2006 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
ANTENNA AND WAVE PROPAGATION
(COMMON TO ELECTRONICS & COMMUNICATION ENGINEERING AND
ELECTRONICS &TELEMATICS)

NOVEMBER 2006

TIME -3 HOUR
MARK – 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define and account for the presence of

i. Radial power flow

ii. Radiation resistance for a short dipole.

(b) Obtain the relative amplitudes of radiation, induction and electro-static fields at a distance of 2 from a short current element having an uniform current of 1 mA along its length.

[8+8]

2. (a) Explain the term Antenna terminal impedance and give the RLC equivalent circuit of it.

(b) Derive an expression for the terminal impedance as a function of frequency and hence define its Bandwidth.   [8+8]

3. (a) Obtain the expression for the beam width of broadside and end fire arrays and compare them?

(b) Explain the principle of multiplication of patterns.   [10+6]

4. (a) Give the current distribution and radiation pattern of a folded dipole antenna. Explain how the radiation pattern will be modified with the addition of a reflector and two directors with such an antenna.

(b) 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?   [8+8]

5. (a) With neat sketches distinguish between the band width, selectivity and other radiation characteristics of slot and complimentary dipoles.

(b) What are the special features of loop antennas? Explain how a small loop is treated as equivalent to a short magnetic dipole.   [8+8]

6. (a) Explain the basic principles of operation in lens antennas. Hence distinguish between the different types of lens antennas used in practice.

(b) With a neat sketch, explain the constructional features of a parabolic reflector and obtain an expression for its curved profile.   [8+8]

7. (a) Explain the gain measurement of antenna by comparison method.

(b) Define beam width of an antenna. Explain the procedure for measuring the beam width and also the side lobe level

8. (a) Explain the following:

i. Ray path

ii. Skip distance

iii. Maximum usable frequency

iv. Faraday Rotation.

(b) Explain the line of sight propagation of radio waves