2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
COMMUNICATION ENGINEERING
(ELECTRONIC & CONTROL ENGINEERING)

NOVEMBER 2005

TIME – 3 HOUR
MARK – 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the applications of balanced modulator? Prove that the balanced modulator produces an output consisting of sidebands, with the carrier re- moved.

(b) An AM broadcast station has a modulation index of 0.75 on the average. What would be its average power saving it if could go over to SSB-SC transmission while having to maintain the same signal strength in its reception area. [6+10]

2. (a) The sinusoidal modulating wave m(t) = Am cos(2 fmt) is applied to a phase modulation with phase sensitivity Kp . The unmodulated carrier wave has frequency fc and amlititude Ac . Determine the spectrum of the resulting phase modulated wave, assuming that the maximum phase deviation p = KpAm does not exceed 0.5 radians.

(b) A carrier wave of frequency 100 MHz is frequency modulated by sine wave of amplitude 20 volts and frequency 100 KHz. The frequency sensitivity of the modulation is 25 KHz per volt. Determine the approximate bandwidth of FM wave using Carson's rule. [10+6]

3. (a) Explain how frequency stability is achieved in modern transmitter.

(b) Describe with aid of suitable diagram, the principal method of SSB generation.

(c) Describe the advantages of a SSB SYSTEM for high frequency point to point communication and explain why it is unsuitable for broadcasting. [4+4+8]

4. (a) Define and explain four specifications of receiver characteristics.

(b) Explain the necessity for AGC in a radio communication system. What is meant by delayed AGC? Explain with a neat circuit diagram. [6+10]

5. (a) Define noise figure of a system. Obtain an expression for the equivalent noise of 2 cascaded stages. Deduce there from the requisite specifications of a good R.F. Amplifier.

(b) Two resistors of 1000 each are at temperatures of 3000K and 4000K respec- tively. Find the voltage power spectral density at the terminals formed by

i. a series
ii. Parallel combination of these resistors. [6+10]

6. (a) Discuss the principle behind the Frequency Division Multiplexing.

(b) Compare and contrast PAM, PWM, PPM methods. [6+10]

7. (a) Draw the block diagram of binary PSK receiver and explain the working principle.
(b) Write the difference between coherent and non coherent systems. Give example. [8+8]

8. (a) Write the important signaling functions for circuits-switching networks?
(b) What are the in channel and common - channel signaling? [12+4]