Exam.Code:0935
Sub. Code: 33763

2076
B.E. (Electrical and Electronics Engineering)
Fifth Semester
PC-EE-503: Electromagnetic Fields Theory

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting two questions each from Section B-C.***

x-x-x

	Section-A (Attempt all questions)	
1	a) State divergence theorem. b) Determine the magneto-motive force (mmf) generated by a multilayer coil of 1000 turns of fine wire carrying a current of 1 mA. c) What is inconsistency of Ampere's law? d) What is perfect conductor? e) What is self inductance of a coil?	10
	Section-B (Attempt any two questions)	
2	a) Three equal positive charges of $4x10^{-9}$ C each are located at three corners of a square of side 20 cm each. Determine the magnitude and direction of electric field at the vacant corner.	6
	b) State Ohm's law. Discuss equation of continuity.	4
3	a) Derive the Laplace's equation in spherical coordinate, also derive the capacitance between a conducting cone with its vertex separated from a conducting plane by an infinitesimal insulating gap and its axis normal to plane.	6
	b) Prove that the field **D** due to a point charge has a divergence of zero.	4
4	a) State and prove Gauss's theorem, also discuss its application.	6
	b) Find the volume of a sphere of radius 'a' from the differential volume.	4
	Section-C (Attempt any two questions)	
5	a) A solenoid of 1 m, length and 10 cm diameter has 500 turns. Calculate the approximate inductance and energy stored in the magnetic field, when a current of 2A, flow through it.	5
	b) Show that Ampere's circuital law as such is true only for study currents and fields. Hence deduce generalized statement of Ampere's law Maxwell's first equation.	5
6	a) Staring from basic laws and theorem derive the Maxwell's equation in differential and integral form.	5
	b) Derive an expression for the magnetic field at the axis of a current carrying loop of radius R. What is the direction of the field?	5
7	a) Discuss and prove the boundary conditions at the surface of discontinuity.	5
	b) State and explain Poynting theorem. What do you understand by instantaneous, average and complex Poynting vector?	5

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