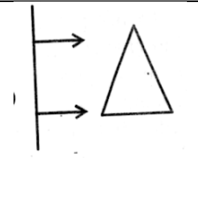
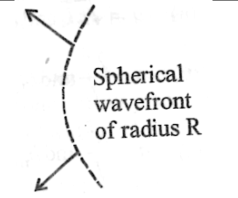
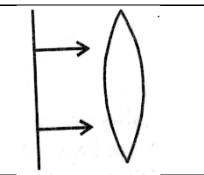
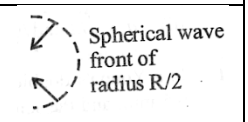
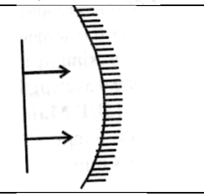
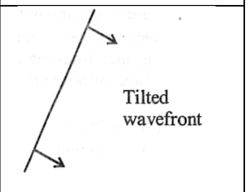
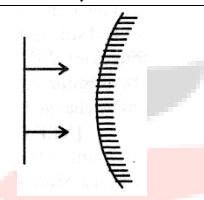
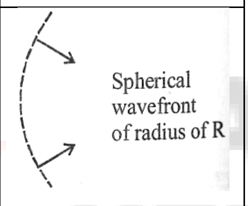
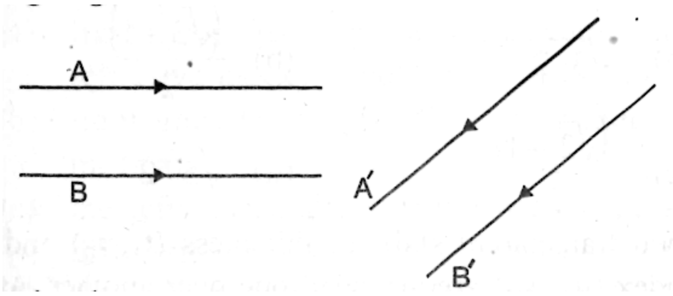
PHYSICS

51. Match Plane wave incident on different surfaces. In column I with the emergent wavefront in Column II.

Column I		Column II	
(A)		(1)	
(B)		(2)	
(C)		(3)	
(D)		(4)	

(1) (A) → (1); (B) → (3); (C) → (2); (D) → (4)
(2) (A) → (3); (B) → (4); (C) → (2); (D) → (1)
(3) (A) → (2); (B) → (4); (C) → (3); (D) → (1)
(4) (A) → (4); (B) → (2); (C) → (1); (D) → (3)

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



(1) is plane
(2) is convex
(3) is concave
(4) may be any spherical mirror

53. An object is placed 40 cm from a concave mirror of focal length 20 cm. The image formed is
(1) real, inverted and same in size
(2) real, inverted and smaller
(3) virtual, erect and larger
(4) virtual, erect and smaller

54. A short linear object of length l lies along the axis of a concave mirror of focal length f at a distance u from the pole of the minor. The size of the image is approximately equal to

(1) $l\left(\frac{u-f}{f}\right)^{\frac{1}{2}}$ (2) $l\left(\frac{u-f}{f}\right)^{2}$

(3) $l\left(\frac{f}{u-f}\right)^{\frac{1}{2}}$ (4) $l\left(\frac{f}{u-f}\right)^{2}$

55. Light travels through a glass plate of thickness t and refractive index μ. If c is the speed of light in vacuum, the time taken by light to travel this thickness of glass is

(1) μtc (2) $\frac{tc}{\mu}$

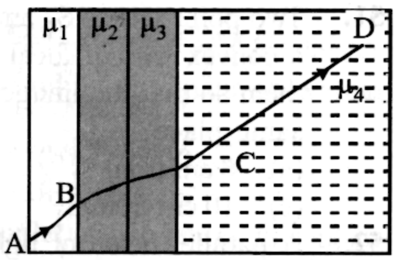
(3) $\frac{t}{\mu c}$ (4) $\frac{\mu t}{c}$

56. A vessel of depth x is half filled with oil of refractive index μ_1 and the other half is filled with water of refractive index μ_2. The apparent depth of the vessel when viewed from above is

(1) $\frac{x(\mu_1+\mu_2)}{2\mu_1\mu_2}$ (2) $\frac{x\mu_1\mu_2}{2(\mu_1+\mu_2)}$

(3) $\frac{x\mu_1\mu_2}{(\mu_1+\mu_2)}$ (4) $\frac{2x(\mu_1+\mu_2)}{2\mu_1\mu_2}$

57. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_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



(1) $\mu_1 = \mu_2$ (2) $\mu_2 = \mu_3$
(3) $\mu_3 = \mu_4$ (4) $\mu_4 = \mu_1$

58. An electromagnetic radiation of frequency n, wavelength λ, travelling with velocity v in air, enters a glass slab of refractive index μ. The frequency, wavelength and velocity of light in the glass slab will be respectively

(1) $\frac{n}{\mu}, \frac{\lambda}{\mu}$ and $\frac{v}{\mu}$ (2) $n, \frac{\lambda}{\mu}$ and $\frac{v}{\mu}$

(3) $n, 2\lambda$ and $\frac{v}{\mu}$ (4) $\frac{2n}{\mu}, \frac{\lambda}{\mu}$ and v

59. Light travels in two media A and B with speeds 1.8×10^8 ms^{-1} and 2.4×10^8 ms^{-1} respectively. Then the critical angle between them is

(1) $\sin^{-1}\left(\frac{2}{3}\right)$ (2) $\tan^{-1}\left(\frac{3}{4}\right)$

(3) $\tan^{-1}\left(\frac{2}{3}\right)$ (4) $\sin^{-1}\left(\frac{3}{4}\right)$

60. A convex lens is immersed in a liquid of refractive index greater than that of glass. It will behave as a

(1) convergent lens
(2) divergent lens
(3) plane glass
(4) homogeneous liquid