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# 21BSC2C2PHL

**B.Sc. II Semester (NEP) Degree Examination, September/October - 2022**

**PHYSICS**

**2 : Electricity and Magnetism**

Time : 3 Hours Maximum Marks : 60

***Note :*** *Answer* ***all*** *the Sections.*

## SECTION - A

**1.** Answer the following sub-questions, each sub-question carry **one** mark. **10x1=10**

(a) State Coulomb's Law in Electrostatics.

(b) What is point charge ?

(c) State Kirchhoff's voltage law.

(d) Define Q-factor.

(e) State Ampere's circuit law.

(f) What is solenoid ?

(g) State Gauss - Divergence Theorem.

(h) What is Electromagnetic Wave ?

(i) Define magnetic moment.

(j) What is Hysteresis loop ?

## SECTION - B

Answer **any four** of the following. Each carry **five** marks. **4x5=20**

**2.** What is Dipole ? Derive expression for potential due to Dipole. **5**

**3.** State and explain maximum Power Transfer Theorem. **5**

**4.** Derive expression for magnetic field due to steady current in a long straight wire. **5**

**5.** Show that $\nabla \times (\nabla \phi) = 0$. **5**

**6.** With neat diagram explain Hertz experiment for production of Electromagnetic waves. **5**

**7.** With neat diagram explain Hysteresis Curve and its physical significance. **5**

**P.T.O.**

## SECTION - C

Answer **any three** of the following questions. Each carry **ten** marks. **3x10=30**

**8.** Using Gauss law Deduce Electric fields due to uniformly charged sphere and uniformly charged hollow cylinder. **10**

**9.** (a) Derive expression for current in case of RC series AC circuit using j notation. **7+3**
(b) In LCR parallel circuit Resistance of 100 ohm and Inductance of 0.25 mHz. Find the band width of the system.

**10.** (a) State and Derive Faraday's laws of Induction. **5+5**
(b) Derive expression for Energy stored in a magnetic field.

**11.** (a) Show that $\nabla \times (\nabla \times A) = \nabla (\nabla . A) - \nabla^2 A$ 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) Give the necessary Langevin's theory of paramagnetism.

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