



Dr. V. S. Krishna Government Degree College (A),  
Visakhapatnam

I B.SC HON(PHYSICS) /SEM-II CC-4  
22053-ELECTRICITY AND MAGNETISM

Time: 3Hrs

Max Marks: 75

SECTION-A

Answer ALL the following questions

5x5=25M

- Q 1) Explain the formation of depletion layer and barrier voltage? What is the barrier Voltage of germanium and silicon diodes?
- Q 2) What is Poisson equation in physics? What is Poisson equation of Electrostatic field and potential?
- Q 3) Explain the capacitance of an isolated conductor?
- Q 4) Define Electric susceptibility and Dielectric constant? ?
- Q 5) Define and explain Biot-Savart's Law?
- Q 6) The dielectric susceptibility of a material is  $356 \times 10^{-12} \text{ C}^2/\text{N-m}^2$ . Calculate the value Of dielectric constant and absolute permittivity of the material.  
Take  $\epsilon_0 = 9 \times 10^{-12} \text{ F/m}$ ?
- Q 7) Explain ferromagnetism? Give examples?
- Q 8) A solenoid of length 0.50 m wound with 5000 turns of wire has a radius of 4cm. Calculate self-Inductance of coil?
- Q 9) Explain KCL and KVL with one Example?
- Q 10) What is charge sensitivity of ballistic galvanometer?

**SECTION-B**

**5x10=50M**

**Answer ALL the following questions**

**Q 1. a) State and prove Gauss Law?**

**(or)**

**b) Explain Laplace's Equations? State, Explain and prove uniqueness Theorem?**

**Q 2. a) What is Electrostatic energy? Explain capacitance of an isolated**

**Conducting Sphere?**

**(or)**

**b) Define D, E and P? Obtain relation between them?**

**Q 3. a) Explain the torque on current loop in a uniform magnetic field?**

**(or)**

**b) Explain the magnetic force on point charge and current carrying wire?**

**Q 4. a) Define Diamagnetism and Ferromagnetism? Explain theories of Ferromagnetism and Diamagnetism? What is Weiss theory in Physics?**

**Explain in detail?**

**(or)**

**b) State and prove reciprocity theorem?**

**Q 5 a) Mention condition for Resonance? Draw the circuit of a RLC Series resonance**

**Circuit and obtain expression to Resonant frequency Bandwidth and Q- factor?**

**(or)**

**b) State and prove Thevenin's Theorem?**