



NUMERICALS

1. A 1.2 cm long pin is placed perpendicular to the principal axis of a convex mirror of focal length 12 cm, at a distance of 8 cm from it.
  - (a) Find the location of the image.
  - (b) Find the height of the image.
  - (c) Is the image erect or inverted ?
2. An object is placed at a distance of 20 cm from a convex mirror of focal length 25 cm. Calculate the position of the image. Discuss its nature.
3. A 2 cm high objects is placed at a distance of 20 cm from a concave mirror. Real image is formed at 40 cm from the mirror. Calculate the focal length of the mirror and the size of the image.
4. Find the position, size and the nature of the image formed by a spherical mirror from the following data.  $u=-20\text{cm}$ ,  $f=-15\text{cm}$ ,  $O=1\text{cm}$
5. A 2cm high object is placed at a distance of 32cm from a concave mirror. The image is real, inverted and 3 cm in size. Find the focal length of the mirror and the position of the image.
6. A concave mirror forms an inverted image of an object placed at a distance of 12cm from it. If the image is twice as large as the object, where is it formed ?
7. A concave mirror forms an erect image of an object placed at a distance of 10cm from it. The size of the image is double that of the object. Where is the image formed ?
8. An object is placed 30 cm from a convex lens. A real image is formed 20 cm from the lens. Find the focal length of the lens.
9. A 2cm long pin is placed perpendicular to the principal axis of a convex lens of focal length 12cm. The distance of the pin from the lens is 15cm. Find the size of the image.
10. A ray of light travelling in air is incident on the plane surface of a transparent medium. The angle of incidence is 45 degree and the angle of refraction is 30 degree. Find the refractive index of the medium. ( $\sin 45= 1/\sqrt{2}$ ,  $\sin 30 = 1/2$ )

11. A point object is placed at a distance of 12cm from a convex lens on its principal axis. Its image is formed on the otherside of the lens at a distance of 18cm from the lens. Find the focal length of the lens.
12. The image of an object formed by a convex lens is of the same size as the object. If the image is formed at a distance of 40cm, find the focal length of the lens .Also, Find the power of the lens. At what distance from the lens is the object placed ?
13. An object is placed on the principal axis of a concave lens at a distance of 20cm from it. If the focal length of the lens is also 20cm , find the location of the image.
14. A beam of light travelling parallel to the principal axis of a concave lens appears to diverge from a point 20cm behind the lens after passing through the lens. Find the power of the lens.
15. A pin which is 2 cm long is placed at a distance of 16 cm from a convex lens. Assuming it to be perpendicular to the principal axis , find the position, size and the nature of the image if the focal length of the lens is 12cm.
16. A convex lens of focal length 20cm is placed in contact with a concave lens of focal length 12.5cm in such a way that they have the same principal axis. Find the power of combination.