

Summary of the Lesson: Light

Introduction

Light is a form of energy that allows us to see objects. When light strikes a surface, it can be reflected, absorbed, or transmitted. Reflection is the process by which light bounces back from a surface.

Key Concepts Covered in the Lesson

1. Reflection of Light

- Reflection occurs when light bounces off a smooth or polished surface.
- A **mirror** is a perfect reflector as it does not absorb or allow light to pass through.
- The image seen in a mirror is a result of **regular reflection**.

2. Terms Related to Reflection

- **Incident Ray**: The light ray that falls on a surface.
- **Point of Incidence**: The point where the incident ray strikes the surface.
- **Normal**: A perpendicular line drawn at the point of incidence.
- **Reflected Ray**: The light ray that bounces back after striking the surface.
- **Angle of Incidence (i)**: The angle between the incident ray and the normal.
- **Angle of Reflection (r)**: The angle between the reflected ray and the normal.

3. Laws of Reflection

1. **First Law**: The incident ray, the reflected ray, and the normal all lie in the same plane.
2. **Second Law**: The angle of incidence is always equal to the angle of reflection ($i = r$).

4. Types of Reflection

- **Regular Reflection**: Occurs on a smooth surface like a mirror, where reflected rays remain parallel, producing a clear image.
- **Irregular (Diffused) Reflection**: Occurs on rough surfaces like walls or stones, where reflected rays scatter in different directions, producing no clear image.

5. Image Formation by a Plane Mirror

- The image formed is:
 - **Virtual** (not real, cannot be captured on a screen).
 - **Upright** (erect).
 - **Same size** as the object.
 - **Laterally inverted** (left and right are reversed).
 - **At the same distance** behind the mirror as the object in front.

6. Real and Virtual Images

- **Real Image:** Formed when light rays actually meet; it is inverted and can be captured on a screen.
- **Virtual Image:** Formed when light rays only appear to meet; it is upright and cannot be captured on a screen.

7. Applications of Mirrors

- **Plane mirrors** are used in:
 - Dressing tables and periscopes.
 - Showcases and decorations.
 - Vehicles (rear-view mirrors).
 - Solar cookers for directing sunlight.

8. Speed of Light

- Light travels at different speeds in different media:
 - **Air/Vacuum:** (3.0×10^8) m/s
 - **Water:** (2.25×10^8) m/s
 - **Glass:** (2.0×10^8) m/s

9. Colours of Light

- **Primary Colours:** Red, Green, and Blue (RGB).
- **Secondary Colours:** Formed by mixing two primary colours:
 - Red + Blue = Magenta
 - Blue + Green = Cyan
 - Red + Green = Yellow
- **Complementary Colours:** Two colours that combine to form white light.
 - Example: Red + Cyan = White.

10. Appearance of Colours

- Objects appear coloured based on which wavelengths of light they reflect or absorb.
- Example:
 - A **red** object absorbs all colours except red, which it reflects.
 - A **white** object reflects all colours.
 - A **black** object absorbs all colours and reflects none.

11. Lateral Inversion

- When we look into a mirror, the left and right sides appear reversed.
- This is why the word "**AMBULANCE**" is written in reverse on emergency vehicles, so it appears correctly in the rear-view mirror of other vehicles.

12. Multiple Reflections

- **Periscopes and Kaleidoscopes** use multiple reflections to form images.

Conclusion

- Light follows the laws of reflection.
- Mirrors form virtual, upright, and laterally inverted images.
- The colour of an object depends on the light it reflects.
- Understanding reflection and colours helps in various real-world applications, including optical instruments and daily life objects.

This summary condenses the lesson while keeping all the essential details. Let me know if you need any modifications! 🚀