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Sixth Semester B.E. Degree Examination, May/June 2010
Antennas and Propagation

Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.*

PART – A

- 1 a. Define the following with respect to antenna:
 - i) Isotropic radiator
 - ii) Directivity
 - iii) Radiation pattern
 - iv) Polarization. (10 Marks)
- b. Antenna of gain G radiates Wt. Watts. Show that the free space intensity E at a distance of r metres is given by $E = \frac{\sqrt{30wt.G}}{r}$ v/m. (05 Marks)
- c. Derive an expression for antenna efficiency in terms of radiation resistance. (05 Marks)
- 2 a. Find the directivity and beam width of the following :
 - i) $U = U_m \sin \phi \cos^2 \theta$ ii) $U = U_m \cos \phi \sin^2 \theta$. (10 Marks)
- b. State and prove the power theorem. (05 Marks)
- c. Prove that $D = 2(n+1)$ for a unidirectional pattern given by $U = U_m \cos^n \theta$. (05 Marks)
- 3 a. Derive an expression for field intensity for two isotropic point sources with equal amplitude and equal phase. (10 Marks)
- b. Draw the polar diagram of a broadside array with number of elements = 5 and spacing = $\lambda/2$. (10 Marks)
- 4 a. Derive an expression for radiation resistance of a short electric dipole. (10 Marks)
- b. Write short notes on :
 - i) Folded dipole antenna ; ii) Thin linear antenna. (10 Marks)

PART – B

- 5 a. Discuss the features of a loop antenna. Derive an expression for far field components of a loop antenna. (10 Marks)
- b. Write notes on : i) Horn antenna ; ii) Slot antenna. (10 Marks)
- 6 a. Discuss the features of an helical antenna. Give the construction details of the helical antenna. (10 Marks)
- b. What are parabolic reflectors? Where these antennas are used? (05 Marks)
- c. Draw the construction details of an embedded antenna. (05 Marks)
- 7 a. Discuss the different forms of radio wave propagation. (10 Marks)
- b. Derive an expression for wave tilt of surface wave. (10 Marks)
- 8 a. Explain different layers of ionosphere in detail. (10 Marks)
- b. Define the following with respect to wave propagation :
 - i) Critical frequency ; ii) MUF ; iii) Virtual height ; iv) Skip distance. (10 Marks)

