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

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E.   **Semester: IV**
Branch: Artificial Intelligence & Data Science, CSE(Data Science),   **Duration: 3 hrs.**
CSE (IOT & Cyber Security Including Blockchain)
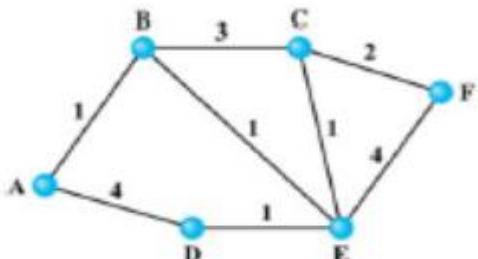**Course Code: 23DS4PCCON/ 23IC4PCCNW**   **Max Marks: 100**
Course: Computer Networks

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

		UNIT – I	CO	PO	Marks
1	a)	Describe four basic topologies with their architecture diagrams and applications.	CO1	PO1	08
	b)	Define line coding and its characteristics. Draw the line code of the sequence a. 01010101 b. 00011000 Using RZ, Manchester and Differential Manchester scheme	CO2	PO2	08
	c)	Assume a system uses five protocol layers. If the application program creates of message of 100 bytes and each layer (including the fifth and first) adds a header of 10 bytes to the data unit, what is the efficiency (the ratio of application layer bytes to the number of bytes transmitted) of the system?	CO3	PO3	04
		UNIT – II			
2	a)	Given message = 1011011, k=7 and generator polynomial $P(X) = X^3 + X^2 + X^0$, n=3. Find the codeword and design the checker in the receiver using Cyclic Redundancy Check (CRC).	CO1	PO1	06
	b)	In CDMA, the following Walsh table is used for chipping the sequences: $$W_8 = W_{2(4)} \begin{vmatrix} +1 & +1 & +1 & +1 & +1 & +1 & +1 & +1 \\ +1 & -1 & +1 & -1 & +1 & -1 & +1 & -1 \\ +1 & +1 & -1 & -1 & +1 & +1 & -1 & -1 \\ +1 & -1 & -1 & +1 & +1 & -1 & -1 & +1 \\ +1 & +1 & +1 & +1 & -1 & -1 & -1 & -1 \\ +1 & -1 & +1 & -1 & -1 & +1 & -1 & +1 \\ +1 & +1 & -1 & -1 & -1 & -1 & +1 & +1 \\ +1 & -1 & -1 & +1 & -1 & +1 & +1 & -1 \end{vmatrix}$$	CO3	PO3	06

		Five stations numbered 1 to 5, transmit the data bits of 1, 1, 1, 0, 0 respectively using the first, second, third, fourth and fifth sequences of W₈ respectively. i) Compute the composite signal seen on transmission medium. ii) Using the composite signal and channel 1's chipping code, decode the data bit value.			
	c)	i) Illustrate the working Pure ALOHA and Slotted ALOHA ii) Stations in pure ALOHA network send frames of size 1000 bits at the rate of 1Mbps. What is the vulnerable time for this network?	*CO2*	*PO2*	**6+2**
		OR			
3	a)	Compare byte stuffing with bit stuffing	*CO 2*	*PO2*	**04**
	b)	Given message =1101011011, n=10 and generator polynomial P(X) = 10011, k=5. a. Show the generation of codeword at the sender site. b. Show the checking of codeword at the receiver site. (assume no error)	*CO 2*	*PO2*	**08**
	c)	Illustrate the working of CSMA/CD with neat diagram. And also show the difference between CSMA/CD and CSMA/CA	*CO 2*	*PO2*	**08**
		UNIT - III			
4	a)	Discuss the two approaches to route the packets in the network layer with neat diagram.	*CO 1*	*PO1*	**06**
	b)	Explain the parameters that are used to measure the performance of the network.	*CO 1*	*PO1*	**06**
	c)	Apply Bellman-Ford algorithm to the network given below: Provide the new routing table for node B that consist of best outgoing line and cost, when it receives the vectors from A:(0, 1, 4, 4, 2,5), E:(5, 1, 1, 1,0,4) and C:(4, 3, 0, 2, 1, 2) 	*CO2*	*PO2*	**08**
		UNIT – IV			
5	a)	Design the subblocks in the network with first address, last address and subnet mask for the given scenario. An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblocks of addresses to use in its three subnets. One subblock of 10 addresses , one subblock of 60 addresses, and one subblock of 120 addresses. Design the subblocks.	*CO 3*	*PO3*	**08**

				CO	PO	
		b)	Describe various transition strategies from IPV4 to IPV6	*CO* 1	*PO1*	**06**
		c)	In distance-vector routing, bad news (increase in a link metric) will propagate slowly. In other words, if a link distance increases, sometimes it takes a long time for all nodes to know the bad news.We assume that a four-node internet is stable, but suddenly the distance between nodes B and C, which is currently 2, is increased to infinity (link fails). Show how this bad news is propagated, and find the new distance vector for each node after stabilization.	*CO* 2	*PO2*	**06**
			OR			
	6	a)	With the TCP state transition diagram, explain the working of client and server process in detail.	*CO* 1	*PO1*	**08**
		b)	The following is a contents of a UDP header in hexadecimal format. 0632000D001CE217 a. Identify the source port number? b. Identify the destination port number? c. Find the total length of the user datagram? d. Calculate the length of the data?	*CO* 2	*PO2*	**04**
		c)	Mention the drawbacks of Stop and wait and Go-back N protocols. Explain how Selective Repeat protocol is efficient with its working.	*CO* 1	*PO1*	**08**
			UNIT – V			
	7	a)	With a neat diagram discuss various application layer paradigms. Mention their advantages and disadvantages	*CO* 1	*PO1*	**08**
		b)	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.	*CO* 2	*PO2*	**08**
		c)	Differentiate between Recursive Resolution and Iterative Resolution with a neat diagram.	*CO* 2	*PO2*	**04**

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