

# The Assam Royal Global University, Guwahati

Royal School of Applied & Pure Sciences

B.Sc. (Generic III) 2<sup>nd</sup> Semester

Semester End Examination, July 2022

Course Title: Electricity and Magnetism

Course Code: PHY012G201

Time: 3 Hours

Maximum Marks: 70

**Note: Attempt all questions as per instructions given**

*The figures in the margin indicate full marks.*

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## Section – A

**Q.1. Answer all questions (Each question carry equal marks)**

**2 × 8=16**

- Why is the armature of a generator wound over a soft iron core?
- How do you define time constant of R-L circuit?
- State Coulomb's law in electrostatics.
- What are dielectrics materials?
- Define relative permeability.
- What is intensity of magnetisation?
- What is right hand thumb rule?
- What is magnetic field?

## Section – B

**Q.2 Answer any two of the following**

**6 × 2 =12**

- Obtain an expression for the instantaneous current during growth and decay in an L-R circuit.
- Explain the process of generating alternating current using A.C generator.
- Discuss the difference of phase between E and i when the circuit contains pure inductance.

**Q.3 Answer any two of the following**

**7 × 2 =14**

- By applying Gauss's theorem, obtain the strength of electric field due to spherically symmetric charge distribution at a point situated, (i) outside the charge distribution and (ii) inside the charge distribution.
- What do you mean by dielectric susceptibility? Establish the relation between dielectric constant and susceptibility.
- Obtain the necessary boundary conditions in electrostatics.

**Q.4 Answer any two of the following**

**7 × 2 =14**

- Obtain the expression for magnetic field due to dipole on the axis of the bar magnet.
- Explain the Hysteresis loop.
- Discuss the properties of dia, para and ferromagnetic substances.

**Q.5 Answer any two of the following**

**7 × 2 =14**

- State Biot-Savart's law. How can it be used to determine the field due to a long straight conductor?
- Give the theory and working of a ballistic galvanometer.
- A closely wound flat circular coil of 25 turns of wire diameter 0.10 m and carries 4 ampere. Determine the flux density at the centre of a coil.

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