C **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: R4G06

B.E. / B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

Artificial Intelligence and Machine Learning

R21UAM406- COMPUTER COMMUNICATION NETWORKS

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Which of the following topology has maximum cabling requirements? CO1-U

   (a) Mesh topology (b) Star topology

   (c) Bus topology (d) Ring Topology

2. In Go-Back-N ARQ, if frames 4, 5, and 6 are received successfully, the receiver may send an ACK _____ to the sender. CO2-App

   (a) 5 (b) 6

   (c) 7 (d) any of the above

3. The 4 byte IP address consists of CO1-U

   (a) network address (b)Mission-critical communications

   (c) Enhanced mobile broadband (d) all of the above

4. An endpoint of an inter-process communication flow across a computer network is called _____ CO1-U

   (a) socket (b) Pipe

   (c) Port (d) Machine

5. To deliver a message to the correct application program running on a host, the _____ address must be consulted. CO1-U

   (a) IP (b) MAC

   (c) Port (d) None of the above

PART – B (5 x 3= 15 Marks)

6.	Draw a hybrid topology with a ring backbone and three bus networks.	CO2-App	
7.	Bit stuff the following data 0001111111001111101000111111111111000011111	CO2-App	
8.	In a block of addresses, we know the IP address of one host is 182.44.82.16/26. What are the first address and the last address in this block?	CO2-App	
9.	What is meant by quality of service? What are the two categories of QoS attributes?	CO1-U	
10.	Write down the characteristics of FTP.	CO1-U	

PART – C (5 x 16= 80 Marks)

11.	(a)	Illustrate with neat sketch of OSI reference model and list out various functions of the Layers.	CO1-U	(16)
		Or		
	(b)	Explain the types of multiplexing with neat diagram.	CO1-U	(16)
12.	(a)	Explain in detail about Error detection and Error correction.	CO1-U	(16)
		Or		
	(b)	Explain in detail about Piggybacking.	CO1-U	(16)
13.	(a)	For the following IP Addresses- 1.2.3.4 10.15.20.60 130.1.2.3 150.0.150.150 Identify the Class, Network IP Address, Direct broadcast address and Limited broadcast address of each IP Address.	CO2-App	(16)
		Or		
	(b)	Consider a system of three LANs with four bridges. The bridges (B1 to B4) connect the LANs as follows: (i) B1 connects LAN 1 and LAN 2. (ii) B2 connects LAN 1 and LAN 3. (iii) B3 connects LAN 2 and LAN 3. (iv) B4 connects LAN 1, LAN 2, and LAN 3. Choose BI as the root bridge. Show the forwarding and blocking ports, after applying the spanning tree procedure.	CO2-App	(16)

14. (a) Consider the effect of using slow start on a line with a 10 msec RTT and no congestion. The receiver window is 24 KB and the maximum segment size is 2 KB. How long does it take before the first full window can be sent? CO2-App (16)

Or

(b) (i) In a leaky bucket used to control liquid flow, how many gallons of liquid are left in the bucket if the output rate is 5 gal/min, there is an input burst of 100 gal/min for 12 s, and there is no input for 48 s? CO2-App (8)

(ii) A client uses TCP to send data to a server. The data are 16 bytes. Calculate the efficiency of this transmission at the TCP level (ratio of useful bytes to total bytes). Calculate the efficiency of transmission at the IP level. Assume no options for the IP header. Calculate the efficiency of transmission at the data link layer. Assume no options for the IF header and use Ethernet at the data link layer. (8)

15. (a) Suppose you are sending an email from your Hotmail account to your friend, who reads his/her e-mail from his/her mail server using IMAP. Briefly describe how your email travels from your host to your friend's host. Also, what are the application-layer protocols involved? Explain each involved protocols which is used to send E-mail. CO2-App (16)

Or

(b) (i) Suppose a firewall is configured to allow outbound TCP connections but inbound connections only to specified ports. The FTP protocol now presents a problem: When an inside client contacts an outside server, the outbound TCP control connection can be opened normally but the TCP data connection traditionally is inbound. CO2-App (8)

(ii) (a) Look up the FTP protocol in, for example, Request for Comments 959. Find out how the PORT command works. Discuss how the client might be written so as to limit the number of ports to which the firewall must grant inbound access. Can the number of such ports be limited to one? (b) Find out how the FTP PASV command can be used to solve this firewall problem. (8)