

1)The SI unit of temperature is

- A. °C
- B. °F
- C. Kelvin (K)
- D. Rankine

Answer: C

2)The boiling point of water at normal atmospheric pressure (1 atm) is

- A. 90 °C
- B. 100 °C
- C. 212 °C
- D. 0 °C

Answer: B

3)The basic principle on which an optical fiber works is

- A. Diffraction
- B. Refraction
- C. Total internal reflection
- D. Scattering

Answer: C

4)What is the material commonly used for the core of optical fibers?

- A. Plastic
- B. Glass
- C. Copper
- D. Aluminium

Answer: B

5)The numerical aperture (NA) of a fiber is given by

- A. $\sqrt{n_1^2 - n_2^2}$
- B. $n_1 - n_2$
- C. $n_1 + n_2$
- D. $\frac{n_1}{n_2}$

Answer: A

6)The law of reflection states that

- A. Angle of incidence > Angle of reflection
- B. Angle of incidence = Angle of reflection
- C. Angle of incidence < Angle of reflection
- D. None of the above

Answer: B

7)The incident ray, reflected ray, and normal all lie in

- A. Different planes

- B. Same plane
- C. Parallel planes
- D. Perpendicular planes

Answer: B

8) Snell's law relates

- A. Angle of incidence and angle of reflection
- B. Angle of incidence and angle of refraction
- C. Refractive index and wavelength
- D. Reflection and diffraction

Answer: B

9) Snell's law is mathematically written as

- A. $n_1 \sin i = n_2 \sin r$
- B. $n_1 \sin r = n_2 \sin i$
- C. $n_1 + n_2 = \sin i$
- D. $\sin i = \sin r$

Answer: A

10) The refractive index of a medium is defined as

- A. Ratio of velocity of light in vacuum to velocity in medium
- B. Ratio of velocity in medium to velocity in vacuum
- C. Product of wavelength and frequency
- D. None of the above

Answer: A

11) If light goes from denser to rarer medium, it bends

- A. Towards the normal
- B. Away from the normal
- C. At the same angle
- D. At 90°

Answer: B

12) If light goes from rarer to denser medium, it bends

- A. Towards the normal
- B. Away from the normal
- C. Does not bend
- D. Refracts only if angle $>$ critical angle

Answer: A

13) The refractive index of water is approximately

- A. 1.00
- B. 1.33
- C. 1.50

D. 2.00

Answer: B

14) When angle of incidence increases beyond critical angle, refraction is replaced by

- A. Scattering
- B. Diffraction
- C. Total internal reflection
- D. Dispersion

Answer: C

15) The condition for total internal reflection is

- A. Light travels from rarer to denser medium
- B. Light travels from denser to rarer medium
- C. Light travels between two gases
- D. None of the above

Answer: B

16) The critical angle is defined as the angle of incidence for which angle of refraction is

- A. 30°
- B. 60°
- C. 90°
- D. 0°

Answer: C

17) Optical fibers work on the principle of

- A. Refraction
- B. Diffraction
- C. Total internal reflection
- D. Interference

Answer: C

18) A ray incident normally ($i = 0^\circ$) on a glass slab emerges

- A. Without deviation
- B. With maximum deviation
- C. Along boundary
- D. Only partially transmitted

Answer: A

19) A light ray travels from glass ($n=1.5$) to air ($n=1.0$). Critical angle is

- A. 30°
- B. 42°
- C. 60°
- D. 90°

Answer: B

20) Which of the following is NOT an application of TIR?

- A. Prisms in binoculars
- B. Optical fiber communication
- C. Mirage
- D. Photoelectric effect

Answer: D

21) Boyle's law states that at constant temperature:

- A. Pressure $\times$ Volume = constant
- B. Pressure $\div$ Volume = constant
- C. Pressure + Volume = constant
- D. Pressure – Volume = constant

Answer: A

22) In Boyle's law, the graph of P vs V is a

- A. Straight line
- B. Parabola
- C. Hyperbola
- D. Circle

Answer: C

23) Charles' law states that at constant pressure, volume of a given mass of gas is proportional to

- A. Pressure
- B. Absolute temperature
- C. Density
- D. Heat supplied

Answer: B

24) In Charles' law, the graph of V vs T (in Kelvin) is

- A. Straight line through origin
- B. Hyperbola
- C. Parabola
- D. Ellipse

Answer: A

25) The temperature at which a gas has zero volume (extrapolated) is

- A. 0 °C
- B. 0 K
- C. –100 °C
- D. –273 °C

Answer: D

26) The SI unit of absolute temperature is

- A. Celsius

- B. Fahrenheit
- C. Kelvin
- D. Rankine

Answer: C

27) Gay-Lussac's law states that at constant volume, pressure of a gas is proportional to

- A. Volume
- B. Temperature (Kelvin)
- C. Mass
- D. Density

Answer: B

28) The ideal gas equation is

- A. $PV = nRT$
- B. $PV = RT$
- C. $P/T = \text{constant}$
- D. $V/T = \text{constant}$

Answer: A

29) The amount of heat required to raise the temperature of 1 kg of a substance by 1 K is called

- A. Latent heat
- B. Specific heat
- C. Thermal conductivity
- D. Calorific value

Answer: B

30) Heat transfer without actual movement of molecules occurs mainly by

- A. Conduction
- B. Convection
- C. Radiation
- D. Both A and C

Answer: A

31) The SI unit of heat energy is

- A. Calorie
- B. Joule
- C. Watt
- D. Electron volt

Answer: B