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: IV**

Branch: AI & DS / CSE(DS)/ CSE(IOT) **Duration: 3 hrs.**

Course Code: 23DS4PCCON / 23IC4PCCNW **Max Marks: 100**

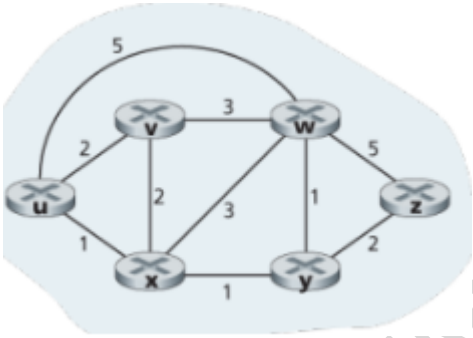
Course: Computer Networks

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)	With a neat diagram explain TCP/IP reference model.	CO1	PO1	**10**
	b)	Explain Time Division Multiplexing with a neat diagram. Ten sources, six with a bit rate of 200 kbps and four with a bit rate of 400 kbps are to be combined using multilevel TDM with no synchronizing bits. Answer the following questions about the final stage of the multiplexing: i) What is the size of a frame in bits? ii) What is the frame rate? iii) What is the duration of a frame? iv) What is the data rate?	CO3	PO3	**10**
		OR			
2	a)	What are Circuit Switched Networks. With proper diagram, explain the phases of Circuit Switched Networks	CO1	PO1	**10**
	b)	Discuss Multi transition: MLT-3 in detail. Develop the line code for the sequence 01001110 using Unipolar NRZ, NRZ-L, NRZ-I, RZ, AMI, and Manchester encoding schemes.	CO3	PO3	**10**
		UNIT - II			
3	a)	With a neat diagram specify the design of CRC encoder and decoder. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x3+1. i) What is the actual bit string transmitted? ii) Suppose the third bit from the left (ie.10**1**11101…) is inverted during transmission. How will receiver detect this error?	CO3	PO3	**10**
	b)	Correlate and analyse the working of CDMA (Code Division Multiple Access) technique with the TDMA.	CO2	PO2	**10**

			Alice and Bob are experimenting with CDMA using W2 Walsh table. Alice uses the code [+1, +1] and Bob uses the code [+1,-1]. Assume they simultaneously send a binary digit to each other. Alice sends bit 0, and Bob send bit 1, show how they can detect what the other person has sent.			
			OR			
	4	a)	Explain CSMA and its persistent methods with neat diagrams. A pure ALOHA network transmits 350-bit frames on a shared channel of 350 kbps. It is required to design ALOHA network to produce the throughput for : i) 1250 frames per second ii) 700 frames per second iii) For 300 frames per second, compute throughput for slotted ALOHA with same specifications	*CO3*	*PO3*	**10**
		b)	Demonstrate Byte stuffing and unstuffing in a character-oriented protocol with an example. Apply stuffing strategies as per the given requirements in the following: i) Byte-stuff the following frame payload in which E is the escape byte, F is the flag byte, and D is a data byte other than an escape or a flag character. Payload is DEDD FDDE EDFD ii) Bit-stuff the following frame payload: 0001 1111 1100 1111 1010 0011 1111 1111 1000 0111	*CO2*	*PO2*	**10**
			UNIT - III			
	5	a)	Identify the benefits of IPv6 over IPV4? Expand the following addresses to its original form. i) 0:15::1:12:1213 ii) 0:0B0E::12DF iii) 2001:EC6::EF9A :0:0 iv) 2001:CB:5:38AF:953E:0:EF00:E2	*CO2*	*PO2*	**10**
		b)	Design a company network which consists of 4 departments connected. Perform subnetting to divide the network into four equal parts. The host IP address to be assumed is 192.168.1.0/24. For each of these subnetworks give the network address, broadcast address, first IP address assigned, the last IP address assigned and the subnet mask and CIDR.	*CO3*	*PO3*	**10**
			OR			

	6	a)	Explain IPv4 header format with a neat diagram. The following is the content of an IPv4 header (first 20 bytes) represented in hexadecimal format: 4500003C1C4640004006B1E6C0A80001C0A800C7. i. What is the version and header length? ii. What is the total length of the IP packet? iii.What is the protocol field indicating? iv. What is the header checksum value?	*CO2*	*PO2*	**10**
		b)	Write Dijkstra algorithm for Link-State (LS) Routing protocol. Apply LS routing for the below given graph. 	*CO3*	*PO3*	**10**
			UNIT - IV			
	7	a)	With a neat sketch explain the TCP segment header.	*CO1*	*PO1*	**08**
		b)	Explain the three way hand shake for establishing a TCP Connection.	*CO1*	*PO1*	**08**
		c)	Silly window syndrome causes serious issues in communication between the sender and the receiver. Justify.	*CO2*	*PO2*	**04**
			OR			
	8	a)	Discuss about the UDP user datagram and header format with neat figures.	*CO1*	*PO1*	**08**
		b)	Mention the drawbacks of Stop and wait and Go-back N protocols. Explain how Selective Repeat protocol is efficient with its working.	*CO1*	*PO1*	**08**
		c)	Consider the following two cases, (i) Window Size = 2^{m-1} and (ii) Window Size $>2^{m-1}$. Analyze the cases and justify which of the two best suits the Selective Repeat ARQ. Support your answer with a figure.	*CO2*	*PO2*	**04**
			UNIT - V			
	9	a)	List the three domains of Domain Name Space and explain them choosing necessary diagram or an illustration.	*CO1*	*PO1*	**08**
		b)	Analyze the need of two port numbers in FTP protocol.	*CO2*	*PO2*	**04**

		c)	Explain SNMP concept. Describe the three components of SNMP architecture.	*CO1*	*PO1*	**08**
			OR			
	10	a)	Explain DNS message format.	*CO1*	*PO1*	**08**
		b)	Analyze why SMTP uses a push-based protocol instead of a pull-based protocol. How does this design choice impact the way email is delivered and retrieved by users?	*CO2*	*PO2*	**04**
		c)	Explain how SMTP operates when A sends email to B where mail server of A and B are different with a neat diagram. Show the sequence of events.	*CO1*	*PO1*	**08**

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