

**COMPUTER COMMUNICATION NETWORKS  
(MCAP 2201)**

**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) A 4 byte IP address consists of \_\_\_\_\_  
(a) only network address (b) only host address  
(c) network address & host address (d) network address & MAC address.
- (ii) 802.11 wireless networking uses \_\_\_\_\_ method as the media access method?  
(a) CSMA/CD (b) CTS/RTS  
(c) CSMA/CA (d) None of these
- (iii) Length of Port addresses in TCP/IP are  
(a) 4 bit long (b) 16 bit long  
(c) 32 bit long (d) None of Above.
- (iv) The process-to-process delivery of the entire message is the responsibility of the \_\_\_\_\_ layer.  
(a) Network (b) Transport  
(c) Application (d) Physical
- (v) The network layer concerns with  
(a) bits (b) frames  
(c) packets (d) none of the mentioned.
- (vi) In classful addressing for class A, how many valid maximum possible network ids can exist  
(a) 129 (b) 128  
(c) 126 (d) 127.
- (vii) TCP is a \_\_\_\_\_ transport protocol  
(a) unreliable (b) best-effort delivery  
(c) reliable (d) none of these

- (viii) Which of the following transmission directions listed is not a legitimate channel?  
(a) Simplex (b) Half Duplex  
(c) Full Duplex (d) Double Duplex.
- (ix) For a sliding window of size  $n-1$ , there can be maximum of \_\_\_\_\_ frames sent but unacknowledged.  
(a) 0 (b)  $n - 1$   
(c)  $n$  (d)  $n + 1$ .
- (x) What is the major factor that makes coaxial cable less susceptible to noise than twisted-pair cable?  
(a) Inner conductor (b) Diameter of cable  
(c) Outer conductor (d) Insulating material.

### **Group- B**

2. (a) How does NRZ-L differ from NRZ-I? [(CO2)(Analyze/IOCQ)]  
(b) Compare the two methods of serial transmission. Discuss the advantages and disadvantages of each. [(CO2)(Analyze/IOCQ)]  
(c) Define the digital to analog modulation. Describe the different type of digital to analog modulation technique. [(CO2)(Understand/LOCQ)]  
**3 + 4 + 5 = 12**
3. (a) Explain in detail about various types of multiplexing with diagram. [(CO2)(Analyze/IOCQ)]  
(b) What is the purpose of cladding in an optical fiber? Compare between omnidirectional waves and unidirectional waves. [(CO2)(Apply/IOCQ)]  
(c) What is quantization? [(CO2)(Remember/LOCQ)]  
**6 + 4 + 2 = 12**

### **Group - C**

4. (a) Explain the process of collision detection in CSMA/CD with the help of a diagram. Justify the use of jamming signal in CSMA/CD. [(CO3)(Understand/LOCQ)]  
(b) Define the role of a monitor station in token ring. How a monitor station is chosen when a token ring is initially established? [(CO3)(Remember/LOCQ)]  
(c) How does a monitor station help in token ring maintenance? [(CO3)(Understand/LOCQ)]  
**(3 + 1) + (2 + 2) + 4 = 12**
5. (a) Explain with the help of a diagram the vulnerable time for CSMA. [(CO3)(Understand/LOCQ)]  
(b) Explain sliding window technique. Why it is used and what are the advantages of sliding window technique? [(CO3)(Understand/LOCQ)]  
(c) Define the flow control. [(CO3)(Remember/LOCQ)]  
**4 + 6 + 2 = 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. [(CO4)(Analyze/IOCQ)]
- (b) Write the IP address 135.1.1.25 mask 255.255.248.0 in CIDR notation. [(CO4)(Apply/IOCQ)]
- (c) Demonstrate with example the process of network address translation? [(CO4)(Apply/IOCQ)]  
**(2 + 2 + 2) + 2 + 4 = 12**
7. (a) Demonstrate the role of ARP and RARP protocol in data communication. [(CO4)(Analyze/IOCQ)]
- (b) A network on the internet has a subnet mask of 255.255.240.0 and uses class B address. How many number of subnets and number of hosts per subnet can be accommodated in that network? [(CO4)(Apply/IOCQ)]
- (c) Illustrate the usage of ICMP protocol. [(CO4)(Apply/IOCQ)]  
**(2 + 2) + (2 + 2) + 4 = 12**

**Group - E**

8. (a) Explain the following concepts:  
 (i) Node-to-node data transfer  
 (ii) Host-to-host data transfer  
 (iii) process-to-process data transfer. [(CO5)(Understand/LOCQ)]
- (b) Argue on the need for using different types of addresses in (i) data link layer, (ii) network layer and (iii) transport layer. [(CO5)(Evaluate/HOCQ)]
- (c) Write a brief note on HyperText Transfer Protocol. [(CO6)(Create/HOCQ)]  
**6 + 2 + 4 = 12**
9. (a) Evaluate open-loop and closed-loop congestion control mechanisms. [(CO5)(Evaluate/HOCQ)]
- (b) Write a short note on Domain Name System. [(CO6)(Create/HOCQ)]
- (c) Evaluate different scheduling techniques for improving the QoS in a network. [(CO6)(Evaluate/HOCQ)]  
**(2 + 2) + 4 + 4 = 12**

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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	33.33	41.66	25

**Course Outcome (CO):**

After the completion of the course students will be able to

C01: Learn different aspects of data communication networks, hardware, software and components of a network and their interrelations.

C02: Understand the purpose of layered architecture and different protocols.

C03: Understand the different LAN protocols and selection of appropriate protocols.

C04: Analyze the performance of the different routing protocols.

C05: Understand the concept of internetworking, congestion control mechanisms.

C06: Learn about quality of service issues.

\*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question;

HOCQ: Higher Order Cognitive Question