

# CLASS XII – PHYSICS

## ANSWER KEY

### (SET- 8)

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#### SECTION A

##### MCQ Answers

1. (c) Charge enclosed
  2. (b) Double
  3. (b) Current increases
  4. (c) Lenz's law
  5. (b) Lags voltage
  6. (c) Dispersion
  7. (b) Frequency
  8. (c) 56
  9. (b)  $\frac{1}{2} LI^2$
  10. (a)  $\lambda = h/p$
  11. (a) Refractive index decreases
  12. (c) Zero
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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. 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.
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#### SECTION B

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**Q17. Electric Dipole and Dipole Moment**

An electric dipole consists of two equal and opposite charges separated by a small distance.

Dipole moment is defined as:

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

SI Unit: Coulomb-meter (C·m)

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**Q18. Ohm's Law**

At constant temperature, current flowing through a conductor is directly proportional to potential difference.

$$V = IR$$

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**Q19. Mutual Induction**

Mutual induction is the phenomenon in which change in current in one coil induces emf in another coil.

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

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**Q20. Resolving Power of Microscope**

Resolving power is the ability of microscope to distinguish two closely spaced objects.

$$RP = \frac{1}{d}$$

Where d = minimum separation between two objects.

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**Q21. Radioactive Activity**

Activity is the number of disintegrations per second.

$$A = \lambda N$$

SI Unit: Becquerel (Bq)

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## SECTION C

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### Q22. Electric Field Due to Infinite Line Charge

Using Gauss's law:

$$E(2\pi rL) = \frac{\lambda L}{\epsilon_0}$$
$$E = \frac{\lambda}{2\pi\epsilon_0 r}$$

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### Q23. Equivalent Capacitance in Parallel

For capacitors in parallel:

$$C = C_1 + C_2 + C_3$$

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### Q24. Magnetic Field at Axial Point of Circular Coil

$$B = \frac{\mu_0 I R^2}{2(R^2 + x^2)^{3/2}}$$

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### Q25. Young's Double Slit Experiment

Fringe width:

$$\beta = \frac{\lambda D}{d}$$

Where

$\lambda$  = wavelength

D = distance of screen

d = slit separation

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### Q26. Time Period of LC Circuit

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

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### Q27. Photoelectric Effect

Einstein's equation:

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

Experimental observations:

1. Threshold frequency exists
  2. KE depends on frequency
  3. Current depends on intensity
  4. Emission is instantaneous
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### Q28. Nuclear Binding Energy Curve

Binding energy per nucleon increases up to mass number 56 (Iron) then decreases.

Explains:

- Stability of medium mass nuclei
  - Fission of heavy nuclei
  - Fusion of light nuclei
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## SECTION D

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### Q29. LCR Circuit

(a) Resonance frequency:

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

(b)

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

(c) Power factor at resonance = 1

(d) Current is maximum

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### Q30. Electromagnetic Waves

(a) Transverse waves: Oscillations perpendicular to direction of propagation

(b)

$$E = cB$$

(c) Frequency: Number of oscillations per second

(d)

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

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## SECTION E

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### Q31. Potential Due to Electric Dipole (Axial Line)

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

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### Q32. Transformer

Voltage ratio:

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

Works on principle of electromagnetic induction.

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**Q33. Half-Life**

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