

Wave and Motion : Geometrical Optics – Typical Questions

(Answers Only)

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|------|--------------------------------------------------|
| A-01 | (a) |
| A-02 | (b) |
| A-03 | (c) |
| A-04 | (d) |
| A-05 | (a) |
| A-06 | (d) |
| A-07 | (d) |
| A-08 | (c) |
| A-09 | (b) |
| A-10 | (c) |
| A-11 | (d) |
| A-12 | (a) |
| A-13 | (c) |
| A-14 | (d) |
| A-15 | (a) |
| A-16 | (b) |
| A-17 | (b) |
| A-18 | (d) |
| A-19 | (a) (b) |
| A-20 | (b) |
| A-21 | (a), (c), (d) |
| A-22 | (c), (d) |
| A-23 | (c), (d) |
| A-24 | (a), (b) |
| A-25 | (b) |
| A-26 | 60 cm from the mirror on the side of the object. |

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| A-27 | 1.4 m, 2.0 m |
| A-28 | 10 cm or 30 cm from the mirror |
| A-29 | 5 cm |
| A-30 | 1.0 mm inside the ball bearing, 0.08 mm |
| A-31 | $\frac{10}{3}$ cm from the mirror on the side opposite to the object, $\frac{10}{3}$ cm, virtual and erect |
| A-32 | 10 cm |
| A-33 | 87.5 cm |
| A-34 | 6.9 cm |
| A-35 | 4.0 cm |
| A-36 | $\frac{(R-h)}{\mu}$ above the water surface |
| A-37 | $2f, 4f$ |
| A-38 | (a) 50 cm (b) 10 cm inside the diverging mirror i.e. virtual image. |
| A-39 | 5.44 ns |
| A-40 | 81.5 cm |
| A-41 | 2.83 m shifted from the position directly below the piece of the wood |
| A-42 | 0.70 cm away from the object |
| A-43 | 30.4 cm |
| A-44 | 0.2 cm above P |
| A-45 | $\frac{\sum_{i=1}^k t_i}{\sum_{i=1}^k \mu_i}$ |
| A-46 | 7.1 cm above the bottom |
| A-47 | (a) $h\left(\mu + \frac{1}{2}\right)$ above itself, $h\left(\mu + \frac{3}{2}\right)$ below itself (b) $h\left(1 + \frac{1}{2\mu}\right)$ below itself and $h\left(1 + \frac{3}{2\mu}\right)$ below itself |
| A-48 | (a) 2.84 cm, (b) 1.41 |

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| A-49 | 26.9 cm |
| A-50 | 0.62 cm |
| A-51 | $\sin^{-1}(0.87)$ |
| A-52 | $\cos^{-1}\frac{2}{3}$ |
| A-53 | 90° |
| A-54 | - |
| A-55 | 0 to $\cos^{-1}\frac{8}{9}$ |
| A-56 | 45° |
| A-57 | (b) $\sin^{-1}\frac{1}{\mu}$ |
| A-58 | (a) 2.8 m (b) 22.6 cm |
| A-59 | $60^\circ, 60^\circ$ |
| A-60 | 2° |
| A-61 | $\mu \leq \sqrt{2}$ |
| A-62 | 100 cm from the surface on the side of S |
| A-63 | 267.0 cm away from the separating surface |
| A-64 | (a) They are reflected (b) If the sphere is completed, the image forms at the point diametrically opposite to A (c) At the mirror image of A in BC (d) Final ray diagram is shown at the illustration. |
| A-65 | (a) 2 cm left to the centre (b) 2.6 cm left to the centre |
| A-66 | 9.1 cm from the farther surface on the other side of the lens |
| A-67 | (a) 2, (b) not possible (c) |
| A-68 | At infinity |
| A-69 | No shift is observed |
| A-70 | 1 cm |
| A-71 | At the reflecting surface of the sphere |
| A-72 | (a) 15 cm from the lens on the axis |

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| | (b) 20 cm from the lens on the axis |
| A-73 | 18.75 cm, 37.5 cm |
| A-74 | (a) 10 cm (b) 300 cm |
| A-75 | ± 24 cm, ± 120 cm |
| A-76 | (a) $\frac{\mu_3 R}{2\mu_2 - \mu_1 - \mu_3}$ (b) $\frac{\mu_1 R}{2\mu_2 - \mu_1 - \mu_3}$ |
| A-77 | (a) 490 cm on the side of the object, virtual (b) 510 cm on the other side, real |
| A-78 | 17.2 cm |
| A-79 | 2.3 cm |
| A-80 | (a) - (b) 13.3 cm towards the object, erect and virtual image |
| A-81 | 8.89 cm, 26.7 cm |
| A-82 | No |
| A-83 | Yes, when prism is placed in a medium having refractive index same as that of the material of prism. |
| A-84 | - |
| A-85 | Fluctuation in distance of separation with fluctuation of refractive index of the material. |
| A-86 | No |
| A-87 | No, Will Burn, Will burn |
| A-88 | Yes |
| A-89 | - |
| A-90 | Slower |
| A-91 | Taller |
| A-92 | - |
| A-93 | Yes |
| A-94 | Yes |
| A-95 | Diverging lens |
| A-96 | - |
| A-97 | No |
| A-98 | Yes |
| A-99 | No |
| A-100 | No |