

Science | Worksheet | Grade X
Light Reflection and Refraction

Short Answer Type Question [2 Marks]

1. List four properties of the image formed by a plane mirror.
2. List four properties of the image formed by a convex mirror.
3. List four properties of the image formed by a concave mirror, when object is placed between focus and pole of the mirror.
4. To instruct a ray diagram, we use two light rays which are so chosen that it is easy to know their directions after refraction from the lens. List these two rays and state the path of these rays after refraction. Use these two rays to locate the image of an object placed between 'F and '2F of a convex lens.
5. A ray of light travelling in air enters obliquely into water. Does the light ray bend towards or away from the normal ? Why? Draw a ray diagram to show the refraction of light in this situation.
6. Distinguish between a real and a virtual image of an object. What type of image is formed (i) by a plane mirror, (ii) on a cinema screen?
7. Define the focus of a concave mirror. If the radius of curvature of a convex mirror is 30 cm, what would be its focal length?
8. Define and show on a diagram, the following terms relating to a concave mirror:
 - (i) Aperture
 - (ii) Radius of curvature
9. State the two laws of reflection of light.
10. "The refractive index of carbon disulphide is 1.63." What is the meaning of this statement in relation to speed of light?

Short Answer Type Question [3 Marks]

1. State the type of mirror preferred as (i) rear view mirror in vehicles, (ii) shaving mirror. Justify your answer giving two reasons in each case.
2. The image of a candle flame placed at a distance of 45 cm from a spherical lens is formed on a screen placed at a distance of 90 cm from the lens.

3. Identify the type of lens and calculate its focal length. If the height of the flame is 2 cm, find the height of its image.
4. A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 24 cm. The distance of the object from the lens is 16 cm. Find the position, size and nature of the image formed, using the lens formula.
5. Name the type of mirror used in the following situations:
- Headlights of a car
 - Rear-view mirror of vehicles
 - Solar furnace Support your answer with reason.
6. A 6 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 15 cm. The distance of the object from the lens is 10 cm. Find the position, size and nature of the image formed, using the lens formula.
7. What is the principle of reversibility of light? Show that the incident ray of light is parallel to the emergent ray of light when light falls obliquely on a side of a rectangular glass slab.
8. With the help of a ray diagram explain why a convex mirror is preferred for rear view mirrors in motor cars.
9. Draw the ray diagram and also state the position, relative size and nature of the image formed by a concave mirror when the object is placed between its centre of curvature, C and focus, F.
10. What is understood by lateral displacement of light? Illustrate it with the help of a diagram. List any two factors on which the lateral displacement of a particular substance depends.

Long Answer Type Questions [5 Marks]

- List the sign conventions for reflection of light by spherical mirrors. Draw a diagram and apply these conventions in the determination of focal length of a spherical mirror which forms a three times magnified real image of an object placed 16 cm in front of it.
- State the law of refraction of light that defines the refractive index of a medium with respect to the other. Express it mathematically. How is refractive index of any medium 'A' with respect to a medium 'B' related to the speed of propagation of light in two media A and B? State the name of this constant when one medium is vacuum or air.
- The refractive indices of glass and water with respect to vacuum are $\frac{3}{2}$ and $\frac{4}{3}$ respectively. If the speed of light in glass is 2×10^8 m/s, find the speed of light in (i) vacuum, (ii) water.

4. To construct a ray diagram, we use two light rays which are so chosen that it is easy to know their directions after reflection from the mirror. List these two rays and state the path of these rays after reflection. Use these rays to locate the image of an object placed between centre of curvature and focus of a concave mirror. [All India]

5. List the sign conventions that are followed in case of refraction of light through spherical lenses. Draw a diagram and apply these conventions in determining the nature and focal length of a spherical lens which forms three times magnified real image of an object placed 16 cm from the lens.

6. Direction (Q1 to Q4): The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer.

(a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.

(b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.

(c) Assertion is true but the Reason is false.

(d) The statement of the Assertion is false but the Reason is true.

1. Assertion: Incident light is reflected in only one direction from a smooth surface.

Reason: Since the angle of incidence and the angle of reflection are same, a beam of parallel rays of light falling on a smooth surface is reflected as a beam of parallel light rays in one direction only.

2. Assertion: Cannot see the distant object clearly.

Reason: The far point of an eye suffering j, from myopia is less than infinity.

3. Assertion: Pupil is black in colour.

Reason: Pupil is black in colour as no light is reflected in it.

4. Assertion: The rainbow is a man made spectrum of sunlight in the sky.

Reason: The rainbow is formed in the sky when the sun is shining and it is raining at the same time direction only.