[**Time: 3 Hours**] **[Marks: 80]**

N.B: Q.1 is compulsory.
Attempt any Three out of remaining questions.
Assume suitable data.

Q.1	a)	Derive the integral form of continuity equation.	**5**
	b)	Explain concept of current density. How is magnetic field evaluated using current sheet.	**5**
	c)	Describe Maxwell's equation for time varying fields.	**5**
	d)	Prove that $\bar{E} = -\bar{\nabla}v$. where Symbols have usual meanings.	**5**
Q.2	a)	Derive an expression for away of two isotropic sources with same amplitude and in phase currents.	**10**
	b)	Explain different methods of feeding of parabolic antenna.	**10**
Q.3	a)	Derive radiation resistance of infinitesimal dipole.	**10**
	b)	Explain boundary conditions for electrostatic fields between two dielectric media.	**10**
Q.4	a)	State and explain principle of pattern multiplication. Explain concept of array factor.	**10**
	b)	Explain following concept of antennas with mathematical expressions. i) Radiation pattern ii)Directivity	**10**
Q.5	a)	Describe various configurations of horn antenna and explain H plane sectoral horn antenna.	**10**
	b)	What is reactive near field. Discuss its importance in communication field and its applications.	**10**
Q.6	a)	Explain sky wave propagation with reference to D,E and F regions and multiple reflections.	**10**
	b)	Design a rectangular microstrip patch with dimension W and L ,over single substrate FR4 whose center frequency is 2.45 GHZ. The height of substrate is 1.6 mm. Find the dimensions W and L taking into account the fringing field.	**10**