B.Sc. DEGREE EXAMINATION,APRIL 2020
II Year IV Semester
Electricity and Magnetism

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Write the differential form of Gauss law.
2. Is Gauss law useful in calculating the field due to three equal charges located at the corners of an equilateral triangle. Explain.
3. State the principle of potentiometer.
4. Why should the potentiometer wire be long and of uniform thickness.
5. Write the expression for the decay of current in an LR circuit.
6. A coil of resistance 1 ohm and inductance 1 Henry is connected to a source of e.m.f 5 volts. Calculate the time constant.
7. Define seebeck effect.
8. Define Peltier effect.
9. Define Magnetisation.
10. What is anti ferromagnetism.
11. State the laws of thermo e.m.f.
12. Distinguish between Diamagnetic and paramagnetic materials.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. State and prove Gauss law in electrostatics.
14. Explain how a potentiometer used to determine the internal resistance of a cell.
15. Discuss the growth of current in a circuit containing resistance and inductance.
16. Derive an expression for the total thermo emf developed in a thermocouple.
17. Give the properties of ferromagnetic materials.
18. Establish the relation $B = \mu_0(H + M)$
19. If the charge on a capacitor of capacitance $2\mu F$ leaking through a high resistance of 100 megaohms is reduced to half its maximum value, calculate the time of leakage.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Apply Gauss law to find electric field intensity inside and outside of a uniformly charged non conducting sphere.
21. Explain with necessary theory, how the potentiometer is used to calibrate a low range voltmeter.
22. Derive an expression for the growth and decay of charge in a capacitor through a resistance.
23. Describe how to determine the peltier co-efficient of a junction experimentally.
24. Explain the atomic origin of (i) diamagnetism (ii) paramagnetism (iii) ferromagnetism.

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