

GUJARAT TECHNOLOGICAL UNIVERSITY

BE Sem-VI Summer Exam 2012

Subject code: 161003**Subject Name: Antenna and Wave Propagation****Date: 15/05/2012****Total Marks: 70****Time duration: 10:30am to 1.00pm****Instructions:**

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

Q.1 (a) Define and discuss the following parameters / terms with help of necessary formula: **07**

- i) Radiation patterns
- ii) Antenna apertures
- iii) Antenna field zones

(b) Classify the various modes of electromagnetic radio wave propagation. **07**
Explain any two of them and discuss their technical features and applications. Draw necessary figures and write mathematical expressions where so ever needed.

Q.2 (a) Draw and explain the experimental set up for measuring the radiation patterns. Also enlist the factors affecting the laboratory measurements, assumptions made and probable remedies. **07**

(b) Explain the three element dipole array. Highlight the design issues and discuss the functions of each parasitic element with help of an example at 900 MHz operating frequency. **07**

OR

(b) Define and explain the two modes of helical antenna. Enlist the design steps for it in any one mode with help of necessary formulae. **07**

Q.3 (a) Which are various forms of antenna arrays? Explain their technical features and draw their ideal radiation patterns. **07**

(b) Write short note on various feed arrangements and impedance matching methods for antenna designs. **07**

OR

Q.3 (a) Explain phased array antenna. How is it used as frequency scanning antenna? Justify. **07**

(b) Write short technical notes on following: **07**

- i) Ultra wide band antenna
- ii) Radiation resistance of half wave folded and simple dipole antennas

Q.4 (a) What do you mean by frequency independent antennas? Draw the log periodic wire antenna and explain its functioning and design concepts in detail. **07**

(b) What is physical significance of antenna synthesis. Explain the Dolph-Tchebysheff Distribution for linear arrays. **07**

OR

Q.4 (a) Why are the slot dipole antennas known as complementary antennas? **07**
Explain the working, design and applications of slot dipole antennas. Show the current distribution and radiation pattern for the same.

- (b) Classify various types of horn antennas. Describe their functioning. How does the corrugation help the overall performance of the horn antennas? 07
- Q.5** (a) Describe the working principle, design and applications of a microstrip patch antenna. Explain the physical significance of fringing field. 07
- (b) Write technical short note on following: 07
- i) Embedded antennas
 - ii) Ionospheric fading and absorption for radio waves
- OR**
- Q.5** (a) What are main features of microwave antennas? Explain parabolic reflector antennas. Enlist and compare various feed mechanisms for the same. 07
- (b) Explain a loop antenna. Derive the expression for its radiation resistance. Compare the same with an equivalent dipole antenna. 07
