CHAPTER- 1
LIGHT-REFLECTION AND REFRACTION

MULTIPLE CHOICE QUESTIONS

1. The focal length of the plane mirror is
   (i)Infinity
   (ii) Zero
   (iii)Negative
   (iv)None of these
2. An image formed by a plane mirror is
   (i) Real and erect
   (ii) Real and inverted
   (iii) Virtual and erect
   (iv)Virtual and inverted
3. A concave mirror gives real, inverted and same size image if the object is placed
   (i)At F
   (ii)At infinity
   (iii)At C
   (iv)Beyond C

FILL IN THE BLANKS

4. Image formed by a plane mirror is always _____ and _____.
5. A spherical mirror, whose reflecting surface is curved inwards, that is faces towards the centre of the sphere, is called a _____.
6. The focal length of a spherical mirror is equal to _____of its radius of curvature.

ONE MARK QUESTIONS

7. Differentiate between a converging and diverging lens.
8. Differentiate between a real image and a virtual image.
9. The angle between the incident ray and the reflected ray is 60^0. What is the angle of incidence?

ASSERTIONS AND REASONS

For the question numbers 10, 11 and 12, 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 the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

10. Assertion: The refractive index of a prism depends only on the kind of glass of which it is made of and the colour of light.
    Reason: The refractive index of a prism depends on the refracting angle of the prism and the angle of the minimum deviation.
11. Assertion: A red object appears dark in the yellow light.
    Reason: A red colour is scattered less.
12. Assertion: Incident ray is directed towards the centre of curvature of spherical mirror. After reflection it retraces its path.
    Reason: Angle of incidence i = Angle of reflection r = 0^o.

THREE MARK QUESTIONS

13. Draw the image formation by a concave mirror of focal length 15cm for the following positions of the object. Also, indicate the nature and relative size of the image:
    (i)The object is placed at 30cm from the mirror.
    (ii) The object is placed at 10cm from the mirror.

14. The size of the image of an object by a mirror having a focal length of 20 cm is observed to be reduced to half of its size.
    (a) At what distance has the object been placed from the mirror?
    (b) What is the nature of the image and the mirror?
    (c) The power of a lens is - 1.5D. What is the nature of this lens?
15. How does the velocity of light vary with change in the optical density of the media?
    Absolute refractive indices of medium 'A' and medium 'B' are 'na' and 'nb' respectively. What is the refractive index of medium 'B' concerning medium 'A'?
    A concave lens made up of a material of refractive index n1 is kept in a medium of refractive index n2. A parallel beam of light is incident on the lens. Trace the path of rays of light parallel to principal axis incident on the concave lens after refraction when:
    (i)n1>n2 (ii)n1=n2
16. (a) A ray of light falls normally on a face of a glass slab. What are the values of angle of incidence and angle of refraction of this ray?
    (b) Light enters from air to a medium 'X'. Its speed in medium'X'becomes1.5× 10^8m/s. The speed of light in air is 3x10^8m/s. Find the refractive index of medium 'X'.

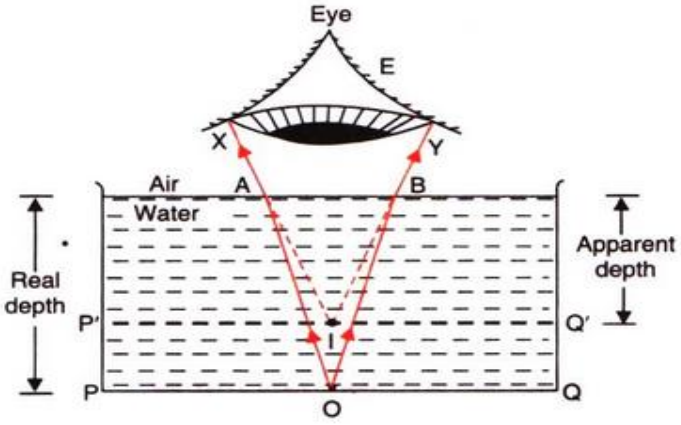
FIVE MARK QUESTIONS

17. (a) A concave mirror produces a three times enlarged image of an object placed at 10cm in front of it. Calculate the focal length of the mirror.
    (b)Show the formation of the image with the help of a ray diagram when an object is placed 6cm away from the pole of a convex mirror.
18. A student wants to project the image of a candle flame on a screen 80cm in front of a mirror by keeping the candle flame at a distance of 20cm from its pole.
    (i)Which type of mirror should the student use?
    (ii)Find the magnification of the image produced.
    (iii)Find the distance between the object and its image.
    (iv)Draw a ray diagram to show the image formation in this case and mark the distance between the object and its image.
19. Name the spherical mirror used as (a) 1. Shaving mirror 2. Rear view mirror in vehicles.
    (a)A man is holding a lighted candle in front of a thick glass mirror and on viewing it obliquely he noticed several images of the candle. Why?

20. **Case study**

Answer question numbers 20 (a) to 20 (d) based on your understanding of the following paragraph and the related studied concepts.

A stick immersed in water appears to be bent. A stick immersed in water reflects light rays. These rays when traveling in water travel in a straight line path but when they go from water to air, they deviate from their path and get deflected away from the normal. When these refracted rays are produced, they appear to meet at point "I" which is higher than the actual point that is 'O'. Therefore, a stick immersed in water appears to be bent due to refraction.



(a)Define lateral displacement.

(b) What is the cause of the refraction of light?

(c) Explain Snell's law.

(d) Which quantity remains constant in case of refraction?