



135525

DCPH201

II Semester B.Sc. Degree Examination, June/July - 2026

(NEP Scheme Repeaters)

PHYSICS

Electricity and Magnetism

Paper : II

Time : 2½ Hours

Maximum Marks : 60

Instructions :**Answer any Four questions from each part.****PART - A****Answer any Four of the following. Each question carries 2 marks. (4×2=8)**

1. State Coulomb's Law.
2. Write the differential form of Gauss's Law in electrostatics.
3. Self-inductance of a coil is also known as electrical inertia. Explain.
4. Why two coils are used in Helmholtz tangent galvanometer instead of single coil?
5. Light waves travel in vacuum whereas sound waves cannot do so. Explain.
6. Electromagnets are made up of soft iron. Justify.

PART - B**Answer any Four of the following. Each question carries 5 marks. (4×5=20)**

7. An electric dipole consists of two opposite charges of magnitude $1/3 \times 10^{-7}$ C separated by 2 cm. The dipole is placed in an external field of 3×10^7 NC⁻¹. What maximum torque does the electric field exert on the dipole?
8. A parallel plate capacitor has initial capacitance C, the permittivity of the space is ϵ_0 , plate area is A, the distance between plates becomes 2d and the permittivity of free space is $5\epsilon_0$, what is the final capacitance of the parallel-plate capacitor.



[P.T.O.]



(2)

DCPH201

9. The current in RL circuit builds up to $1/3$ of its steady state value in 5s. What is its inductive time constant?
10. A coil of self-inductance 1H and having 1000 turns carries a current of 5A. What is the energy stored in it? What will be the induced emf in it if the current changes at 200 As^{-1} ?
11. A resistance of 2Ω and an inductance of 10 mH are connected in series with an ac source of 50Hz. Calculate the power factor of the circuit?
12. Calculate the skin depth in copper of conductivity $5.8 \times 10^7 \text{ Sm}^{-1}$ for the electromagnetic waves of frequency 1 MHz. Given $\mu = \mu_0 = 4\pi \times 10^{-7} \text{ Hm}^{-1}$

PART - C

Answer any Four of the following. Each question carries 8 marks. (4×8=32)

13. Obtain an expression for potential at a point due to a uniformly charged conducting sphere.
14. Derive an expression for the energy stored in a capacitor and the energy density.
15. Define time constant and hence derive an expression for growth of current in LR circuit.
16. State and prove Ampere's circuital law.
17. Derive Maxwell's equations $\nabla \cdot \vec{B} = 0$ and $\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$
18. Deduce the Langevin's theory of diamagnetism.

