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B.Sc ( PS) Computer Sci VI Sem  
Assignment ( Magnetism)

### Assignment-3 (Magnetism)

- Q1. An iron ring of mean circumferential length  $20\text{ cm}$  and cross-sectional area  $1\text{ cm}^2$  is wound uniformly with  $200$  turns of wire. When a current of  $0.30$  amp flows in the windings, the flux in the ring is  $2 \times 10^{-6}$  weber. Find the magnetic flux density in the ring, the magnetic intensity and permeability of iron.
- Q2. The horizontal component of the flux density of earth's magnetic field is  $1.7 \times 10^{-5} \text{ W/m}^2$ . What is the horizontal component of magnetic intensity?
- Q3. A magnetizing field of  $1200 \text{ A/m}$  produces a magnetic flux of  $2.4 \times 10^{-5}$  weber in an iron bar of cross-sectional area of  $0.2 \text{ cm}^2$ . Calculate permeability and susceptibility of the bar.
- Q4. A paramagnetic salt contains  $10^{28} \text{ ions/m}^3$  with magnetic moment of one Bohr magneton. Calculate the paramagnetic susceptibility and the magnetization produced in a uniform magnetic field of  $10^6 \text{ A/m}$ , at room temperature.
- Q5. The susceptibility of magnesium is  $1.2 \times 10^{-5}$  at  $300 \text{ K}$ . Find the susceptibility at  $400 \text{ K}$ .
- Q6. A magnetic substance has  $10^{28} \text{ atoms/m}^3$ .

The magnetic moment of each atom is  $1.8 \times 10^{-23} \text{ Am}^2$ . Calculate the paramagnetic susceptibility at  $300 \text{ K}$ . What would be dipole moment of a bar of this material  $0.1 \text{ m}$  long and  $1 \text{ sq. cm}$  cross-section in a field of  $8 \times 10^4 \text{ A/m}$ .

Q7. Estimate the paramagnetic susceptibility of a substance which has  $5 \times 10^{28}$  atoms per unit volume placed in the magnetic field of  $1 \text{ T}$  at  $300 \text{ K}$ .

