

CLASS XII – PHYSICS

ANSWER KEY

(SET- 9)

SECTION A

MCQ Answers

1. (c) $1/r^2$
 2. (c) Plate separation
 3. (b) Same direction
 4. (b) Flux changes rapidly
 5. (a) Leads voltage by 90°
 6. (d) Slits are not coherent
 7. (b) $E = hv$
 8. (d) Temperature
 9. (a) 0°
 10. (a) Time for decay of half nuclei
 11. (b) Low
 12. (a) $nh/2\pi$
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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 Field Intensity

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

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

SI Unit: N/C

Q18. Magnetic Dipole Moment

Magnetic dipole moment of a current loop is defined as:

$$\vec{m} = I\vec{A}$$

Where

I = current

A = area of loop

SI Unit: A·m²

Q19. Impedance

Impedance is the total opposition offered by a circuit to alternating current.

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

Unit: Ohm (Ω)

Q20. Total Internal Reflection

Total internal reflection occurs when light travels from denser to rarer medium and angle of incidence exceeds critical angle.

Condition:

$$i > C$$

Q21. Decay Constant

Decay constant (λ) is the probability of decay per unit time.

$$\lambda = \frac{-1}{N} \frac{dN}{dt}$$

SECTION C

Q22. Electric Potential Due to Electric Dipole

Potential at a point on axial line:

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

Where

p = dipole moment

Q23. Energy Stored in Capacitor

Work done:

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

Energy stored:

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

Q24. Force on Current Carrying Conductor

$$F = BIL \sin \theta$$

Maximum when $\theta = 90^\circ$

Q25. Diffraction Due to Single Slit

Condition for minima:

$$a \sin \theta = n\lambda$$

Where

a = slit width

Q26. Average Power in AC Circuit

$$P = VI \cos \phi$$

Where

$\cos \phi$ = power factor

Q27. Bohr's Model

Angular momentum:

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

Energy of nth orbit:

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

Q28. Radioactive Decay Law

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

SECTION D

Q29. Transformer

(a) Step-up transformer increases voltage.

(b)

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

(c) Laminated core reduces eddy current loss.

(d) Efficiency:

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

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 to stop fastest electrons.

SECTION E

Q31. Electric Field Due to Infinite Plane Sheet

Using Gauss's law:

$$E = \frac{\sigma}{2\epsilon_0}$$

Q32. Cyclotron

Time period:

$$T = \frac{2\pi m}{qB}$$

Works on principle of magnetic force and alternating electric field.

Q33. Relation Between Half-Life and Decay Constant

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