CLASS 12 – PHYSICS

MODEL QUESTION PAPER

(SET – 1)

Time: 3 Hours   **Maximum Marks: 70**

Sections:

- **Section A:** 16 Questions (12 MCQs + 4 Assertion–Reason) × 1 = 16 Marks

- **Section B:** 5 Very Short Answer (2 marks each) = 10 Marks

- **Section C:** 7 Short Answer (3 marks each) = 21 Marks

- **Section D:** 2 Case Study Based (4 marks each) = 8 Marks

- **Section E:** 3 Long Answer (5 marks each) = 15 Marks

SECTION A (1 × 16 = 16 Marks)

(12 MCQs)

1. The SI unit of electric field is:
   (a) N/C
   (b) C/N
   (c) Volt
   (d) Joule

2. The dimensional formula of magnetic flux is:
   (a) $[ML^2T^{-2}A^{-1}]$
   (b) $[MLT^{-2}A^{-1}]$
   (c) $[ML^2T^{-1}A^{-1}]$
   (d) $[MLT^{-1}A^{-1}]$

3. Drift velocity is directly proportional to:
   (a) Resistance
   (b) Electric field

(c) Length

(d) Area

4. In Young's double slit experiment, fringe width depends on:
   (a) Distance between slits
   (b) Wavelength
   (c) Distance of screen
   (d) All of these

5. The half-life of a radioactive substance is 5 years. After 15 years, the remaining quantity is:
   (a) 1/2
   (b) 1/4
   (c) 1/8
   (d) 1/16

6. In a step-up transformer:
   (a) Voltage decreases
   (b) Current increases
   (c) Voltage increases
   (d) Power increases

7. Photoelectric effect supports:
   (a) Wave theory
   (b) Particle theory
   (c) Both
   (d) None

8. Energy of photon is proportional to:
   (a) λ
   (b) $1/\lambda$
   (c) $\sqrt{\lambda}$
   (d) λ^2

9. The work function depends on:
   (a) Intensity
   (b) Frequency
   (c) Nature of metal
   (d) Temperature

10. SI unit of self inductance is:
    (a) Tesla
    (b) Henry

(c) Weber

(d) Volt

11. In AC circuit at resonance, impedance is:
    (a) Maximum
    (b) Minimum
    (c) Zero
    (d) Infinite

12. The binding energy per nucleon is maximum for:
    (a) Hydrogen
    (b) Iron
    (c) Uranium
    (d) Helium

Assertion–Reason (Q13–16)

13.

Assertion (A): Electric field inside a conductor is zero.
Reason (R): Charges reside only on surface in electrostatic equilibrium.

14.

Assertion (A): In YDSE, central fringe is bright.
Reason (R): Path difference at centre is zero.

15.

Assertion (A): Increasing frequency increases kinetic energy of photoelectrons.
Reason (R): KE = hv – Φ

16.

Assertion (A): Transformer works on DC supply.
Reason (R): Changing magnetic flux induces emf.

SECTION B (2 × 5 = 10 Marks)

17. Define electric flux. Write its SI unit.

18. State Gauss's law.

19. Define resistivity. On what factors does it depend?

20. What is nuclear fission?

21. State two properties of electromagnetic waves.

SECTION C (3 × 7 = 21 Marks)

22. Derive expression for electric field due to point charge.

23. Explain working of a potentiometer.

24. Derive relation between drift velocity and current.

25. Explain Young's double slit experiment with diagram.

26. State and prove Faraday's laws of electromagnetic induction.

27. Derive expression for energy stored in capacitor.

28. Explain Bohr's model of hydrogen atom.

SECTION D (Case Study Based) (4 × 2 = 8 Marks)

29. Case Study: Photoelectric Effect

Light of frequency above threshold frequency falls on metal surface.

(a) Define threshold frequency.
(b) What happens if intensity increases?
(c) Write Einstein's equation.
(d) What happens if frequency is below threshold?

30. Case Study: Transformer

A transformer is used to step down 220V to 22V.

(a) Is it step-up or step-down?
(b) Write relation between turns and voltage.
(c) Why laminated core is used?
(d) Define efficiency.

SECTION E (5 × 3 = 15 Marks)

31. Derive expression for magnetic field on axis of circular current loop.

32. Explain working and construction of cyclotron.

33. Derive expression for fringe width in YDSE.