CLASS XII – PHYSICS

ANSWER KEY

(SET- 2)

SECTION A

MCQ Answers

1. (b) kq/r
2. (c) Dielectric constant increases
3. (c) Tesla
4. (b) Energy
5. (c) $I_0/\sqrt{2}$
6. (b) Frequency
7. (c) Velocity decreases
8. (c) Electroscope
9. (c) Sun
10. (d) All of these
11. (b) Uniform
12. (c) Zero

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 but R is not correct explanation of A.

SECTION B

Q17. Electric Dipole Moment

Definition:

Electric dipole moment is defined as the product of magnitude of one charge and distance between two charges.

$$\vec{p} = q\vec{d}$$

SI Unit: Coulomb-meter (C·m)

Q18. Kirchhoff's Laws

(i) Kirchhoff's Current Law (KCL):

The algebraic sum of currents at a junction is zero.

$$\sum I = 0$$

(ii) Kirchhoff's Voltage Law (KVL):

The algebraic sum of potential differences in a closed loop is zero.

$$\sum V = 0$$

Q19. Magnetic Flux

Definition:

Magnetic flux is the total number of magnetic field lines passing through a surface.

$$\Phi_B = \vec{B} \cdot \vec{A} = BA\cos\ \theta$$

SI Unit: Weber (Wb)

Q20. Total Internal Reflection

Definition:

When light travels from denser to rarer medium and angle of incidence exceeds critical angle, the ray reflects back into denser medium.

Condition:

$$i > C$$

Where C = critical angle

Q21. Binding Energy Per Nucleon

Binding energy per nucleon is the binding energy divided by total number of nucleons.

$$\text{Binding Energy per nucleon} = \frac{\text{Total Binding Energy}}{A}$$

SECTION C

Q22. Capacitance of Parallel Plate Capacitor

Let
A = Area
d = Separation

$$C = \frac{\varepsilon_0 A}{d}$$

If dielectric constant K is present:

$$C = \frac{K\varepsilon_0 A}{d}$$

Q23. Moving Coil Galvanometer

Principle:

It works on the principle that a current carrying coil placed in magnetic field experiences torque.

Torque:

$$\tau = nBIA$$

Deflection:

$$\theta \propto I$$

Q24. Relation Between Current and Drift Velocity

Let

n = number density
A = area
vd = drift velocity

$$I = nqAv_d$$
$$v_d = \frac{I}{nqA}$$

Q25. Huygens' Principle

Each point on wavefront acts as a source of secondary wavelets.

New wavefront is tangent to these wavelets.

Q26. Ampere's Circuital Law

Statement:

The line integral of magnetic field around closed loop equals μ_0 times current enclosed.

$$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$$

Q27. Time Period of LC Oscillation

$$T = 2\pi\sqrt{LC}$$

Frequency:

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

Q28. Radioactive Decay Law

$$\frac{dN}{dt} = -\lambda N$$

On integration:

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

SECTION D

Q29. AC Circuit

(a) RMS Value:

$$I_{rms} = \frac{I_0}{\sqrt{2}}$$

(b) Impedance:

$$Z = \sqrt{R^2 + X_L^2}$$

(c) Phase difference:
Current lags voltage by angle ϕ.

(d) Resonance condition:

$$X_L = X_C$$

Q30. Nuclear Reactor

(a) Chain Reaction:
Self-sustaining fission process.

(b) Control Rods:
Absorb excess neutrons.

(c) Critical Mass:
Minimum mass required to sustain chain reaction.

(d) Shielding:
Prevents harmful radiation from escaping.

SECTION E

Q31. Electric Field Due to Infinite Plane Sheet

Using Gauss's law:

$$E = \frac{\sigma}{2\varepsilon_0}$$

Q32. Transformer

Principle:

Works on electromagnetic induction.

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

Used to step up or step down voltage.

Q33. Einstein's Photoelectric Equation

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

Where
Φ = Work function

Significance:

- Supports particle nature of light
- Explains threshold frequency
- KE depends on frequency