Duration 3hrs **Total Marks 80**

NB:- 1)Question No. 1 is Compulsory.
2) Attempt any three Questions out of remaining five Questions.
3) Assume suitable data if necessary and justify the same.

Q.1 **Answer any four out of five questions**.

	a	Explain Coulomb's law in Electrostatics and hence define Unit Charge.	**05**
	b	Express the following vector in Cartesian co-ordinate system **A**=2 cos θ âr +3 r âθ - 4 âz	**05**
	c	State and explain relationship between Electric Intensity and potential.	**05**
	d	What is Lorentz force equation for moving charge? Enlist two applications.	**05**
	e	Explain inconsistency in Ampere's circuital law	**05**
Q2	**a**	Show that electric field due to infinite sheet of charge at a point is independent of distance at that point from the plane containing the charge.	**10**
	b	Three equal point charges of 2 µc are in free space at (0,0,0), (2,0,0), (0,2,0) respectively . Find net force on fourth charge of 5µC at (2,2,0)	**10**
Q3	**a**	Derive Poission's and Laplace equation. Two plates of a parallel capacitors are separated by a distance 'd 'and maintained at potential **0** and $\mathbf{V_1}$ respectively. Find potential at any point between plates.	**10**
	b	Derive the set of Maxwell's equation for Static field and Time varying field	**10**
Q4	**a**	Explain Ampere circutal law and differentiate between conduction current and displacement current	**10**
	b	Find the capacitance of a co-axial conductor of length L, where inner and outer radius are r1 and r2 respectively	**10**
Q5	**a**	A current sheet $K^- = 10$ âz A/m lies in X=4 m plane and a second sheet $K^- = -8$ âz A/m is at X= - 5 m plane. Find H^- at points (i) (1,1,1) (ii) (0, -3, 10)	**10**
	b	Derive magnetic field intensity due to finite and infinite wire carrying a current I.	**10**
Q6	**a**	Formulate the wave equation from Maxwell's equations for perfectly conducting medium	**10**
	b	Consider an interphase in Y- Z plane .The region X < 0 is medium1 with μ_{r1}= 4.5 and magnetic field, **H**= 4 â x+5 â y- 6 â z A/m. The region X > 0 is medium 2 with μ_{r2} = 6 . Find $\mathbf{H}_2$ and $\mathbf{B}_2$ in medium 2 and also calculate the angle made by $\mathbf{H}_2$ with normal to interface.	**10**

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