

**MCA/3<sup>RD</sup> SEM/MCAP 2102(BACKLOG)/2021**  
**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) Before data can be transmitted they must be transformed to \_\_\_\_\_  
(a) periodic signal (b) electromagnetic signal  
(c) aperiodic signal (d) low-frequency sine waves.
- (ii) Which one of the following is not a function of network layer?  
(a) Routing (b) Inter-networking  
(c) Congestion control (d) None of the mentioned.
- (iii) Which of the following best describes a single bit error?  
(a) A single bit is inverted  
(b) A single bit is inverted per data unit  
(c) A single bit is inverted per transmission  
(d) Any of the above.
- (iv) In the \_\_\_\_ method, all data exchanges must be made through the primary device even when the ultimate destination is a secondary device.  
(a) reservation (b) polling  
(c) token passing (d) none of the above.
- (v) Which one of the following is a data link protocol?  
(a) Ethernet (b) Point to point protocol  
(c) HDLC (d) All of the mentioned.
- (vi) 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.
- (vii) An endpoint of an inter-process communication flow across a computer network is called  
(a) Socket (b) Pipe (c) Port (d) None of the mentioned.

- (viii) 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.
- (ix) In a Go-Back-N ARQ, if the window size is 63, what is the range of sequence numbers?  
(a) 0 – 63 (b) 0 – 64 (c) 1 – 63 (d) 1 – 64.
- (x) When the hop-count field reaches zero and the destination has not been reached, a \_\_\_\_\_ error message is sent.  
(a) Destination-unreachable (b) Time-exceeded  
(c) Parameter-problem (d) Redirection.

### Group – B

2. (a) Differentiate between Circuit Switching and Packet Switching. [(CO1) (Remember/LOCQ)]  
(b) Compare AM, PM and FM with example. [(CO2) (Analyze/IOCQ)]  
(c) Define the throughput, propagation speed and propagation time? [(CO2) (Evaluate/HOCQ)]  
**4 + 4 + 4 = 12**
3. (a) Using NRZ-L and NRZ-I line encoding techniques encode the following binary strings:  
(i) 11001010 (ii) 01011011. [(CO2)(Apply/IOCQ)]  
(b) How does PSK differ from QPSK? Describe the method of ASK signal generation. [(CO2)(Analyze/IOCQ)]  
(c) Define the bit stuffing? [(CO2)(Understand /LOCQ)]  
**5 + 5 + 2 = 12**

### Group – C

4. (a) Write about Stop and Wait with ARQ protocol. [(CO3) (Remember/LOCQ)]  
(b) Construct the Hamming code for the bit sequence 1001101. [(CO3) (Evaluate/HOCQ)]  
(c) Describe the Piggybacking? [(CO3) (Remember/LOCQ)]  
**4 + 6 + 2 = 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. [(CO3)(Analyze/IOCQ)]  
(b) Describe a controlled medium access protocol. [(CO3)(Analyze/IOCQ)]  
(c) What is the IEEE standard for token bus protocol? How the virtual ring of a token bus is re-established when the successor node of a token holder node fails? [(CO3) (Apply/IOCQ)]  
**(4 + 2) + 2 + (1 + 3) = 12**

**Group – D**

6. (a) Write about Packet Format in ARP? [(CO4)(Remember/LOCQ)]  
 (b) Differentiate IPv4 and IPv6? Who manages these? [(CO4)(Analyze/IOCQ)]  
 (c) Which fields of the IP header change from router to router?  
 [(CO4)(Understand/LOCQ)] **6 + 4 + 2 = 12**
7. (a) What are the drawbacks of classful addressing? Explain the procedure of masking and its use with an example. [(CO4) Remember/LOCQ]  
 (b) Justify with example the benefit of subnetting and supernetting.  
 [(CO4) (Analyze/IOCQ)]  
 (c) What is the recommended IPV4 address pool for the private networks? [(CO4) (Understand/LOCQ)] **4 + 4 + 4 = 12**

**Group – E**

8. (a) Describe the token bucket mechanism for congestion control with suitable diagram. [(CO5)(Analyze/IOCQ)]  
 (b) 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)]  
 (c) Which problem in the leaky bucket approach is addressed by using a token bucket mechanism? [(CO5) (Analyze/IOCQ)] **4 + 6 + 2 = 12**
9. (a) Explain the duties of transport layer. [(CO6)(Analyze/IOCQ)]  
 (b) What are the techniques to improve the QOS? Explain. [(CO6) (Evaluate/HOCQ)]  
 (c) Define MIME. [(CO6) (Apply/IOCQ)] **5 + 5 + 2 = 12**

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	37.5%	50%	12.5%

**Course Outcome (CO):**

- CO1: Understand the layered architecture and different protocols of the network paradigm.  
 CO2: Classify different signal transmission and multiplexing schemes as represented in the physical layer.  
 CO3: Differentiate different LAN protocols with special emphasis to flow and error control.  
 CO4: Analyze the performance of the different routing protocols.  
 CO5: Interpret the concept of internetworking, congestion control mechanisms.  
 CO6: Learn about improvement of quality of service and various application layer issues.

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

<b>Department &amp; Section</b>	<b>Submission link:</b>
<b>MCA</b>	<a href="https://classroom.google.com/c/NDczMzczNzUxMTI3/a/NDczMzczNzUxMjU5/details">https://classroom.google.com/c/NDczMzczNzUxMTI3/a/NDczMzczNzUxMjU5/details</a>