Printed Pages : 3 **TEC – 605**

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

PAPER ID : 3100 Roll No.

B. Tech.

(SEM. VI) EXAMINATION, 2008-09

ANTENNA AND WAVE PROPAGATION

Time : 3 Hours] *[Total Marks : 100*

Note : Attempt all the questions.

1 Attempt any **two** questions of the following : **10×2=20**

(a) Explain the following:

(i) Isotropic Radiator

(ii) Directive Gain

(iii) Effective length

(b) Derive Reciprocity theorem for antennas. Show that the transmitting and receiving radiation pattern of antennas are equal.

(c) Explain the operation of a yagi-uda antenna. What are the advantages? Differentiate between the director and reflector of the antenna.

2 Attempt any **two** questions of the following : **10×2=20**

(a) What is a broadside array? Explain in detail the structure, radiation pattern and principle of operation of such an antenna.

(b) Find the location of the first nulls on either side of the beam centre for linear array of 80-in-phase elements fed with equal amplitude current which are $\lambda/2$ apart.

(c) Explain the Non-resonant antenna (Rhombic antenna) and show its radiation pattern. Why it is called broadband antenna?

3 Attempt any **two** questions of the following : **10×2=20**

(a) Write short notes on following :

(i) Ground Wave Propagation

(ii) Duct propagation

(iii) Effect of ionosphere on sky waves.

(b) What is the mechanism of tropospheric propagation? What are the practical considerations involved in using troposcatter propagation? What are the advantages of using this mechanism?

(c) Discuss the effect of Earths magnetic field on ionospheric radio wave propogation. Estimate the Gyro-frequency.

4 Attempt any **two** questions of the following : **10×2=20**

(a) An air-filled rectangular waveguide has dimensions of a = 6 cm and b = 4 cm. The signal frequency is 3 GHz. Compute the following for TE_{10} mode.

(i) Cut off frequency

(ii) Wavelength in waveguide

(iii) Phase velocity in waveguides

(iv) Wave impedance in waveguide.

(b) Derive expression for field components for TE wave in rectangular waveguide. Define dominant and degenerate modes.

(c) What do you understand by excitation of waveguides? What are the various methods of excitation of rectangular and circular waveguides?

5 Attempt any **two** questions of the following : **10×2=20**

(a) What is velocity modulation? Explain the operation of reflex Klystron with neat diagram.

(b) Explain the schematic and working of magnetron.

(c) Write short notes on any **two** of the following :

(i) TWT amplifier

(ii) Gunn diode

(iii) Backward Wave Oscillator (BWO)
