

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

**PAPER ID : 2120**

Roll No.

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**B. Tech**

**(SEMESTER-V) THEORY EXAMINATION, 2012-13**

**ANTENNA & WAVE PROPAGATION**

*Time : 2 Hours ]*

*[ Total Marks : 50*

1. Attempt **all** question. **5 × 2 = 10**
- (a) Define radiation resistance of an antenna.
- (b) Define beam width of an antenna.
- (c) Define end fire array.
- (d) Define pitch angle of a helical antenna.
- (e) Explain the term tilting for ground wave propagation.
2. Answer any **three** : **5 × 3 = 15**
- (a) For end fire array consisting of several half wavelength long isotropic radiators is to have a directive gain of 30. Find array length and width of the minor lobe (i.e. beam width between first nulls.) What will be these values for a broad side array ?
- (b) What is the effective aperture of an antenna and how it is related to the gain ?
- (c) Show that directivity of a small loop antenna is  $3/2$ .
- (d) Show that a parabolic dish antenna can provide a very narrow beam.
- (e) Explain the term virtual height and MUF for sky wave propagation.

Answer the following questions :

5 × 5 = 25

3. Explain the term antenna beam area or beam solid angle.

**OR**

Explain the term antenna efficiency, front to back ratio, antenna bandwidth, and antenna beam efficiency.

4. Derive expression for the directivity of an end fire array of the point sources spaced distance  $d$  apart.

**OR**

Describe the principle of End fire and Broad side arrays.

5. What are the different types of antennas used at very high frequencies ? Discuss the advantages of a folded dipole ? What is a balun and why it is used at these frequencies ?

**OR**

Write short notes on Yagi antenna and folded dipole antenna.

6. Explain the term multi hop propagation. Explain the structural details of the ionosphere.

**OR**

Explain space wave and surface wave. What is radio horizon ? Define LOS.

7. Write short notes on antenna temperature and equivalent noise temperature of antenna.

**OR**

An antenna has a radiation resistance of 72 ohm, a loss resistance of 8 ohms and a power gain of 12 db, determine antenna efficiency and its directivity.