

MCA (Revised)
Term-End Examination
June, 2007

**MCS-042 (S) : DATA COMMUNICATION
AND COMPUTER NETWORKS**

Time : 3 hours

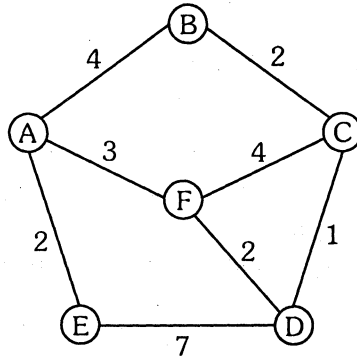
Maximum Marks : 100

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

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1. (a) Draw the pulse diagram for bit stream 1010111001011, for the following encoding techniques : 6
- (i) NRZ-L
 - (ii) Manchester
 - (iii) Differential Manchester
- (b) Explain the differences between Circuit switching and Packet switching. How is virtual circuit approach different from datagram approach ? 7
- (c) "Slotted ALOHA achieves double efficiency than pure ALOHA." Justify the statement. 6

- (d) What is the mechanism of : 6
- (i) Stop and Wait
 - (ii) Continuous ARQ

- (e) Consider the following network with the indicated link cost. Use Dijkstra's shortest path algorithm to compute the shortest path from A to all other network nodes. Show the complete calculation. 7



- (f) Find the CRC for a 10 bit sequence 1010011110 and a divisor of 1011. Also, check your answer. 5
- (g) Compare flow control and congestion control. 3
- 2.** (a) What is MAN ? How does it differ from LANs and WANs in terms of size, transmission media and reliability ? 7
- (b) Explain the mechanism of light propagation in Fiber optics. Also, describe the methods of connecting fibers in a network. 5

- (c) What is Hamming Distance ? Find minimum hamming distance between the code words 000111, 111000 and 111111. Can it be used as single-bit error correcting code ? 6
- (d) What is piggybacking ? 2
3. (a) How is QAM different from PSK ? For a required number of signal levels, which one will provide better key ? Justify your answer. 4
- (b) What is the need of CSMA in data communication ? Explain the working of different CSMA protocols. 7
- (c) How is Block-Cipher different from Stream-Cipher ? Write all the steps of DES algorithm having 64-bit block size and 56-bit key. Also, draw suitable diagram to show all the steps in the algorithm. 9
4. (a) In distance vector routing, how does each router get its initial knowledge about the network and how does it use shared information to update that knowledge ? Give suitable example to explain your answer. 7
- (b) Explain the working of token bucket traffic shaper. How is it different from leaky bucket traffic shaper ? Give at least four differences. 7
- (c) What are the considerations in choosing the length of the time-slice for TDM ? What are the inefficiencies inherent in Synchronous TDM and how does Statistical TDM seek to reduce them ? 6

5. Answer the following questions :

- (i) Compare the sliding window protocol in datalink layer with that in the transport layer. 4
- (ii) What are the data packets at each TCP/IP protocol suite layer ? 4
- (iii) Differentiate between a physical address and a logical address. 2
- (iv) Change 77 to its one's complement form. 2
- (v) What is the major disadvantage of public key encryption ? Also, give the major disadvantage of secret key encryption. 3
- (vi) Explain the components of X-509 certificate. 5