



**CLASS X : ASSIGNMENT : CHAPTER-9 : LIGHT : SCIENCE (PHYSICS)**  
**REFLECTION OF LIGHT**

1. What is the angle of reflection when a ray of light is incident normally on a plane mirror?
2. What is the angle of reflection when the incident ray makes an angle of  $35^\circ$  with the surface of the mirror?
3. An object is placed at a distance of 5cm from a plane mirror, where will the image be formed?
4. An object is placed 2m from a plane mirror, how far is it from its image?
5. An object 5cm high is placed in front of a plane mirror, what is the height of the image formed?
6. Why is the word 'AMBULANCE' written in an inverted manner on the vehicle?
7. What is the value of the angle of incidence and reflection for normal incidence?
8. Is the image formed by a plane mirror real or virtual?
9. Which type of image is formed on a cinema screen?
10. The distance between the object and the image formed by a plane mirror is 11.6cm. How far is the object from the mirror?
11. Why does a parting on the left appear as a parting on the right when viewed in a plane mirror?
12. Identify the image as real or virtual
  - i. The image is inverted.
  - ii. The image is erect.
  - iii. Image cannot be received on a screen.
  - iv. Image is formed on the screen.
  - v. Image formed by the actual intersection of rays of light.
  - vi. Image formed by the apparent intersection of rays of light.

**MIRRORS**

13. What is the focal length of a plane mirror?
14. The radius of curvature of a spherical mirror is 50cm, what is its focal length?
15. The focal length of a spherical mirror is 50cm, what is its radius of curvature?
16. What kind of a mirror has?
  - i. Virtual focus.
  - ii. Real focus.
17. With the help of a diagram show how a concave mirror converges a parallel beam of light.
18. With the help of a diagram show how a convex mirror diverges a parallel beam of light.
19. What happens when a ray parallel to the principal axis falls on a concave mirror? Draw the ray diagram.
20. Trace the path of light directed towards the focus of a convex mirror. Mark
21. A virtual, erect, and enlarged image is formed by a mirror. Name the type of mirror and draw the ray diagram for the same.

**MIRROR FORMULA AND MAGNIFICATION**

22. An object 2cm tall is placed in front of a concave mirror of radius of curvature 20cm at a distance of 5cm. Find the position, nature, and size of the image.
23. An object 2cm high is placed 20cm in front of a convex mirror of focal length 10cm. Find the nature, position, and size of the image.
24. An object 2cm high is placed at a distance of 16cm from a concave mirror, which produces a real image 3cm high. What is the focal length of the mirror? Find the position of the image.
25. A concave mirror of focal length 10cm produces a real image on its axis 20cm away from the mirror. Find the position of the object.
26. A convex mirror used for rear view on an automobile has a radius of curvature of 3m. If a bus is located at 5m from this mirror, find the position, nature and magnification of the image.
27. An object 4cm in size is placed 25cm in front of a concave mirror of focal length 15cm. At what



distance from the mirror should a screen be placed in order to obtain a sharp image? Find the nature and size of the image

**REFRACTIVE INDEX**

28. If  $n_{21} > 1$  then which medium is optically denser and in which medium light will travel faster?
29. Name a medium that is optically denser than water but has a mass density less than water.
30. A ray of light traveling in air enters obliquely into water, it will bend. Why?
31. Name the medium with the highest and lowest optical density
32. The refractive index of kerosene is 1.44, turpentine is 1.47 and water is 1.33, in which medium the light will travel fastest? Why?
33. Calculate the velocity of light in a diamond if the refractive index of the diamond is 2.4.
34. Calculate the refractive index of the medium in which the speed of light is  $2.5 \times 10^8 \text{ ms}^{-1}$ .
35. Under what conditions a ray of light does not bend when travelling from one medium to another?

**LENS FORMULA AND MAGNIFICATION**

36. A 5 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30cm. Find the position, nature, and size of the image.
37. An object is placed at a distance of 4 cm from a concave lens of focal length 12cm. Find the position, magnification, and nature of the image.
38. A diverging lens has a focal length of 15cm. At what distance should the object be placed from the lens so that it forms an image 10cm from the lens? Also, find the magnification produced by the lens.
39. A convex lens forms a real and inverted image of a needle at a distance of 30cm from the lens. Where is the needle placed in front of the convex lens, so that this image is 3 times the size of the object?
40. A converging lens produces an inverted image magnified 3 times the size of the object placed at a distance of 15cm from it. Calculate the focal length of the lens.
41. A convex lens forms a real image of a needle at a distance of 24cm from the lens. Find the position of the needle if the image is twice the size of the object. Draw the ray diagram

**POWER OF A LENS**

42. Find the power of a concave lens of focal length 2m.
43. Find the focal length of a lens of power -2.0D. What type of lens is this?
44. Find the power of a convex lens of focal length 2m.
45. Find the focal length of a lens of power +2.5D. What type of lens is this?
46. A doctor has prescribed a corrective lens of power +1.5D. Find the focal length of the lens. Is the prescribed lens diverging or converging?
47. A doctor has prescribed a corrective lens of power -1.0D. Find the focal length of the lens. Is the prescribed lens diverging or converging?

**PRACTICAL BASED QUESTIONS**

48. For a double convex lens an image lies at the same distance as the object is from the lens and the image is real and inverted. Draw a ray diagram to show it
49. To find focal length of a convex lens in laboratory, Manoj fixed it on a stand and kept it on a mark of 15.3 cm on an optical bench. To get a clear image of a distant tree, he adjusted a screen and finally got clear image when screen was placed at 32.5 cm. Calculate focal length of the lens.
50. For determining the focal length of a concave mirror, a teacher asks her students to Identify a concave mirror from a few mirrors lying on the table.
  - a) A \_\_\_\_\_ the mirror is depressed at the center and the self-image formed is enlarged and erect.
  - b) B \_\_\_\_\_ the mirror is raised at the center and the self-image formed is smaller and erect.
  - c) C \_\_\_\_\_ the mirror is plane all over and the self-image is of the same size.

51. An experiment to trace the path of a ray of light through a glass slab is performed by four students I, II, III and IV. They reported the following measurements of angle of incidence  $i$ , angle of refraction  $r$  and angle of emergence  $e$ . which one of the students has performed the experiment correctly?

Student	Angle $i$	Angle $r$	Angle $e$
I	$60^\circ$	$35^\circ$	$59^\circ$
II	$45^\circ$	$40^\circ$	$40^\circ$
III	$35^\circ$	$30^\circ$	$40^\circ$
IV	$50^\circ$	$55^\circ$	$50^\circ$

52. For an equilateral prism, the angle of incidence is  $40^\circ$  and the corresponding angle of emergence is  $58^\circ$ . Calculate the angle of deviation suffered by light ray while passing through the prism.