2008 COCHIN UNIVERSITY OF SCIENCE & TECHNOLOGY

B.TECH ELECTRONICS & COMMUNICATION ENGINEERING
RADIO COMMUNICATION

NOVEMBER 2008

TIME: 3 HOUR
MARK: 90

ANSWER ANY SIX QUESTION
ALL QUESTIONS CARRY EQUAL MARKS

1a. The derived E field for a Hertzian/Short dipole have two significant components. Explain these fields, their behavior and significance

b. Explain the following:

i) Radiation resistance and efficiency

ii) Effective aperture area

iii) Directivity and gain

2a. Draw a typical dipole antenna and its radiation pattern and explain

i) major lobe and beamwidth

ii) side lobe and its level

iii) polarization

b. Compare between lambda/2 dipole and lambda/4 monopole and folded dipole in terms of their radiation resistance, directivity, and beamwidth

3a. Explain clearly the reciprocity theorem for antennas

b. Explain and describe the 3-element Yagi array, naming the elements, dimensions and their spacing

4a. Using the expression derived for total field for a 2-element array, derive the field expression for an n-element array of isotropic radiators with equal excitation and elements spaced lambda/2

b. Through geometrical interpretation explain why parablic reflector antennas are almost always preferred at microwave frequencies

5a. Ionosphere supports long distance communication. Explain, indicating the behaviorand limitations of ground wave, space wave and troposphere

b. Explain Line Of Sight (LOS) communication and Horizon effect. The heights of transmitting and receiving antennas are 20m and 15m respectively from ground. Determine the maximum range obtainable in the line of sight mode

6a. Explain the folowing: critical frequency, virtual height, effect of earth's magnetic field, skip distance

b. Exlain with necessary figure and relation Antenna Gain measurement by substitution method

7a. Explain clearly with figures the following : pulse width, pulse repetition frequency, range resolution, range ambiguity

b. A pulse radar has plse width of 1 microsecond and prf of 1000Hz. Determine range resolution and unambiguous range

8a. Describe the concept of Matched filter receiver and show that the impulse response of the matched filter is the signal itself reversed in time

b. Explain the "Chirp" radar and its necessity and functioning through waveforms

9a. Explain the functioning of fm-cw radar as an altimeter, bringing out the advantages

b. Describe the two main types of transmitter configuration normally used and compare them

10a.Describe Amplitude Comparison Monopulse Tracking radar using 4 antennas/ feeds. What are the criticalities in this approach?

b. Describe the passive ECm techniques normally used against radar