

Worksheet -Class X, Chapter-10, Light

(2/2: Refraction of Light)

- 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
 - concave lens of focal length 10 cm
 - convex lens of focal length 20 cm
 - concave mirror of focal length 10 cm
 - concave mirror of focal length 20 cm
- A spherical mirror and a thin spherical lens have each a focal length -15 cm. The mirror and the lens are likely to be
 - the mirror is concave and the lens is convex
 - both concave
 - the mirror is convex but the lens is concave
 - both convex.
- 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:*
 - Both A and R are true, and R is correct explanation of the assertion.*
 - Both A and R are true, but R is not the correct explanation of the assertion.*
 - A is true, but R is false.*
 - 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.
- Why is the refractive index of atmosphere different at different altitudes?
- 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.
- 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.
- 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.
 - If the refractive index of glass for light going from air to glass is $\frac{3}{2}$, find the refractive index of air for light going from glass to air.
- 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.
 - 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
 - $n_1 > n_2$
 - $n_1 = n_2$
 - $n_1 < n_2$
- An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm.
 - Use lens formula to find the distance of the image from the lens.
 - List four characteristics of the image (nature, position, size erect / inverted) formed by the lens in this case.
 - Draw a ray diagram to justify your answer of part (ii)
- 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.
 - 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.