

CLASS XII – PHYSICS

ANSWER KEY

(SET- 4)

SECTION A

MCQ Answers

1. (b) Distance is halved
 2. (c) Radius
 3. (a) $1/r$
 4. (b) Rate of change of flux
 5. (b) Leads voltage by 90°
 6. (b) Violet light
 7. (c) $1/n^2$
 8. (b) Rectifier
 9. (a) $[M^{-1}L^{-3}T^4A^2]$
 10. (c) Energy
 11. (a) $2\pi\sqrt{LC}$
 12. (b) $1/r$
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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.
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SECTION B

Q17. Electric Potential Difference

Definition:

Electric potential difference between two points is the work done in moving a unit positive charge from one point to another.

$$V = \frac{W}{q}$$

SI Unit: Volt (V)

Q18. Biot–Savart Law

Statement:

The magnetic field at a point due to a current element is directly proportional to current and inversely proportional to square of distance.

$$dB = \frac{\mu_0}{4\pi} \frac{Idl \sin \theta}{r^2}$$

Q19. Power Factor

Power factor is the cosine of phase angle between voltage and current.

$$\text{Power Factor} = \cos \phi$$

Q20. Magnifying Power of Compound Microscope

Magnifying power:

$$M = \frac{L}{f_o} \left(1 + \frac{D}{f_e} \right)$$

Where

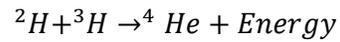
L = tube length

D = least distance of distinct vision

Q21. Nuclear Fusion

Nuclear fusion is the process in which two light nuclei combine to form heavier nucleus with release of energy.

Example:



SECTION C

Q22. Electric Field Due to Dipole (Axial Line)

$$E = \frac{1}{4\pi\epsilon_0} \frac{2p}{r^3}$$

Where

p = dipole moment

Direction is along axial line.

Q23. Charging and Discharging of Capacitor

Charging equation:

$$q = Q(1 - e^{-t/RC})$$

Current:

$$I = \frac{V}{R} e^{-t/RC}$$

Discharging:

$$q = Qe^{-t/RC}$$

Q24. Force Between Two Parallel Conductors

$$F = \frac{\mu_0 I_1 I_2 L}{2\pi d}$$

If currents in same direction → Attractive force

Q25. Interference

Interference is redistribution of intensity due to superposition of waves.

Condition for Constructive Interference:

$$\Delta x = n\lambda$$

Q26. Resonant Frequency in LCR Circuit

At resonance:

$$\begin{aligned} X_L &= X_C \\ \omega L &= \frac{1}{\omega C} \\ f_0 &= \frac{1}{2\pi\sqrt{LC}} \end{aligned}$$

Q27. Bohr's Postulates

1. Electrons revolve in fixed orbits.
2. Angular momentum quantized:

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

Radius of nth orbit:

$$r_n = \frac{n^2 h^2}{4\pi^2 m k e^2}$$

Q28. Radioactive Decay Law

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

On integration:

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

SECTION D

Q29. Capacitor

(a) If separation increases \rightarrow Charge remains same (battery connected, V constant so C decreases \rightarrow Q decreases if disconnected remains same)

(b) Dielectric constant:

$$K = \frac{\epsilon}{\epsilon_0}$$

(c) Capacitance:

$$C = \frac{\epsilon_0 A}{d}$$

(d) Energy:

$$U = \frac{1}{2} CV^2$$

If voltage increases \rightarrow Energy increases.

Q30. Electromagnetic Waves

(a) Relation:

$$E = cB$$

(b) Wavelength: Distance between two successive crests.

(c) EM waves are transverse waves.

(d) Speed:

$$c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$$