

**MCA (Revised)**  
**Term-End Examination**  
**June, 2011**

**MCS-042 : DATA COMMUNICATION AND  
COMPUTER NETWORKS**

*Time : 3 hours*

*Maximum Marks : 100*

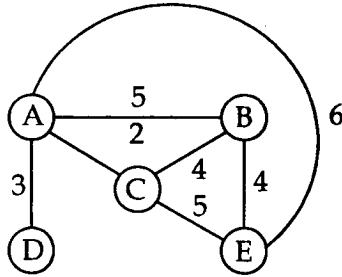
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*Note : Question number one is compulsory. Attempt any three questions from the rest.*

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1. (a) If a binary signal is sent over 3 MHz and whose signal to noise ratio is 30 dB, what is the maximum achievable channel capacity ? 4
- (b) Assume a data stream is made of "000000" encode this stream using the following encoding schemes (Do any three). 6
- (i) Manchester
  - (ii) Differential Manchester
  - (iii) UNI polar
  - (iv) Polar NR Z-I
  - (v) RZ
- (c) Construct the Hamming code for the bit sequences 10011010. 5

- (d) Consider the following network with the indicated link cost. Use Dijkstra's shortest path algorithm to find the shortest path from source node A to all other nodes. 10



- (e) Explain the hidden station and exposed station problems with illustration. 5
- (f) How does TCP's congestion control mechanism work? Illustrate through an example. 5
- (g) Explain encryption and decryption process in Triple DES. 5
2. (a) What is Infrared? Describe its characteristics and its two applications. 5
- (b) Compare byte stuffing and bit stuffing. 3+2  
Also, "Bit Stuff" the following data frame.
- 000111111100110001111111100
- (c) What is count to infinity problem in distance vector routing algorithm? 5
- (d) What happens if one of the stations is unplugged in Bus topology and ring topology? 5

3. (a) How does token bucket traffic shaper work ? Explain through a diagram. 5
- (b) What are the reasons for having a minimum length frame in ethernet ? Explain. 5
- (c) What kinds of applications are run over UDP ? Justify. 5
- (d) What is the important aspect that establishes trust in digital signature ? 5
4. (a) What are the design foals of SSL 3.0 ? 5
- (b) Explain the following TCP/IP header fields 10
- Source port
  - Urgent pointer
  - Sequence Number
  - Type of service
  - Fragment offset
- (c) What is basic idea behind CIDR (classless interdomain routing) ? Explain through an example. 5
5. (a) Explain the following concepts with respect to multicasting : 5
- Group management
  - Pruning
- (b) What are the advantages of fragmentation of frames in IEEE 802.11 ? Discuss. 5
- (c) What are the problems of synchronous TDM ? How does statistical TDM resolve the problem ? 5
- (d) What are the differences between client/server and peer to peer architecture ? Discuss. 5