REFRACTION OF LIGHT AT PLANE SURFACES

INCLUDED IN THIS SECTION

- ✓ Multiple-Choice Questions (MCQs)
- ✓ Solutions

1. **An object is placed at a distance of 0.25 m in front of a plane mirror. The distance between the object and the image will be**

a) 0.25 m
b) 1.0 m
c) 0.5 m
d) 0.125 m

2. **The angle of incidence of a ray of light having zero angle of reflection is**

a) 0
b) 30°
c) 45°
d) 90°

3. **If a man's face is 25 cm in front of a concave shaving mirror, producing erect image 1.5 times the size of face, the focal length of the mirror is**

a) 75 cm
b) 25 cm
c) 15 cm
d) 60 cm

4. **As light travels from a *rarer* to a *denser* medium, it will have**

a) increased velocity
b) decreased velocity
c) decreased wavelength
d) both (b) and (c)

5. **The angle of incidence *i* and refraction *r* are equal in a transparent slab when the value of *i* is**

a) 0°
b) 45°
c) 90°
d) depends on the material of slab

6. The refractive index of transparent medium is greater than one because

a) Speed of light in vacuum < speed of light in transparent medium
b) Speed of light in vacuum > speed of light in transparent medium
c) Speed light in vacuum = speed of light in transparent medium
d) Frequency of light wave changes when it moves from rarer to denser medium

7. The refractive index of water is 1.33. The speed of light in water will be

a) 1.33×10^8 m/s
b) 3×10^8 m/s
c) 2.26×10^8 m/s
d) 2.66×10^8 m/s

8. You are given three media A, B and C of refractive index 1.33, 1.65 and 1.46 respectively. The medium in which the light will travel fastest is

a) A
b) B
c) C
d) equal in all three media

9. Light from the Sun falling on a convex lens will converge at a point called

a) centre of curvature
b) focus
c) radius of curvature
d) optical centre

10. Large number of thin strips of black paint are made on the surface of a convex lens of focal length 20 cm to catch the image of a white horse. The image will be

a) a zebra of black stripes
b) a horse of black stripes
c) a horse of less brightness
d) a zebra of less brightness

11. A divergent lens will produce

a) always a real image
b) always a virtual image
c) both real and a virtual image
d) none of these

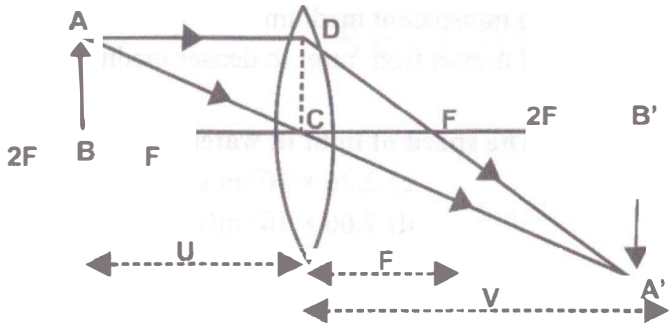
12. When object moves closer to convex lens, the image formed by it shifts

a) away from the lens
b) towards the lens
c) first towards and then away from the lens
d) first away and then towards the lens

13. When object moves closer to a concave lens, the image formed by it shifts

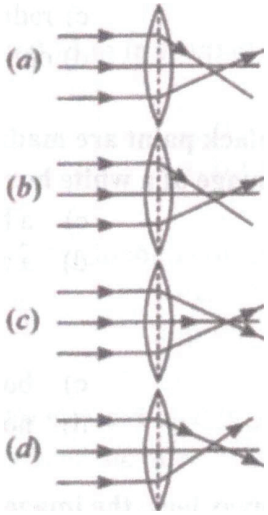
a) away from the lens on the same side of object
b) toward the lens
c) away from the lens on the other side of lens
d) first towards and then away from the lens

14. A magnified real image is formed by a convex lens when the object is at



a) F
b) between F and 2F
c) 2F
d) only (a) and (b) both

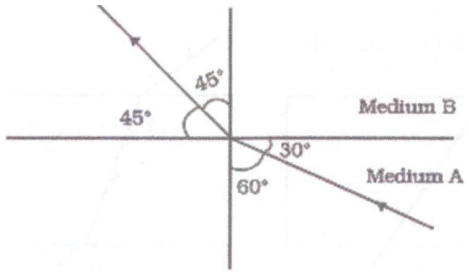
15. The distance between the optical centre and point of convergence is equal to focal length in which of the following cases?



16. A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is _____

a) 30 cm
b) 20 cm
c) 40 cm
d) 60 cm

17. Figure shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A will be

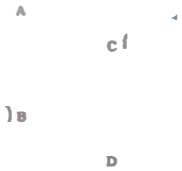


a) √3/√2
b) √2/√3
c) 1/ √2
d) √2

18. A light ray enters from medium A to medium B as shown in figure. The refractive index of medium B relative to A will be

a) greater than unity
b) less than unity
c) equal to unity
d) zero

19. Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the figure. Which of the following could be inside the box?

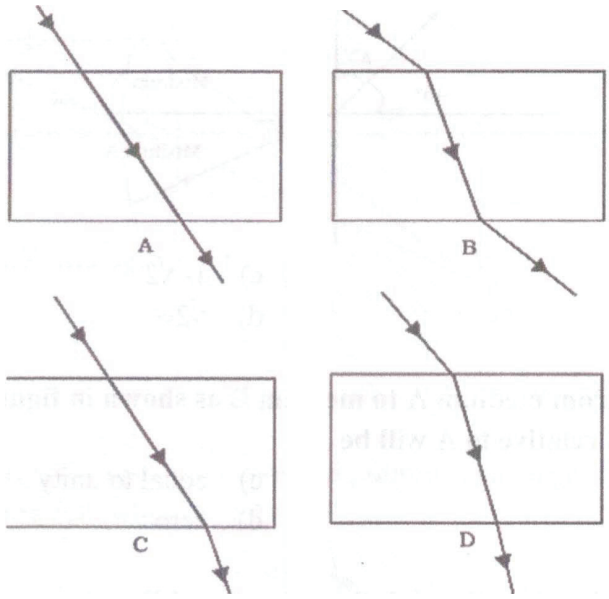


a) A rectangular glass slab
b) A convex lens
c) A concave lens
d) A prism

20. In torches, search lights and headlights of vehicles the bulb is placed

a) between the pole and the focus of the reflector
b) very near to the focus of the reflector
c) between the focus and centre of curvature of the reflector
d) at the centre of curvature of the reflector

21. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in figure. Which one of them is correct?



a) A
b) B
c) C
d) D

22. When light falls on a smooth polished surface, most of it

a) is reflected in the same direction
b) is reflected in different directions
c) is scattered
d) is refracted into the second medium

23. Image formed by reflection from a plane mirror is

a) real and inverted
b) virtual and erect
c) real and erect
d) virtual and inverted

24. If an incident ray passes through the focus, the reflected ray will

a) pass through the pole
b) be parallel to the principal axis
c) retrace its path
d) pass through the centre of curvature

25. Magnifying power of a concave lens is

a) always > 1
b) always < 1
c) always = 1
d) can have any value

26. The image formed by a convex lens can be

a) virtual and magnified
b) virtual and diminished
c) virtual and of same size
d) virtual image is not formed

27. A point object is placed at a distance of 20 cm from a convex mirror of focal length 20 cm. The image will form at:

a) at infinity
b) at focus
c) at the pole
d) behind the mirror

28. Focal length of a concave mirror is

a) Negative
b) Positive
c) depends on the position of object
d) depends on the position of image

29. If the power of a lens is – 2 D, what is its focal length?

a) +50 cm
b) -100 cm
c) -50 cm
d) +100 cm

30. If the magnification produced by a lens has a negative value, the image will be

a) virtual and inverted
b) virtual and erect
c) real and erect
d) real and inverted

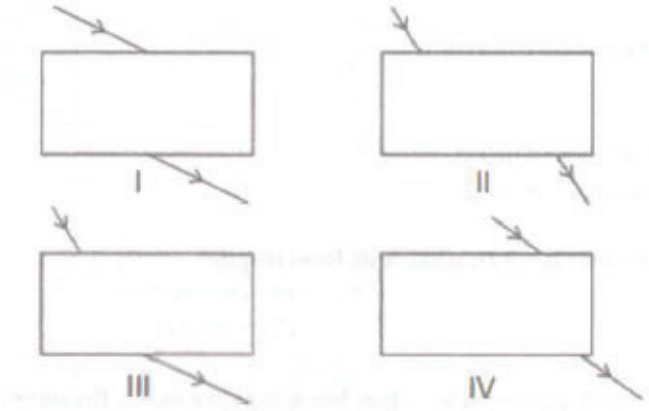
31. If the image is formed in front of the mirror, then the distance of image will be

a) positive or negative depending on the size of the object
b) zero
c) positive
d) negative

32. A ray of light is travelling from a rarer medium to a denser medium. While entering the denser medium at the point of incidence, it

a) goes straight into the second medium
b) bends towards the normal
c) bends away from the normal
d) does not enter at all

33. During an experiment, a student traces the path of a ray of light passing through a rectangular glass slab at different angles of incidence. By following the labelling indicated in which figure, he can accurately measure the angle of incidence and the angle of emergence?



a) I
b) II
c) III
d) IV

34. When a ray of light from air enters a denser medium, it:

a) bends away from the normal
b) bends towards the normal
c) goes undeviated
d) is reflected back

35. A light ray does not bend at the boundary in passing from one medium to the other medium if the angle of incidence is:

a) 0°
b) 45°
c) 60°
d) 90

36. has the highest refractive index.

a) Glass
b) Water
c) Diamond
d) Ruby

37. In refraction of light through a prism, the light ray:

a) Suffers refraction only at one face of the prism.
b) Emerges out from the prism in a direction parallel to the incident ray.
c) Bends at both the surfaces of prism towards its base.
d) Bends at both the surfaces of prism opposite to its base.,

38. Refraction occurs when light passes through an equilateral prism. The prism's deviation is independent of

a) angle of incidence
b) colour of light
c) material of prism
d) size of prism

39. A ray of light incident at an angle 48° on a prism of refracting angle 60° deviates minimally. Calculate the angle of minimum deviation.

a) 36°
b) 46°
c) 26°
d) 48°

40. A small air bubble in a glass block when seen from above appears to be raised because of

a) refraction of light
b) reflection of light
c) reflection and refraction of light
d) none of the above

41. An object in a denser medium when viewed from a rarer medium appears to be raised. The shift is maximum for:

a) red light
b) violet light
c) yellow lighten
d) green light

42. A water pond appears to be 2.7 m deep. If the refractive index of water is 4/3, the actual depth of the pond is

a) 3.6
b) 4.6
c) 2.6
d) 2.9

43. The critical angle for glass-air interface is

a) 24°
b) 48°
c) 42°
d) 45°

44. A total reflecting right angled isosceles prism can be used to deviate a ray of light by

a) 30°
b) 60°
c) 75°
d) 90°

45. A total reflecting equilateral prism can be used to deviate a ray of light by

a) 30°
b) 60°
c) 75°
d) 90°

46. A ray of light while travelling from an optically denser medium to a rarer medium will

a) bend towards the normal
b) bend away from the normal
c) travel along the normal
d) None of the above

47. A ray of light while travelling from medium A to medium B deviates away from the normal. The speed of light in medium

a) A is more than B
b) B is more than A
c) A is same as B
d) None of these

48. Four optical media A, B, C and D have refractive indices as 1.50, 1.00, 1.250 and 1.70, respectively. The light will travel fastest in medium

a) A
b) B
c) C
d) D

49. Which of these media has highest refractive index?

a) Glass
b) Air
c) Diamond
d) Water

50. In an equilateral prism, the angle of incidence is 45° and the angle of emergence is 55°. The angle of deviation of the ray of light is :

a) 45°
b) 40°
c) 35°
d) 50°

51. The angle of deviation is maximum for light of colour :

a) red
b) blue
c) violet
d) green

52. The critical angle for glass-air interface is generally taken as :

a) 40°
b) 42°
c) 45°
d) 48°

53. For total internal reflection to occur:

a) the angle of incidence should be equal to the critical angle
b) the angle of incidence should be smaller than the critical angle
c) the angle of incidence should be greater than the critical angle
d) None of the above

54. A right-angled isosceles prism can deviate a ray of light by 180°. For this reason, it is commonly used in

a) binocular
b) periscope
c) microscope
d) projector