



B.Sc. II Semester Degree Examination, September/October - 2023

PHYSICS

DSC 2 : Electricity and Magnetism

(NEP)

Time : 2 Hours

Maximum Marks : 60

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- Note:** (i) Answer **all** the Sections.
(ii) Non-Programmed scientific calculators are allowed.
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SECTION - A

1. Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**
- What is Dipole ?
 - Define Electric Potential.
 - State Kirchhoff's Current Law.
 - Find the resistance value for colour code Red-Brown-Black.
 - State Ampere's circuit law.
 - Define Self Inductance of a coil.
 - State Gauss divergence theorem.
 - Is electric field intensity a vector ?
 - Mention one example for Ferromagnetic material.
 - Define magnetic moment.

SECTION - B

Answer **any four** of the following questions. Each question carries **five** marks.

4x5=20

- Derive expression for potential due to quadruple.
- Explain Thevenin's theorem with example.
- Derive expression for Rms value of alternating current.
- Show that $\nabla \times (\nabla \phi) = 0$.
- Explain Gauss law of magnetism.
- Derive Faraday's laws from Lorentz Force.



SECTION - C

Answer **any three** of the following questions. Each question carries **ten** marks.

3x10=30

- 8.** Using Gauss law derive electric fields due to uniformly charged sphere and hollow cylinder. **10**
- 9.** (a) Derive expression for Bandwidth of LCR series Circuit. **7+3**
(b) In LCR Series Circuit Resistance of 90 Ohm and Inductance of 0.5 mH. Find the bandwidth of the system.
- 10.** (a) Derive expression for magnetic field due to steady current in a long straight wire. **5+5**
(b) Derive expression for magnetic field due to solenoid.
- 11.** (a) Show that $\nabla \times (\nabla \times A) = \nabla(\nabla \cdot A) - \nabla^2 A$ where $A = A_1 \hat{i} + A_2 \hat{j} + A_3 \hat{k}$. **7+3**
(b) Find the speed of Electromagnetic waves in free space.
- 12.** (a) Derive the relation between magnetic moment and angular momentum. **5+5**
(b) With neat diagram explain Hysteresis curve.

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