Roll No…….. **Total No. of Printed Pages: [01]**
Total No. of Questions: [09]

B.Sc. (Hons.) Chemistry (Semester – 1st)
ELECTRICITY AND MAGNETISM
Subject Code: BPHYS1101
Paper ID: [19131605]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a. State Gauss law in electrostatic and give its differential form.
b. Show that Electrostatic field is conservative in nature.
c. Define magnetic vector potential.
d. State Faraday's law of electromagnetic induction and give its integral form.
e. Differentiate soft and hard magnetic materials on the basis of B-H curve.
f. What do you mean by Magnetic permeability?
g. State Lenz's law and how it relates to electromagnetic induction?
h. Explain Kirchhoff's law for AC circuits.
i. What is displacement vector and how it relates to electric field?
j. State maximum power transfer theorem.

Section – B **(5 marks each)**

Q2. Derive Laplace and Poission equation in electrostatics and gives its significance.
Q3. Using Biot Savart Law, Derive an expression for magnetic field due to infinite straight wire carrying current.
Q4. Derive expression for the differential form of Gauss Law in dielectrics.
Q5. Derive expression for the (i) resonance frequency (ii) power dissipation in LCR circuit.
Q6. Explain the hysteresis and energy loss in ferromagnetic materials with help of suitable diagram.

Section – C **(10 marks each)**

Q7. Define Ampere's Circuital law and use it to derive magnetic field inside the infinite solenoid.
Q8. Define magnetic vector potential and hence deduce Biot Savart's law using its mathematical expression.
Q9. What is ferromagnetism? Derive an expression for temperature dependence of Ferromagnetic Susceptibility.