LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2023**

PH 5505 – ELECTRICITY & MAGNETISM

Date: 03-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

	PART – A	**(10 x 2 = 20 Marks)**
Q. No.	**Answer ALL questions**	
1	What is electric dipole moment?	
2	Define farad.	
3	An electric dipole consists of two opposite charges of magnitude $q = 2.0\times10^{-6}$C separated by 4.0 cm. When the dipole is placed in an external field of 1.0×10^{5} N C^{-1}, find the maximum torque exerted by the field on the dipole.	
4	What is Seebeck effect?	
5	State Faraday's laws of electrolysis.	
6	Define coefficient of mutual-induction of a coil.	
7	State Fleming's left-hand rule.	
8	What is meant by wattless current?	
9	Obtain an expression for the average value of an alternating current.	
10	Derive the relation between relative permeability and susceptibility.	
	PART – B	**(4 x 7.5 = 30 Marks)**
	Answer any FOUR questions	
11	Derive an expression for the electric potential at a point due to a point charge.	
12	Explain with necessary theory how a Carey-Foster bridge is used to determine the resistance of a wire.	
13	Derive an expression for the magnetic induction at a point due to an infinite straight conductor carrying current.	
14	Describe the experimental method of determination of specific conductivity of an electrolyte using Kohlrausch's bridge.	
15	Using Maxwell's equations determine the velocity of electromagnetic waves in free space.	
16	Compare the properties of dia, para and ferro magnetic materials.	
	PART – C	**(4 x 12.5 = 50 Marks)**
	Answer any FOUR questions	
17	State Gauss's law in electrostatics. Apply it to determine the electric field due to a uniformly charged spherical shell at a point P (i) inside (ii) on and (iii) outside the shell. (2+4+6.5)	

18	a) Write a note on Thomson effect. (4.5) b) Explain Seeback effect, Peltier effect. (4) c) Define neutral temperature and the temperature of inversion and show how they are represented in the thermo – electric diagram. (4)
19	Discuss the growth and decay of charge in an LCR circuit.
20	Explain the construction and theory of Helmholtz galvanometer.
21	Give Langevin's theory of paramagnetism to obtain Curie's law and also mention the failure of the theory.
22	Derive all the four Maxwell's equations.

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