

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER-V • EXAMINATION – SUMMER 2013

Subject Code: X51101

Date: 10-05-2013

Subject Name: Antenna & 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 following terms **07**
- 1) Antenna
 - 2) Beam Area
 - 3) Radiation Intensity
 - 4) Directivity
 - 5) Polarization
 - 6) Fading
 - 7) Ionization
- (b)** Calculate the approximate directivity of unidirectional antennas having power pattern given by $P(\theta, \phi) = P_m \sin \theta \sin^2 \phi$, $0 \leq \theta, \phi \leq \pi$ **07**
- Q.2 (a)** Calculate the radiation resistance of current element whose overall length is $\lambda/50$. **07**
- (b)** Derive the expression for the radiation resistance of a half wave dipole antenna. **07**
- OR**
- (b)** Explain the principle of pattern multiplication for array of point sources. **07**
- Q.3 (a)** Explain Yagi Uda antenna in detail. **07**
- (b)** Derive expression the radiation resistance of a loop antenna. **07**
- OR**
- Q.3 (a)** Define & explain the two modes of helical antenna. **07**
- (b)** Explain in brief broadside & end fire array. **07**
- Q.4 (a)** Explain in brief Embedded antenna & Plasma antenna. **07**
- (b)** Classify the various type of horn antenna. How does the corrugation help the overall performance of the horn antennas? **07**
- OR**
- Q.4 (a)** Explain Log periodic antenna & Micro strip antenna. **07**
- (b)** What is a slot antenna? State & explain the Babinet's principle. **07**
- Q.5 (a)** Define the terms MUF, Critical Frequency & Skip Distance, also explain the structure of Ionosphere. **07**
- (b)** Explain antenna gain measurement method. **07**
- OR**
- Q.5 (a)** Enlist the modes of propagation & explain space wave propagation. **07**
- (b)** In satellite communication system the height of the satellite is 36000 km above the earth and operated at 4000 MHz. The gain of the transmitting antenna is 20 dB and that of receiving antenna is 40 dB. Determine i) the free space transmission loss ii) the power received when the power transmitted is 200 W. **07**