

GUJARAT TECHNOLOGICAL UNIVERSITY**B E Sem-VI Examination May 2011****Subject code: 161003****Subject Name: Antenna & Wave Propagation****Date: 19/05/2011****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Attempt all following short questions. **07**
 (i) What is Antenna? (ii) Define Radiation Resistance.
 (iii) Show Antenna Field Zones. (iv) Define Directivity.
 (v) What is Beam Solid Angle? (vi) Define HPBW.
 (vii) How many square degree equals to solid angle of a sphere?
- (b) Attempt Any Two of the following. **07**
 (i) Show that effective length of receiving antenna is same as that of transmitting antenna.
 (ii) Show that directivity of a current element is 1.5 or 1.76 db.
 (iii) Starting with field equations of short dipole, show that amplitude of radiation field and induction field are equal at $\lambda/6$ distance.
 (iv) Derive expression for Effective Aperture A_e of an antenna having impedance Z_A and terminating impedance Z_T .
- Q.2** (a) Explain Principle of Pattern Multiplication for array of point sources. Also give two examples of short dipoles. **07**
 (b) Explain Broadside and End-fire Array, considering linear array of four isotropic sources. **07**
- OR**
- (b) Explain Schelkunoff Theorem and show its usefulness. **07**
- Q.3** (a) Compare far fields of Short Dipole and Small Loop antenna. **07**
 (b) Derive expression for Radiation Resistance of Loop antenna. **07**
- OR**
- Q.3** (a) Show that Short Magnetic dipole is equivalent to a loop. **07**
 (b) Explain Practical design considerations for the Monofilar Axial Mode Helical antenna. **07**
- Q.4** (a) Explain Yagi-Uda antenna in detail. **07**
 (b) Explain Frequency Scanning Arrays and mention its advantages. **07**
- OR**
- Q.4** (a) Attempt details of Any Two of the following. **07**
 (i) Lens Antenna. (ii) Micro Strip Antenna (iii) Slot Antenna. (iv) Log Periodic Antenna.
 (b) Show how impedance matching is done with the help of Folded Dipole Antenna. **07**
- Q.5** (a) Explain Antenna Gain measurement methods. **07**
 (b) Explain Characteristics of Ionosphere layer and define following terms **07**
 MUF, Critical Frequency & Skip Distance.
- OR**
- Q.5** (a) Explain different modes of Propagation with its practical significance. **07**
 (b) Describe Antennas for Terrestrial Mobile communication systems. **07**
