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**MCS-042**

**MASTERS IN COMPUTER  
APPLICATIONS (MCA)  
Term-End Examination  
December, 2019**

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

*Time : 3 Hours**Maximum Marks : 100*

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*Note : Question No. 1 is compulsory. Attempt any  
three questions from the rest.*

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1. (a) Find CRC for data polynomial  $x^5 + x^4 + x^2 + x + 1$  with a generator polynomial  $x^3 + x + 1$ . 6
- (b) Sketch the Manchester and RZ encoding schemes for the following bit stream : 5  
111000110111.
- (c) What is count to Infinity problem in distance vector routing algorithm ? Explain it with the help of an example. 6

- (d) Derive the throughput expression for pure ALOHA. Also show the vulnerable time of this protocol. 7
- (e) Discuss and show the process of connection establishment and termination in TCP. How does it handle delayed arrival of SYN and ACK packets ? 10
- (f) How does encryption and decryption take place in RSA ? Explain. 6
2. (a) Construct the Hamming Code for the bit sequence 10011101. 6
- (b) Define Shannon's theorem if a binary signal is sent over 3 MHz channel with signal to noise ratio of 30 dB. What is the maximum achievable channel capacity ? 7
- (c) What is the purpose of a digital signature ? Explain the process of generating it. 7
3. (a) Why ethernet frame has both the minimum and maximum length restriction ? Explain. 6

- (b) How is silly window syndrome created by the receiver ? What is the proposed solution ? Discuss. 7
- (c) How does PCM work ? Explain with the help of a diagram. 7
4. (a) For what purpose Leaky Bucket algorithm is used ? Explain the algorithm. 7
- (b) Explain the hidden station and exposed station problems in wireless LAN ? Why is CSMA/CD protocol not suitable for wireless LAN ? 8
- (c) Illustrate and compare circuit switching and packet switching techniques. 5
5. (a) 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

- (b) Consider the following network with the indicated link cost. Use Bellman-Ford algorithm to find the shortest path from source node A to all the other nodes in the network :

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