

9. (a) What do you mean by congestion control? Explain the concept of token bucket in congestion controlling.
- (b) Describe in brief service provided by TCP.
- (c) How is a secret key cryptography different from public key cryptography?

(2+3)+4+3= 12

DATA COMMUNICATION & COMPUTER NETWORKS
(MCAP 2102)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) Which of the following is an example of a bounded medium?
 (a) Coaxial cable (b) Wave guide
 (c) Fiber optic cable (d) All of these.
- (ii) The physical layer is responsible for
 (a) Line coding (b) Channel coding
 (c) Modulation (d) All of the mentioned.
- (iii) In asynchronous serial communication the physical layer provides
 (a) start and stop signalling
 (b) flow control
 (c) both start & stop signalling and flow control
 (d) None of the mentioned.
- (iv) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called
 (a) Piggybacking
 (b) Cyclic redundancy check
 (c) Fletcher's checksum
 (d) None of the mentioned.
- (v) Which one of the following is the multiple access protocol for channel access control?
 (a) CSMA/CD (b) CSMA/CA
 (c) Both CSMA/CD & CSMA/CA (d) None of the mentioned.

- (vi) A subset of a network that includes all the routers but contains no loops is called
 (a) Spanning tree (b) Spider structure
 (c) Spider tree (d) None of the mentioned
- (vii) ICMP is primarily used for
 (a) error and diagnostic functions (b) addressing
 (c) forwarding (d) none of the mentioned
- (viii) Which of these is not applicable for IP protocol?
 (a) Is connectionless (b) Offer reliable service
 (c) Offer unreliable service (d) None of the mentioned.
- (ix) Which one of the following is an internet standard protocol for managing devices on IP network?
 (a) Dynamic host configuration protocol
 (b) Simple network management protocol
 (c) Internet message access protocol
 (d) Media gateway protocol.
- (x) Multiple object can be sent over a TCP connection between client and server in
 (a) Persistent HTTP (b) Nonpersistent HTTP
 (c) Both (a) and (b) (d) None of the mentioned.

Group – B

2. (a) What is a line coding? What are the advantages of line code?
 (b) With a neat diagram, write down the PCM technique for analog-to-digital modulation.
 (c) Explain the types of transmission modes.
(1 + 2) + 6 + 3 = 12
3. (a) What is Multiplexing? Explain different types of Multiplexing.
 (b) Explain the characteristics Shielded twisted pair (STP) and Unshielded twisted pair (UTP) cable.
 (c) Find the minimum bandwidth for an FSK signal transmitting at 2000 bps transmission is in half-duplex mode, and the carriers are separated by 3000Hz.
(2 + 4) + 3 + 3 = 12

Group – C

4. (a) Write down the steps involved in CRC calculation.
 (b) Construct the Hamming code for the bit sequence 1001101.
 (c) Describe why in Selective Repeat ARQ, the size of the sender and receiver window must be at most one-half of $2m$, where m is the number of data bits.
3 + 5 + 4 = 12
5. (a) Explain how a collision is detected in CSMA/CD with the help of a Diagram. Justify the use of jamming signal in CSMA/CD.
 (b) Which MAC protocol is suitable for MAN? Explain with diagram the medium access control principle of DQDB.
(4 + 2) + (1 + 5) = 12

Group – D

6. (a) A block of addresses is granted to a small organization. One of the addresses is 205.16.37.39/28.
 (i) What is the first address in the block?
 (ii) What is the last address in the block?
 (iii) Find the total number of addresses in the block
 (b) Subnet the Class C IP Address 205.11.2.0 so that you have 30 subnets.
 (i) Find the subnet mask.
 (ii) How many hosts can each subnet have?
 (c) What is the role of ARP and RARP protocol in data communication?
3+4+5 = 12
7. (a) Discuss different routing techniques in brief.
 (b) Write about Packet Format in ARP?
 (c) Which fields of the IP header change from router to router?
5+ 5 + 2 = 12

Group – E

8. (a) How does MIME enhance SMTP?
 (b) Give the format of HTTP request message and explain.
 (c) Discuss the basic model of FTP.
4+ 4 + 4 = 12