

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 131524

Roll No.

--	--	--	--	--	--	--	--	--	--

B.Tech.

(SEM. V) THEORY EXAMINATION, 2015-16

**ANTENNA & WAVE PROPAGATION**

[Time : 3 hours]

[Maximum Marks : 100]

**Section-A**

1. Attempt all sections. All sections carry **equal** marks. Write answer of each section in short. (10×2=20)
  - (a) Write three methods which might be used to generate circular polarisation for a lowearth-orbit satellite antenna communication system.
  - (b) Explain why all practical antenna necessarily have maximum directivity greater than unity.
  - (c) What are the difficulties in waveguide Propagation?
  - (d) Find the terminal impedance of infinitesimally thin  $\lambda/2$  slot antenna when the impedance of infinitesimally  $\lambda/2$  dipole antenna is  $73 + 42.5j \Omega$ .

- (e) What is radiation resistance?
- (f) What do you mean by resonant and Non-resonant long wire antenna?
- (g) Define antenna array and Point source.
- (h) What are the advantages and disadvantages of rhombic antenna?
- (i) What is anechoic chamber? For what purpose it is used?
- (j) What do you understand by line of sight?

### Section-B

**Note:** Attempt **any five** questions from this section.

(10×5=50)

- 2. Derive the Friis transmission line formula. Calculate the effective aperture of dipole length 2cm at a frequency of 1.2 GHz. What will be the power received for an incident power density of  $2 \text{ m W/m}^2$ ?
- 3. Explain the concept of Antenna Temperature. Calculate the maximum effective aperture of a beam antenna having a HPBW of 30 degree and 35 degree in perpendicular planes intersecting in beam axis. Assume negligible side lobes.

- 4. Explain in detail about folded dipole antenna. How impedance of folded dipole antenna is related to the number of dipoles and radius of dipoles?
- 5. Explain the principle of pattern multiplication and its advantages. Give one example of Pattern Synthesis.
- 6. Write a short note on Microstrip antenna and Slot antenna.
- 7. What are the methods for Gain Measurement?
- 8. Describe the applications of Loop antenna? Write down the comparison between parabolic and reflector antennas?
- 9. Write short note on Ground wave propagations and space wave propagation?

### Section-C

**Note:** Attempt **any two** questions from this section

(15×2=30)

- 10. Explain the various modes of operation of a helical antenna. What is Horn antenna? Explain its applications.

11. Explain the mechanism of Ionospheric propagation with neat diagram. In an Ionospheric propagation, reflection take place at a height of 400 km and that the maximum denesity in the ionosphere corresponds to a 0.9 refractive index at 10MHz. Determine the ground range for which this frequency is MUF take earth's curvature into consideration.
12. (a) Discuss the method for the measurement of Radiation Pattern
- (b) Design a three-element Yagi-Uda antenna at an operating frequency of 250MHz.
- (c) For end fire array consisting of several half wave length long isotropic radiators to have a directive gain of 30. Find the array length and FNBW. What will be these values for Broadside array?

—x—