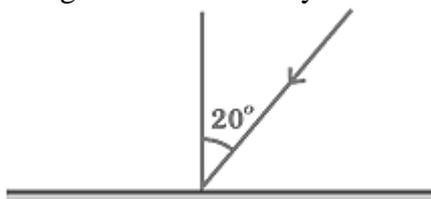


National Institute of Open Schooling
Senior Secondary
Lesson 20 – Reflection and Refraction of Light
WORKSHEET – 20

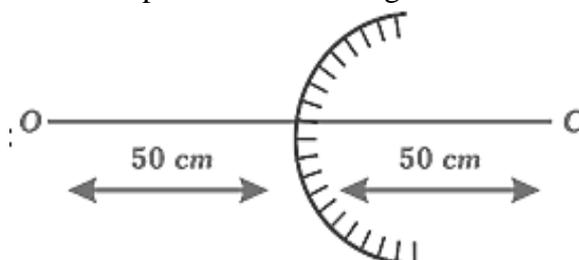
Q1. A ray is incident at an angle of 20° to a plane mirror as shown in figure. If mirror is rotated by 10° in anticlockwise direction and incident ray is rotated by 10° in clockwise direction then by what angle the reflected ray will be rotated?



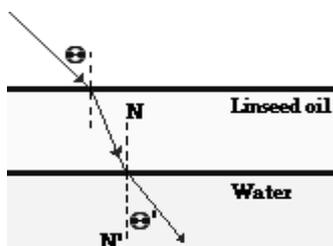
Q2. Draw the ray diagram in each case to show the position and nature of the image formed when the object is placed:

- a) at the centre of curvature of a concave mirror
- b) between the pole P and focus F of a concave mirror
- c) in front of a convex mirror
- d) at $2F$ of a convex lens
- e) in front of a concave lens

Q3. Consider a convex mirror of radius 50 cm. An object is at the distance 50 cm from the pole of the mirror. Find the position of the image formed at its axis.

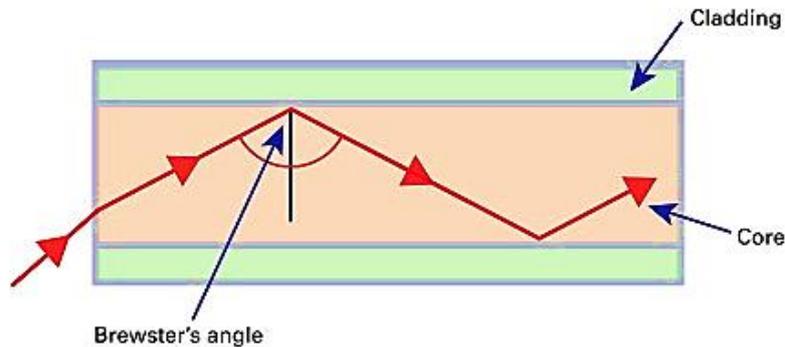


Q4. The diagram below shows a ray of light traveling through air towards a thin layer of linseed oil ($n=1.50$) resting on top of water ($n=1.33$). The light ray approaches the linseed oil at an angle of incidence of 48.2° .



- a) Determine the angle of refraction at the air-linseed oil boundary.
- b) Determine the angle of refraction at the linseed oil-water boundary.

- Q5.** There are many manifestations of refraction and total internal reflection in real life situations. Observe your surroundings and write any two.
- Q6.** A light ray is passing through water ($n=1.33$) towards the boundary with a transparent solid at an angle of 56.4° . The light refracts into the solid at an angle of refraction of 42.1° . Determine the index of refraction of the unknown solid.
- Q7.** An optical fibre made up the glass with refractive index $n_1 = 1.5$ (core) which is surrounded by another glass of refractive index n_2 (cladding). Find the refractive index n_2 of the cladding such that the critical angle between the two cladding is 80° .



- Q8.** Explain why substances with high refractive index like diamond, sparkle?
- Q9.** Lenses and mirrors are widely used in our daily life. It has been observed that lenses and mirrors do not produce a perfect image. Explain the defects in the image formation and factors responsible for the defects in the image formation.
- Q10.** A concave lens has focal length of 20 cm. At what distance from the lens; a 5 cm tall object is placed so that it forms an image at 15 cm from the lens? Also calculate the size of the image formed.