MCS-042

MCA (Revised)

Term-End Examination

December, 2008

MCS-042 : DATA COMMUNICATION AND COMPUTER NETWORKS

Time : 3 hours *Maximum Marks : 100*

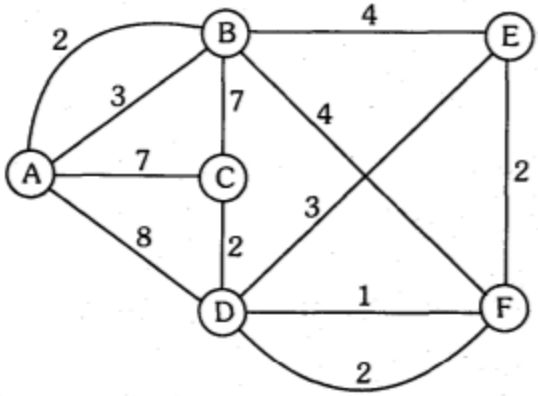
Note : *Question number 1 is* ***compulsory****. Attempt any* ***three*** *questions from the rest.*

1. (a) Assume a binary signal is sent over a 8 KHz channel, where S/N Ratio is 20 dB. Can it carry 48 kbps data rate ? Show relevant calculations. 5

(b) Show the constellation diagram of QPSK. 5

(c) Find CRC for the data polynomial $x^9 + x^7 + x^3 + x^2 + 1$ with generator polynomial $x^3 + x + 1$. 5

(d) Consider the following network, with the indicated link cost. Use Bellman Ford Algorithm to find the shortest paths from Source Node (A) to all other nodes. 10



(e) What is the advantage of QAM over ASK or PSK ? A constellation diagram consists of 8 equally spaced points on the circle. If the bit rate is 4800 bps, what is the baud rate ? 5

(f) "Data link and Transport layer have some common functions like flow control and reliable delivery." Is it a duplication of functions ? Explain your answer. 5

(g) What is the maximum capacity of a Noiseless channel whose bandwidth is 200 KHz and in which the value of the data transmitted may be indicated by one of 64 different amplitudes ? 5

2. (a) Discuss Link state routing. What are the problems in Link state routing ? 7

(b) Assume two prime numbers are p = 13 and q = 11. Calculate the Public and Private key for RSA algorithm. 8

(c) How is the efficiency in the use of bandwidth increased by Selective Repeat ARQ ? Give an example. 5

3. (a) Show the operation of Ethernet protocol. 5

(b) Explain the purpose of the following TCP header fields : 10

(i) SYN Flag

(ii) FIN Flag

(iii) Window size

(iv) Urgent Pointer

(v) Sequence Number

(c) Compare Synchronous TDM and Statistical TDM in terms of efficiency, data rate and hardware requirement. 5

4. Differentiate between the following : *20*

(a) Packet and Circuit switching

(b) Bus and Star topology

(c) Isochronous and Synchronous communication

(d) Pure ALOHA and Slotted ALOHA

5. (a) Assume the Maximum Transfer Unit (MTU) is 1480 bytes, 20 bytes is the header and data is 4980 bytes. Show the fragmentation process indicating the fragmentation field values at each stage.

Make suitable assumptions. *10*

(b) Why is traffic shaping needed ? Write an algorithm for traffic shaping when the data rate is variable. *5*

(c) Explain how TCP provides reliability. *5*