CLASS XII – PHYSICS

ANSWER KEY

(SET- 3)

SECTION A

MCQ Answers

1. (b) Rest frame
2. (b) $\frac{1}{2} CV^2$
3. (d) 90°
4. (b) 0.02 s
5. (b) 3×10^8 m/s
6. (b) Decreases
7. (c) Volt
8. (b) KE is zero
9. (d) All of these
10. (b) Magnetic
11. (b) $1/\sqrt{2}$
12. (b) n^2

Assertion–Reason Answers

13. Both A and R are true and R is correct explanation of A.
14. Both A and R are true and R is correct explanation of A.
15. Both A and R are true and R is correct explanation of A.
16. Both A and R are true and R is correct explanation of A.

SECTION B

Q17. Electric Field Intensity

Definition:

Electric field intensity at a point is the force experienced by a unit positive charge placed at that point.

$$E = \frac{F}{q}$$

SI Unit: N/C

Q18. Lorentz Force

When a charged particle moves in electric and magnetic field, it experiences Lorentz force.

$$\vec{F} = q(\vec{E} + \vec{v} \times \vec{B})$$

Q19. Self-Inductance

Self-inductance is the property of coil by which it opposes change in current flowing through it.
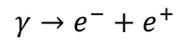
$$L = \frac{N\Phi}{I}$$

SI unit: Henry (H)

Q20. Snell's Law

$$n_1 \sin i = n_2 \sin r$$

It relates angle of incidence and refraction.

Q21. Pair Production

Pair production is the phenomenon in which a photon converts into electron and positron in presence of nucleus.

$$\gamma \rightarrow e^- + e^+$$

Minimum energy required = 1.02 MeV

SECTION C

Q22. Electric Potential Due to Point Charge

Work done in bringing unit charge from infinity to distance r:

$$V = \frac{1}{4\pi\varepsilon_0}\frac{q}{r}$$

Q23. Wheatstone Bridge

Principle:

When bridge is balanced:

$$\frac{P}{Q} = \frac{R}{S}$$

No current flows through galvanometer.

Q24. Magnetic Field at Centre of Circular Loop

$$B = \frac{\mu_0 I}{2R}$$

For N turns:

$$B = \frac{\mu_0 NI}{2R}$$

Q25. Simple Microscope

Magnifying power:

$$M = 1 + \frac{D}{f}$$

Where
D = least distance of distinct vision

Q26. Impedance in Series LCR Circuit

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

Where

$$X_L = \omega L$$
$$X_C = \frac{1}{\omega C}$$

Q27. Kinetic Energy of Photoelectrons

Einstein's equation:

$$h\nu = KE_{max} + \Phi$$
$$KE_{max} = h\nu - \Phi$$

Q28. Mass Defect and Binding Energy

Mass defect:

$$\Delta m = (Zm_p + Nm_n - m_{nucleus})$$

Binding energy:

$$E = \Delta mc^2$$

SECTION D

Q29. LCR Circuit

(a) Resonance:
When $X_L = X_C$

(b) Resonant frequency:

$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$

(c) Power factor at resonance = 1

(d) Impedance minimum (Z = R)

Q30. Dual Nature of Radiation

(a) de-Broglie Hypothesis:
Matter has wave nature.

(b) Wavelength:

$$\lambda = \frac{h}{p}$$

(c) Work function:
Minimum energy required to remove electron.

(d) Stopping potential:
Minimum potential required to stop fastest electrons.