CLASS XII – PHYSICS

MODEL QUESTION PAPER

(SET – 2)

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

General Instructions:

1. All questions are compulsory.
2. Use of calculator is not permitted.
3. Draw neat diagrams wherever required.
4. Internal choices are provided in some questions.

Question Paper Design

- **Total Questions:** 33
- **Section A:** 16 Questions (12 MCQs + 4 Assertion–Reason) × 1 = 16
- **Section B:** 5 Questions × 2 = 10
- **Section C:** 7 Questions × 3 = 21
- **Section D:** 2 Case Study Based × 4 = 8
- **Section E:** 3 Questions × 5 = 15

SECTION A (1 × 16 = 16 Marks)

Q1–Q12: Multiple Choice Questions

1. The electric potential due to a point charge at distance r is:
   (a) kqr
   (b) kq/r
   (c) kr/q
   (d) qr

2. Capacitance of a parallel plate capacitor increases if:
   (a) Plate separation increases
   (b) Area decreases
   (c) Dielectric constant increases
   (d) Voltage increases

3. The unit of magnetic field is:
   (a) Weber
   (b) Henry
   (c) Tesla
   (d) Volt

4. Lenz's law is based on conservation of:
   (a) Charge
   (b) Energy
   (c) Momentum
   (d) Mass

5. In AC circuit, RMS value of current is equal to:
   (a) I_0
   (b) $I_0/2$
   (c) $I_0/\sqrt{2}$
   (d) $\sqrt{2}\, I_0$

6. In photoelectric effect, stopping potential depends on:
   (a) Intensity
   (b) Frequency
   (c) Area
   (d) Temperature

7. The de-Broglie wavelength of electron increases if:
   (a) Velocity increases
   (b) Momentum increases
   (c) Velocity decreases
   (d) Charge increases

8. The device used to detect electric charge is:
   (a) Ammeter
   (b) Galvanometer
   (c) Electroscope
   (d) Voltmeter

9. Nuclear fusion occurs in:
   (a) Nuclear reactor

(b) Atom bomb
(c) Sun
(d) Geiger counter

10. Quality factor of resonance circuit depends on:
    (a) Resistance
    (b) Inductance
    (c) Capacitance
    (d) All of these

11. Magnetic field inside a long solenoid is:
    (a) Zero
    (b) Uniform
    (c) Infinite
    (d) Variable

12. Work done in moving a charge in equipotential surface is:
    (a) Maximum
    (b) Minimum
    (c) Zero
    (d) Infinite

Q13–Q16: Assertion–Reason Type

13.

Assertion (A): Electric potential is scalar quantity.
Reason (R): It has magnitude but no direction.

14.

Assertion (A): Magnetic monopoles do not exist.
Reason (R): Magnetic field lines form closed loops.

15.

Assertion (A): In nuclear reactor, moderator is used.
Reason (R): It slows down neutrons.

16.

Assertion (A): EM waves do not require medium.
Reason (R): They are transverse waves.

SECTION B (2 × 5 = 10 Marks)

17. Define electric dipole moment and write its SI unit.
18. State Kirchhoff's two laws.
19. Define magnetic flux. Write its formula.
20. What is total internal reflection? Write condition.
21. Define binding energy per nucleon.

SECTION C (3 × 7 = 21 Marks)

22. Derive expression for capacitance of parallel plate capacitor.
23. Explain working of a moving coil galvanometer.
24. Derive relation between current and drift velocity.
25. Explain Huygens' principle.
26. State and explain Ampere's circuital law.
27. Derive expression for time period of LC oscillations.
28. Explain radioactive decay law and derive its equation.

SECTION D (4 × 2 = 8 Marks)

29. Case Study: AC Circuit

An AC source is connected to a resistor and inductor in series.

(a) Define RMS value.
(b) Write expression for impedance.
(c) What is phase difference between V and I?
(d) Define resonance condition.

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30. Case Study: Nuclear Reactor

A nuclear reactor produces energy through fission reaction.

(a) Define chain reaction.
(b) Role of control rods.

(c) What is critical mass?
(d) Why shielding is necessary?

SECTION E (5 × 3 = 15 Marks)

31. Derive expression for electric field due to uniformly charged infinite plane sheet.

32. Explain construction and working of transformer with diagram.

33. Derive Einstein’s photoelectric equation and explain its significance.
