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## PHYSICS

# LIGHT

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1. Light is in the form of an **electromagnetic wave**
2. The visible light has wavelengths stretches between **400–700 nanometres.**
3. The primary source of light is **sun.**
4. **Optics** is a branch of physics that deals with the properties and behaviour of light, along with its interactions with the matter.
5. Light exhibits various properties which are **Reflection, Refraction, Total internal reflection, Dispersion.**
6. Light speed is  **$3 \times 10^8$  m/s** which is the form of energy.
7. Light is a **transverse wave.**

8. When light falls on the surface of an object it can either be- **Absorbed, Transmitted, Reflected**

9. If an object absorbs all the light **falling on it, then it will appear perfectly black for example a blackboard.**

10. An object is said to transmit light if it allows light to pass through itself and such objects are **transparent.**

11. If an object sends back light rays falling on its surface then it is said to **have reflected the light.**

12. When a ray of light falls on a boundary separating two media comes back into the same media, then this phenomenon is called the **reflection of light.**

13. The angle of incidence is **equal** to the angle of reflection.

14. The incident ray, the reflected ray and the normal to the mirror at the point of incidence all lie in **the same plane.**

15. To see his full image in a plane mirror, a person required a mirror of at **least half of his height**

16. **Laws of reflection** are applicable to **all types** of reflecting surfaces including spherical surfaces.

17. The reflecting surface of a spherical mirror may be **curved inwards or outwards.**

18. A spherical mirror, whose reflecting surface is curved inwards, that is, faces towards the centre of the sphere, is called a **concave mirror.**

19. A spherical mirror whose reflecting surface is curved outwards, is called a **convex mirror.**

20. The reflecting surface of a spherical mirror forms a part of a sphere which has a centre- That point is called the **centre of curvature** of the spherical mirror.

21. The centre of curvature **is not a part of the mirror**. It lies **outside its reflecting surface**.

22. The centre of curvature of a **concave mirror lies in front of it**.

23. The centre of curvature of a **convex mirror lies behind the mirror**.

24. The phenomenon of deviation of light rays from its path when it travels from one transparent medium to another medium is called **refraction of light**.

25. The cause of refraction is due to the **different speed of light in the different medium**.

26. When a ray of light enters from one medium to another medium, its **frequency and phase do not change, but wavelength and velocity change**.

27. Due to **refraction** from Earth's atmosphere, the stars appear to twinkle.

28. The incident ray, the refracted ray and the normal at the point of incidence all three lie in the **same plane in** refraction of light .

29. The ratio of sine angle of incidence to the sine angle of refraction remains constant for a pair of media .  $\frac{\sin i}{\sin r} = \text{constant} = \frac{\mu_2}{\mu_1}$ , this law is known as **Snell's law or law of refraction of light** .

30. When light travels through a denser medium towards a rarer medium it deviates away from the normal, therefore a pond appears shallower.

31. A coin appears at **lesser depth** in water.

32. The angle of incidence in a denser medium for which the angle of refraction in rarer medium becomes  $90^\circ$ , is called the **critical angle**.

33. When a light ray travelling from a denser medium to the rarer medium,

in this incident at the interface at an angle of incidence greater than critical angle, then light rays reflected into the denser medium, this phenomenon is known as **total internal reflection**

34. Sparkling of diamond, mirage and looming, shinning of the air bubble in water and optical Fibre are examples of total internal reflection.

35. The image formed by a concave mirror is generally **real and inverted**

36. The image formed by a convex mirror is **always virtual, erect and diminished.**

37. **The radius of Curvature (R):**

The radius hollow sphere of which the mirror is a part.

38. **Pole (P):** The mid-point of a spherical mirror is called pole.

39. **Focus (F):** when a parallel beam of light rays is incident on a spherical mirror then after reflection it meets

or appears to meet at a point on the principal axis, called focus of the spherical mirror.

40. **Focal length (f):** Focal length  $d = R/2$

41. Prism is a uniform transparent refracting medium bounded by plane surfaces inclined at some angles forming a triangular shape.

42. When a light is incident on a glass prism, it disperses into its seven colour components in the following sequence **VIBGYOR**, and this is known as the **dispersion of white light**.

43. The refractive index of glass is **maximum for violet colour**

44. The refractive index of glass is **minimum for the red colour**

45. Rainbow is caused by **dispersion of sunlight** by tiny water droplets, present in the atmosphere.

46. The **water droplets** act like small **prisms** in rainbow formation.



47. The twinkling of a star is due to **atmospheric refraction of starlight.**

48. The apparent position of the star is slightly **different from its actual position.**

49. The Sun is visible to us about 2 minutes before the actual sunrise, and about 2 minutes after the actual sunset because of atmospheric refraction.

50. Hotter air is **less dense** and has **smaller refractive index** than the cooler air.

51. The earth's atmosphere is a heterogeneous mixture of minute particles like smoke, tiny water droplets, suspended particles of dust and molecules of air.

52. When a beam of light strikes such fine particles, the path of the beam becomes visible which is known as **Tyndall Effect**

53. The colour of the scattered light depends on the **size** of the scattering particles.

54. The order of colours in light, arranged from shortest wavelength to longest, is called the **visible spectrum of light**.

55. Ultraviolet light and x-rays have wavelengths **shorter than violet light**

56. infrared (heat) and radio waves have wavelengths longer than red light.

57. The full range of wavelengths for light is called the "electromagnetic spectrum.

58. Wavelength of White Light: The white light extends from the **400 nm to 750 nm**.

59. Since, the speed of **light**, remains constant, as frequency goes up, wavelength must go down.

60. **violet** has the **highest frequency** and the **shortest**

**wavelength** of the visible colours of light.

61. **red** has the **lowest frequency** and the **longest wavelength** of the visible colours of light.