

ADCA / MCA (II Yr)
Term-End Examination
June, 2007

CS-09 (S) : DATA COMMUNICATION AND NETWORKS

Time : 3 hours

Maximum Marks : 75

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest.

1. (a) Explain the difference between the following line coding techniques : 8
- (i) Unipolar NRZ
 - (ii) Polar NRZ
 - (iii) Bipolar encoding
 - (iv) Differential Manchester coding
- (b) Consider a digital voice channel. Assume a bandwidth of 3100 Hz. Find the channel capacity in bps, if the S/N ratio is 30 dB. 4
- (c) List various services offered by User Datagram Protocol (UDP). What is its datagram format ? 6

- (d) Differentiate between a source routing bridge and transparent bridge with the help of diagrams. Also explain its operation. 8
- (e) Data at the rate of 6 bps is to be transmitted over leased line of BW 4 KHz using Nyquist criterion pulses. Determine the value of roll of factor r that can be used. 4
2. (a) What are the problems with a 2-way handshake in a connection establishment and a connection termination ? How does 3-way handshake resolve them ? 5
- (b) Explain the process of phase shift keying. What are the applications where it will be better than ASK ? 5
- (c) A binary source emits data at a rate of 256,000 bits/sec. Multi-amplitude shift keying (MASK) with $M = 2$ is considered. Determine signal power required at receiver input and minimum transmission bandwidth required, if $S_n(w) = 10^{-6}$ and bit error rate P_b is required to be less than 10^{-5} . 5
3. (a) What are the services offered by network layer ? Explain various protocols, which are devised to cater these services. 8

(b) Explain the size and purpose of the following fields in CSMA MAC frame format : 7

- (i) Preamble
- (ii) Start frame delimiter
- (iii) Destination address
- (iv) Source address
- (v) Length
- (vi) LLC data
- (vii) Pad

4. (a) For what purpose is reverse address resolution protocol used ? 3

(b) Differentiate among the following : 6

- (i) Circuit switching
- (ii) Packet switching
- (iii) Message switching

(c) Construct a systematic (7, 4) cyclic code using generator polynomial 6

$$g(x) = x^3 + x^2 + 1$$

Consider a data vector $d = 1010$.

5. Write any three differences between the following : 15

- (i) Frequency division multiplexing and Time division multiplexing
- (ii) Token ring and Token bus architecture
- (iii) Upward multiplexing and Downward multiplexing