

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-V • EXAMINATION – SUMMER • 2014

Subject Code: X 51101**Date: 27-05-2014****Subject Name: Antenna and Wave Propagation****Time: 02:30 pm - 05:00 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) Define the term Antenna. Also explain radio communication link with transmitting antenna and a receiving antenna. **07**
- (b) Define the following terms (i) Radiation intensity (ii) Gain (iii) Directivity (iv) Effective aperture (v) Polarization (vi) Skip distance (vii) MUF. **07**
- Q.2** (a) Define the term effective height of an antenna. For a short vertical grounded antenna is designed to radiate at 10 MHz, calculate the radiation resistance if the effective height of antenna is 50 meters. **07**
- (b) Derive the far field components and the radiation resistance of a small circular loop with radius 'a' and with a uniform phase current. **07**
- OR**
- (b) Draw the figure of helix with its associated dimensions showing the relationship between the circumference, spacing, turn length and pitch angle of helix. State the limits of $C\lambda$, α and n for a helix to produce an axial mode. **07**
- Q.3** (a) Derive the field equation at a distant point due to the linear arrays of n-isotropic point source of equal amplitude and spacing. **07**
- (b) Explain Yagi-Uda antenna in detail. **07**
- OR**
- Q.3** (a) Explain Dolph-Tschebysheff array in brief. **07**
- (b) Explain the principle of pattern multiplication. **07**
- Q.4** (a) Explain the structure of ionosphere. **07**
- (b) Derive the expression for radiation resistance of a half-wave dipole antenna. **07**
- OR**
- Q.4** (a) What is a slot antenna and where is it used ? State Babinet's principle and illustrate its application to slot antennas and complementary antennas. **07**
- (b) Show how impedance matching is done with the help of folded dipole antenna. **07**
- Q.5** (a) Describe the methods for measuring the gain and beam width of antenna. **07**
- (b) What do you mean by frequency independent antennas? Draw the log periodic wire antenna and explain its functioning and design concepts in detail. **07**
- OR**
- Q.5** (a) Explain different types of reflector antennas. **07**
- (b) Explain different modes of propagation with its practical significance. **07**
