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

PAPER ID : 2486 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VI) EVEN THEORY EXAMINATION 2012-13

ANTENNA AND WAVE PROPAGATION

Time : 2 Hours *Total Marks : 50*

Note :– (1) Attempt **all** questions.

(2) All questions carry equal marks.

1. Attempt any **two** parts of the following : **(5×2=10)**

(a) Derive the fields produced by an oscillating current element in radiation and near zone.

(b) Define radiation resistance. Calculate the radiation resistance and efficiency of a current element whose overall length is $\lambda/50$ and loss resistance is 1.5 Ω.

(c) Explain radiation patterns of an antenna. Draw the pattern (E and H plane) of half wave dipole and isotropic antenna.

2. Attempt any **two** parts of the following : **(5×2=10)**

(a) Derive reciprocity theorem for antenna.

(b) Show that the maximum effective aperture of a short dipole antenna is $0.119\ \lambda^2$.

(c) Explain the principle of pattern multiplication. Obtain the radiation pattern of 4 elements fed inphase, spaced $\lambda/2$ apart using pattern multiplication.

3. Attempt any **two** parts of the following : **(5×2=10)**

(a) Explain the various types of antenna arrays.

(b) What is yagi antenna ? Explain its construction and properties.

(c) Explain the principle of operation of parabolic dish.

4. Attempt any **two** parts of the following : **(5×2=10)**

(a) Define the term MUF and skip distance.

(b) Explain the phenomenon of Duct propagation.

(c) In a communication link two identical antenna operating at 10 GHz and used with power gain of 40 db. If the transmitted power is 1 W. Find the received power if the range of the link is 30 km.

5. Attempt any **two** parts of the following : **(5×2=10)**

(a) Describe the principle of operation of rhombic antenna. What happens to the main lobe of rhombic antenna if its frequency is doubled ?

(b) Explain the working principle of log spiral antenna.

(c) Describe constructional details and principle of operation of broadband antenna.