U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Electronics & Communication Engineering **Duration: 3 hrs.**

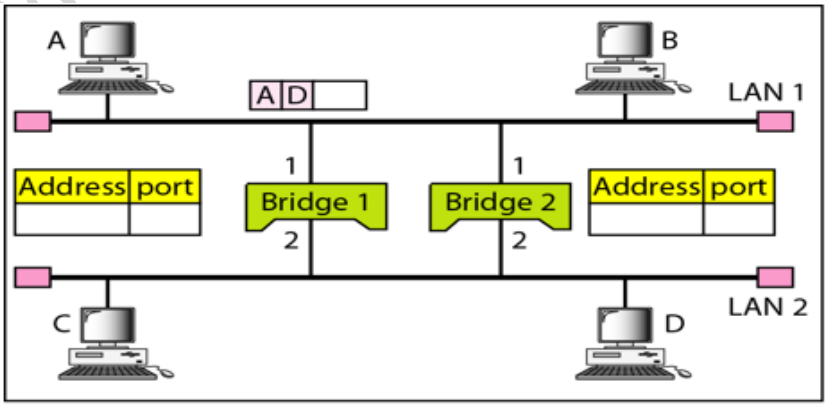
Course Code: 23EC6PCCCN / 22EC6PCCCN **Max Marks: 100**

Course: Computer Communication Networks

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	For each of the following four networks, discuss the consequences if a connection fails. i. Five devices arranged in a mesh topology ii. Five devices arranged in a star topology (not counting the hub) iii. Five devices arranged in a bus topology iv. Five devices arranged in a ring topology	2	2	**8**
	b)	Compare TCP/IP and OSI model. How do the layers of the Internet model correlate to the layers of the OSI model?	2	2	**10**
	c)	If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?	1	1	**2**
		OR			
2	a)	State the advantages of optical fiber over twisted-pair and coaxial cable. Calculate the bandwidth of the light for the following wavelength ranges (assume a propagation speed of 2×10^8 m/s) i) 1000 to 1200 nm ii) 1000 to 1400 nm	1	1	**8**
	b)	Design a three-stage space-division switch with N =100. We use 10 crossbars at the first and third stages and 6 crossbars at the middle stage. i. Draw the configuration diagram. ii. Calculate the total number of crosspoints. iii. Find the possible number of simultaneous connections. iv. Find the possible number of simultaneous connections if we use one single crossbar (100 x 100). v. Find the blocking factor, the ratio of the number of connections in iii and in iv.	3	3	**10**
	c)	Distinguish between CM and CMTS.	2	2	**2**

			UNIT - II			
	3	a)	Illustrate with a neat diagram the Go-Back-N ARQ Protocol using piggybacking. Discuss the design steps.	2	2	**12**
		b)	With a neat transition phase diagram, discuss the PPP connection phases.	2	2	**8**
			OR			
	4	a)	Explain the process of CRC encoding for error detection. Given the dataword 101001110 and the divisor 10111, i. Show the generation of the codeword at the sender site (using binary division). ii. Show the checking of the codeword at the receiver site (assume no error).	1	1	**12**
		b)	A sender needs to send the four data items Ox3456, OxABCC, Ox02BC, and OxEEEE. Find the checksum at the sender site and at the receiver site if there is no error.	1	1	**8**
			UNIT - III			
	5	a)	Discuss how CSMA/CD protocol reduces the collision in a network. A network using CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time (including the delays in the devices and ignoring the time needed to send a jamming signal) is 25.6 μs, what is the minimum size of the frame?	1	1	**10**
		b)	Discuss the changes in the standard Ethernet. If an Ethernet destination address is 07:01:02:03:04:05, what is the type of the address (unicast, multicast, or broadcast)?	*2*	*2*	**10**
			OR			
	6	a)	With a neat flowchart, discuss how CSMA/CA is used in wireless LANs. How is NAV used to avoid collision?	*2*	*2*	**10**
		b)	List the steps followed by a bridge to create a loopless topology using spanning tree algorithm. Find the spanning tree for the system in Figure 1.  Figure 1	*1*	*1*	**10**

			UNIT - IV			
	7	a)	An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets. i. Find the subnet mask. ii. Find the number of addresses in each subnet. iii. Find the first and last addresses in subnet 1. iv. Find the first and last addresses in subnet 1024.	*3*	*3*	**10**
		b)	Discuss the various fields of IPv4 datagram. An IPv4 packet has arrived with the first few hexadecimal digits as shown. 0x45000028000100000102 . . . How many hops can this packet travel before being dropped? The data belong to what upper-layer protocol?	*1*	*1*	**10**
			OR			
	8	a)	List and discuss the various types of ICMP messages. Give an example of a situation in which a host would never receive a redirection message.	*2*	*2*	**10**
		b)	Discuss the three forwarding techniques. Create a routing table for router R1, using the configuration in Figure 2.  Figure 2	*3*	*3*	**10**
			UNIT - V			
	9	a)	Discuss the services offered by TCP to the processes at the application layer. An IP datagram is carrying a TCP segment destined for address 130.14.16.17/16. The destination port address is corrupted, and it arrives at destination 130.14.16.19/16. How does the receiving TCP react to this error?	*2*	*2*	**10**
		b)	TCP opens a connection using an initial sequence number (ISN) of 14,534. The other party opens the connection with an ISN of 21,732. Show the three TCP segments during the connection establishment.	*2*	*2*	**10**
			OR			
	10	a)	List and discuss the various types of closed-loop congestion control. What are the two strategies used by Frame relay to avoid congestion?	*2*	*2*	**10**
		b)	Discuss the leaky bucket for traffic shaping and explain its effect. 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?	*1*	*1*	**10**

****