B.Tech. Degree V Semester Examination, November 2005

CS 504 DATA COMMUNICATION

(2002 Admissions)

Time: 3 Hours Maximum Marks: 100

I a) Explain amplitude modulation. Give equation for modulation index and power relations of AM wave. (10)

b) A 400 watts carrier is modulated (AM) to a depth of 75 percent. Calculate the total power in the modulated wave. (5)

c) Explain signal-to-noise ratio and noise figure with respect to analog communication system. (5)

OR

II a) Explain how TDM of PCM signals is effectively used in telecommunication system. (10)

b) Explain how voice signals are digitized to from PCM signal. (10)

III a) Explain quadracture amplitude modulation. What is the advantage of QAM over other digital modulation techniques? (8)

b) What are the guided transmission media that can be used for digital communication? Give brief notes. Give brief notes on different catagories of UTP cables. (12)

OR

IV a) If a 64 symbol stage modem is designed to transfer data at a rate of 2.048Mbps, what is the minimum bandwidth for the transmission cable. Assume base band signaling. (5)

b) Deduce the maximum theoretical information rates associated with the following transmission channels.

i) A telex network with a bandwidth 500Hz and signal –to-noise ratio of 5dB

ii) A PSTN with bandwidth of 3100 Hz and signal-to-noise ratio of 5dB. (5 x 2 = 10)

c) A modem to be used with a PSTN uses an AM-PSK modulation scheme with eight levels for signaling element. If the bandwidth of the PSTN is 3100Hz, deduce the Niquist maximum data transfer rate. (5)

V a) A data stream '1 0 0 1 1 1 0 1' has to be transmitted over a digital transmission media. Neatly draw the encoded pattern of this data stream for the following methods. Also give notes on those encoding schemes.

i) Polar NRZ-L ii) Polar NPZ-I

iii) Manchester iv) Differential Manchestar

v) Bipolar AMI vi) Pseuodo – tarnary (6)

b) Explain simplex, half duplex and full duplex transmission modes. (6)

c) Write notes on parallel and serial transmission. (8)

OR

VI a) Write notes on synchronous transmission and asynchronous transmission (10)

b) Explain bit stuffing and character stuffing with suitable examples. (10)

VII a) Explain idle-RQ protocol for error control. (8)

b) A series of 1000 bit frame is to be transmitted using idle RQ protocol. Determine the link utilization for the following types of data link assuming data transmission rate of I) 1Kbps ii) Mbps. The velocity of propagation of the link is 2×10^8m/s and the bit error rate is negligible.

i) A twisted pair cable 1km in length

ii) A leased live 200km in length

iii) A satellite link of 50,000 Km (3 x 4 =12)

OR