



## Class - VII January Month Class Work Notes

### 15. Light, Mirror and Lenses

#### Technical Words:

1. Reflection - the phenomenon of light bouncing off a surface.
2. Virtual image - image that cannot be obtained on a screen.
3. concave mirror - a mirror that has a curved reflecting surface that bulges inwards.
4. lens - a transparent object that has one or two curved surfaces.
5. Convex lens - a lens that is thicker at the centre and thinner at the edges.
6. Concave lens - a lens that is thinner at the centre and thicker at the edges.

#### A. Answer the question.

##### Short answer question

1. Define regular and irregular reflections. Give examples.

*[Answer] Regular reflection: When parallel rays of light fall on a smooth and even surface, the reflected rays are also parallel to each other. It takes place on a plane mirror and in still water.*

*Irregular reflection: When parallel light rays fall on an uneven surface such as a rough floor, they get scattered in all directions. It takes place on walls and ground.*

2. How are convex mirrors used in vehicles? Explain.

*[Answer] Convex mirrors are used as rear-view mirrors in vehicles. They provide a wider field of view for drivers. The bulging surface of the convex mirror diverges light, and allows the drivers to see a larger area behind, without turning their head.*

3. Write down two uses of concave mirrors.

*[Answer] (i) Concave mirrors are used by dentists to get a magnified view of the patient's teeth. (ii) They are often used as shaving mirrors to provide a magnified view of the face.*

4. What is the nature of the images formed by a concave lens?

*[Answer] The images formed by a concave lens are always virtual, upright and diminished, and formed on the same side of the lens as the object.*

5. How is a rainbow formed?

*[Answer] A rainbow forms in the sky when sunlight passes through water droplets. It usually appears right after rain or when there is mist. Sunlight is made up of seven different colours—violet, indigo, blue, green, yellow, orange and red. When sunlight passes through a water droplet in the sky, it is split into its constituent colours.*

### **Long answer question**

1. Describe an experiment to show that light travels in straight lines.

*[Answer] **Aim:** To show that light travels in straight line*

***Materials required:** lighted candle, hollow rubber or plastic tube*

***Method:***

*(i) Place a lighted candle on a table.*

*(ii) Take a short tube of hollow rubber or plastic.*

*(iii) Keep the tube absolutely straight and pointed at the candle flame. Peep through the tube and try to see the flame.*

*(iv) Now bend the tube a little and try to observe the flame now.*

***Observation:***

*(i) When the tube is straight, the candle flame is visible.*

*(ii) When the tube is bent, the candle flame cannot be seen.*

***Conclusion:** We can say that light travels in a straight line.*

2. For a convex mirror, define the following terms with the help of a diagram.
- focus
  - principal axis
  - radius of curvature
  - pole

*[Answer] Convex Mirror (Diagram: Refer to the textbook.)*

*a. Focus: Rays of light parallel to the principal axis that fall on a convex mirror are reflected in such a way that they appear to meet at a point behind the mirror. This point is called the focus of the mirror*

*b. Principal axis: The imaginary line passing through the pole and centre of curvature of a convex mirror is its principal axis.*

*c. Radius of curvature: The distance between the pole and the centre of curvature of the convex mirror is called its radius of curvature.*

*d. Pole: The geometric centre of the convex mirror is called its pole.*

3. For a concave lens, define the following terms with the help of a diagram.
- focus
  - principal axis
  - optical centre

*[Answer] Concave Lens (Diagram: Refer to the textbook.)*

*a. Focus: The light rays parallel to the principal axis that originate from the object appear to diverge from a point as they pass through the lens. This point is called the principal focus of a concave lens.*

*b. Principal axis: The line passing through the optical centre of the lens and perpendicular to its surface is the principal axis of the lens.*

*c. Optical centre: The geometric centre of the concave lens is called its optical centre.*

4. State the nature and position of the images formed by a convex lens when the object is located:
- between  $O$  and  $F$ .
  - between  $F$  and  $2F$ .
  - at  $2F$ .
  - beyond  $2F$ .

*[Answer] For convex lens, a. between  $O$  and  $F$ : Image is virtual, upright and enlarged. It is formed on the same side of the lens as the object.*

*b. between  $F$  and  $2F$ : Image is real, inverted and enlarged. It is formed beyond  $2F$  on the other side of the lens.*

*c. at  $2F$ : Image is real, inverted and of the same size as the object. It is formed at  $2F$ , on the other side of the lens.*

*d. beyond  $2F$ : Image is real, inverted and diminished. It is formed between  $F$  and  $2F$  on the other side of the lens.*

**B. Picture-based question.**

1. Draw mirror images of the following words.

EYE

YELLOW

MADAM

PRISM

Which word(s) remain(s) the same after reflection?

*[Answer] a. EYE b. YELLOW c. MADAM d. M2IRP*