CLASS XII – PHYSICS

ANSWER KEY

(SET- 6)

SECTION A

MCQ Answers

1. (c) Zero

2. (d) All of these

3. (c) Zero

4. (b) Weber

5. (b) 0°

6. (c) 10^{-10} m

7. (b) 2pE

8. (b) Frequency increases

9. (c) More than primary

10. (a) $[MT^{-2}A^{-1}]$

11. (c) Uranium

12. (a) Nature of medium

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. Assertion is true but Reason is false.

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

SECTION B

Q17. Electric Flux

Definition:

Electric flux is the total number of electric field lines passing through a surface.

Expression:

$$\Phi_E = \vec{E} \cdot \vec{A} = EA\cos\theta$$

SI Unit: N m²/C

Q18. Wheatstone Bridge

Wheatstone bridge is an arrangement used to measure unknown resistance.

Balance Condition:

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

At balance point, no current flows through galvanometer.

Q19. Self-Induction

Self-induction is the phenomenon in which change in current in a coil induces emf in the same coil.

$$E = -L\frac{dI}{dt}$$

Q20. Laws of Photoelectric Emission

1. Emission occurs only when frequency ≥ threshold frequency.

2. KE depends on frequency.

3. Current depends on intensity.

4. Emission is instantaneous.

Q21. Nuclear Binding Energy

Binding energy is the energy required to separate a nucleus into its nucleons.

$$E = \Delta mc^2$$

SECTION C

Q22. Electric Field Due to Uniformly Charged Solid Sphere

Using Gauss's law:

(i) Inside sphere (r < R):

$$E = \frac{1}{4\pi\varepsilon_0}\frac{Qr}{R^3}$$

(ii) Outside sphere (r > R):

$$E = \frac{1}{4\pi\varepsilon_0}\frac{Q}{r^2}$$

Q23. Resistance of Conductor

$$R = \rho\frac{L}{A}$$

Where
ρ = resistivity
L = length
A = area

Q24. Magnetic Field Due to Infinite Straight Wire

Using Ampere's Law:

$$\oint \vec{B}\cdot d\vec{l} = \mu_0 I$$
$$B(2\pi r) = \mu_0 I$$

$$B = \frac{\mu_0 I}{2\pi r}$$

Q25. Interference in Thin Films

Interference occurs due to superposition of reflected rays.

Condition for Bright Fringe:

$$2t = n\lambda$$

Where
t = thickness

Q26. Average Power in LCR Circuit

$$P = VI\cos\phi$$

Where

$$\cos\phi = \frac{R}{Z}$$

Q27. Bohr's Energy Levels

Energy of nth orbit:

$$E_n = -\frac{13.6}{n^2} \text{ eV}$$

Derived using Coulomb force and quantization condition:

$$mvr = \frac{nh}{2\pi}$$

Q28. Radioactive Decay and Half-Life

$$N = N_0 e^{-\lambda}$$

Half-life:

$$T_{1/2} = \frac{0.693}{\lambda}$$

SECTION D

Q29. Transformer

(a) Step-down transformer

(b)

$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

(c) Soft iron core reduces hysteresis loss.

(d) Efficiency:

$$\eta = \frac{Output}{Input} \times 100$$

Q30. Photoelectric Effect

(a) Threshold frequency: Minimum frequency required to emit electrons.

(b) Increasing intensity increases current.

(c)

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

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

SECTION E

Q31. Electric Field Due to Dipole (Equatorial Line)

$$E = \frac{1}{4\pi\varepsilon_0}\frac{p}{r^3}$$

Direction opposite to dipole moment.

Q32. AC Generator

Principle:

Electromagnetic induction

Induced emf:

$$E = NBA\omega\sin\,\omega t$$

Q33. Relation Between Decay Constant and Mean Life

Mean life:

$$\tau = \frac{1}{\lambda}$$