LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **PHYSICS**

FIFTH SEMESTER – NOVEMBER 2012

# PH 5508/5505/4500 - ELECTRICITY & MAGNETISM

Date : 03/11/2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**PART - A**

**Answer ALL questions: (10X 2 = 20)**

1. Explain electric dipole and electric dipole moment.
2. Calculate the energy required to charge in air a metallic sphere of radius 2m to a potential

of 3000 volts.

1. Define Peltier coefficient.
2. State Kirchoff’s laws of current electricity.
3. State Biot –Savart’s law.
4. Determine the magnetic intensity at a distance of 10 cm due to a long straight conductor

carrying a current of 75A.

1. Calculate the time of leakage if the charge on a capacitor of capacitance 4 microfarad in leaking through a resistance of 100 megaohms is reduced to half its maximum value.
2. Why is shock from ac more severe than that from dc?
3. Define magnetic permeability. Write the relation between relative permeability and susceptibility
4. Write Maxwell’s equations.

**PART B**

**Answer any FOUR questions: (4 x7. 5 = 30 )**

1. Obtain an expression for torque and the potential energy of a dipole placed in a uniform

electric field. (4+3.5)

1. Describe the Kohlausch bridge method to determine the specific conductivity of an electrolyte.
2. Obtain an expression for the force on a current carrying conductor placed in a magnetic field.
3. A resistance R and a 4µF capacitor in series are connected to a 200 volt direct supply. Across the capacitor is a neon lamp that strikes at 120 volts. Calculate the value of R to make the lamp strike 10 seconds after switch has been closed.
4. With help of Maxwell’s equations show that electromagnetic waves are transverse in nature.

**PART - C**

**Answer any FOUR questions: (4 x 12.5 = 50)**

1. (a) Obtain an expression for the capacitance of a parallel plate capacitor. (5)

(b) What will be the capacitance if the space between the plates is partially filled with a slab of

thickness d and relative permittivity εr? (7.5)

1. What is a thermo – electric diagram? Explain how Peltier and Thomson emf’s, neutral temperature and temperature of inversion can all be determined using the diagram. (3 + 9.5)
2. (a) Describe the construction of a moving coil galvanometer. Obtain an expression for the quantity of

charge flowing through it. (3+6)

(b) Explain damping correction. (3.5)

1. .Describe the principle, construction and working of a three phase ac generator.
2. .Discuss Langevin’s theory of para magnetism.

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