

Worksheet -Class X, Chapter-10, Light

(2/2: Refraction of Light)

1. A student determine the focal length of a device 'X' by focusing the image of a distant object on a screen placed 20 cm from the device on the same side as the object. The device 'X' is
 - a) concave lens of focal length 10 cm
 - b) convex lens of focal length 20 cm
 - c) concave mirror of focal length 10 cm
 - d) concave mirror of focal length 20 cm
 2. A spherical mirror and a thin spherical lens have each a focal length -15 cm. The mirror and the lens are likely to be
 - a) the mirror is concave and the lens is convex
 - b) both concave
 - c) the mirror is convex but the lens is concave
 - d) both convex.
 3. *In this question, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:*
 - a) Both A and R are true, and R is correct explanation of the assertion.
 - b) Both A and R are true, but R is not the correct explanation of the assertion.
 - c) A is true, but R is false.
 - d) A is false, but R is true.
- Assertion (A):** If the rays are diverging after emerging from a lens, the lens must be concave.
- Reason (R):** the convex lens can also give diverging rays.
4. Why is the refractive index of atmosphere different at different altitudes?
 5. A 10 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 12 cm. The distance of the object from the lens is 18 cm. Find the nature, position and size of the image formed.
 6. What is meant by power of a lens? Write the SI unit. A student uses a lens of focal length 40 cm and another of -20 cm. Write the nature and power of each lens.
 7. (i) Draw a ray diagram to show the refraction of light through a glass slab and mark angle of refraction and the lateral shift suffered by the ray of light while passing through the slab.
(ii) If the refractive index of glass for light going from air to glass is $3/2$, find the refractive index of air for light going from glass to air.
 8. (i) On entering in a medium from air, the speed of light becomes half of its value in air. Find the refractive index of that medium with respect to air.
(ii) A glass slab made of a material of refractive index n_1 is kept in a medium of refractive index n_2 . A light ray is incident on the slab. Draw the path of the rays of light emerging from the glass slab, if
 - a) $n_1 > n_2$
 - b) $n_1 = n_2$
 - c) $n_1 < n_2$
 9. An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm.
 - (i) Use lens formula to find the distance of the image from the lens.
 - (ii) List four characteristics of the image (nature, position, size erect / inverted) formed by the lens in this case.
 - (iii) Draw a ray diagram to justify your answer of part (ii)
 10. (i) A lens produces a magnification of -0.5. Is this a converging or diverging lens? If the focal length of the lens is 6 cm, draw a ray diagram showing the image formation in this case.
(ii) A girl was playing with a thin beam of light from a laser torch by directing it from different directions on a convex lens held vertically. She was surprised to see that in a particular direction the beam of light continues to move along the same direction after passing through the lens. Draw a ray diagram to support your answer.