

■ Chapter 1: Electrostatics & Gauss's Law

No.	Question
1	What is Coulomb's law? Deduce Coulomb's law from Gauss's law.
2	What is meant by electric field intensity? Write the expression for the electric field intensity due to a point charge.
3	An infinite length rod has linear charge density λ . Calculate E at distance 'r'.
4	What is meant by a Gaussian surface? Describe Quantization of charge.
5	What is electric dipole and electric dipole moment? Calculate the electric field on the perpendicular bisector.
6	Write the expression for the electric field intensity due to a ring of charge q and radius a.
7	Deduce the electric field due to a long, straight uniformly charged wire.
8	Derive the relation among D, E, and P (electric vectors).
9	What is electric flux? Write down the properties of lines of force.
10	State and explain Gauss's law.
11	Explain Biot–Savart law and express it in vector form.
12	State and explain Coulomb's law in vector form.
13	Write the relation between D and E.
14	Define dielectric constant. What is an electric vector?
15	What is electric potential and potential difference? Calculate the potential due to a point charge.

■ Chapter 2: Capacitance & Dielectrics

No.	Question
16	Derive the expression of equivalent capacitance for a series combination of capacitors.
17	A capacitor of $4\mu\text{F}$ and $3\mu\text{F}$ in series is in parallel with $2\mu\text{F}$. Find the equivalent capacitance.
18	What is an electric dipole? Calculate the electric potential.
19	What is electric potential? Derive the relation between electric field and potential.
20	What is an RC circuit? Prove that $q = q_0(1 - e^{-t/RC})$.

⚡ Chapter 3: Current Electricity & Kirchhoff's Laws

No.	Question
21	State and explain Kirchhoff's Current Law.
22	Define current, current density, resistance, resistivity, and electric potential.
23	State and explain Kirchhoff's Voltage Law.

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| 24 | How can you find the value of an unknown resistor using a Wheatstone Bridge? |
| 25 | State and explain Ohm's Law. |
| 26 | Write down the working principle of the Wheatstone Bridge. |
| 27 | Write short notes on Ammeter, Voltmeter, and Galvanometer. |
| 28 | Write down the working principle of the Ammeter and the Voltmeter. |
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□ **Chapter 4: Magnetism & Magnetic Fields**

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| 29 | What do you understand by a magnetic dipole? What is the difference between electric and magnetic fields? |
| 30 | Show that the magnetic force on a current-carrying conductor is $F = I(L \times B)$. |
| 31 | What is the Lorentz force? State and explain Fleming's left and right-hand rules. |
| 32 | State and explain Coulomb's law for magnetic induction. |
| 33 | Write down the characteristics of paramagnetic, diamagnetic, and ferromagnetic materials. |
| 34 | What do you mean by hysteresis and eddy current losses? |
| 35 | Explain Maxwell's screw rule and Fleming's left-hand rule. |
| 36 | Define magnetic flux. Explain Biot-Savart law and express it in vector form. |
| 37 | Calculate the magnetic field B for a solenoid or coil using Ampere's law. |
| 38 | Calculate the magnetic field B for a packed coil or solenoid. |
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⚡ **Chapter 5: Electromagnetic Induction & RL Circuits**

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| 39 | Derive the transient response of an RL circuit (charging and discharging phases). |
| 40 | Derive the equation of an RC circuit charging process. |
| 41 | State and explain Lenz's Law. |