**B.Sc. DEGREE EXAMINATION, APRIL 2016.**

**II YEAR — IV SEMESTER**

**Major Paper VIII — ELECTRICITY AND**

**MAGNETISM**

**Time : 3 hours Max. Marks : 60**

**SECTION A — (10 × 1 = 10 marks)**

**Answer any *TEN* questions**

1. Define intensity of the electric field.
2. Write the differential form of Gauss law.
3. State the principle of working of a potentiometer.
4. How can the sensitivity of a potentiometer be increased?
5. Write the expression for decay of current in an L-R circuit.
6. Define time constant of an RC circuit.
7. What is Seebeck effect?
8. State the law of intermediate metals.
9. What is meant by magnetization?
10. State the relationship between the three magnetic vectors ***B****,* ***H*** and ***M****.*
11. What is pyroelectricity?
12. Among the following two sets of series combination of L and R, indicate which one is suitable for obtaining rapid growth and decay of current in an L-R circuit. Give reason.

(a) L = 1 mH and R=1000 ohm

(b) L = 10 mH and R= 10 ohm .

**SECTION B — (5 × 4 = 20 marks)**

**Answer any *FIVE* questions**

1. The electric field in a given region of space is E= 5x i + 6y j + 3z k. Find the volume charge density.
2. With a circuit diagram explain the calibration of low range voltmeter using a potentiometer.
3. In an experiment to determine high resistance by leakage, a capacitor of 0.2μF is used. It is first fully charged and discharged through a ballistic galvanometer. The observed kick was 12 cm on a scale. The capacitor was fully charged again and allowed to leak through a high resistance R for 2 seconds. The remaining charge in C gave a kick of 6 cm on the same scale when discharged through the B.G. Calculate the value of R.
4. Explain Peltier effect.
5. A rod of magnetic material 0.5 m in length has a coil of 200 turns wound over it uniformly. If a current of 2 ampere is sent through it, calculate
6. magnetizing field H
7. the intensity of magnetization M
8. magnetic induction B
9. relative permeability μr of the material. Given χ m= 6 x 10-3
10. State and prove Gauss’s law in electrostatics.
11. Deduce an expression for the discharge of a condenser through a resistance.

[P.T.O.]

**SECTION C — (3 × 10 = 30 marks)**

**Answer any *THREE* questions**

1. Apply Gauss’s law to determine the electric field intensity due to a uniformly charged non-conducting sphere at a point
2. outside the sphere
3. on the surface of the sphere
4. inside the sphere.
5. Explain with a circuit diagram, how the internal resistance of a cell can be determined using potentiometer.
6. Deduce an expression for growth of current in a series circuit containing resistance and inductance.
7. With a circuit explain the measurement of thermoemf using a potentiometer.
8. Discuss in detail the properties of dia, para and ferro magnetic materials.

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