^{-1}$ $\lambda = 444 \text{ nm}$

UNSOLVED SUBJECTIVE LEVEL - II

- $2 \cos 15^\circ$
- 60 cm

3. $\frac{R}{2}(\mu n + \mu - 1)$
4. $f = x_1, R = \frac{x_1 x_2}{x_1 + x_2}, \mu = \frac{x_1}{x_1 - x_2}$
5. $x = d + \frac{(d - f_1)f_2}{d - f_1 - f_2}, y = \frac{\Delta(d - f_1)}{d - f_1 - f_2}$
7. Final image will be formed at optical center of L_1
8. $\mu = 1.382$
9. (a) 0.1 m (b) 0.2 mm (c) 51
(d) 5001 (e) 2501

UNSOLVED SUBJECTIVE LEVEL - III

1. $\frac{52}{9} \text{ cm}$
2. Image will coincide with object
3. $f_2 = \frac{n_2 R_1 R_2}{n(R_1 + R_2) - (n_1 R_2 + n_2 R_1)}, f_1 = \frac{n_1 R_1 R_2}{n(R_1 + R_2) - (n_1 R_2 + n_2 R_1)} \frac{f_1}{a} + \frac{f_2}{b} = 1$
4. $\frac{15}{13} \text{ cm}$
5. $\frac{100}{19} \text{ cm}$
6. 17.1 cm
8. (a) 0.3276 mm (b) 1.2 cm
(c) 0.7 mm
10. $\frac{3}{4}$

PREVIOUS YEARS IIT-JEE PROBLEMS

- (a) $A'B' = 1.8\text{ cm}$, $M = -1.5$ (b) $t_{\min} = 90\text{ nm}$
- (a) 4.33 mm (b) 0.75
(c) 650 nm and 433.3 nm .
- $\hat{r} = \frac{\sqrt{2}}{10}(3\hat{i} + 4\hat{j} - 5\hat{k})$
- (a) $\lambda_0 = 60\text{ nm}$ (b) $i = \frac{\sin^{-1} 1.5}{2} = 42.8^\circ$
- (a) 4 minima at positions $\pm 0.258\text{ m}$ and $\pm 1.13\text{ m}$
(b) $y = \frac{3}{\sqrt{7}}$ & $\frac{1}{\sqrt{15}}$
- $t = 9.3 \times 10^{-6}\text{ m}$
- (a) $\frac{m}{\theta} = \frac{\sqrt{n^2 - 1}}{\sin^{-1}\left(\frac{1}{n}\right)}$ (b) $K^{1/2}x = 4y^{1/4}$
(c) $P(x_1, y_1) = P(4, 1)$ (d) $\theta_c = 90^\circ$.