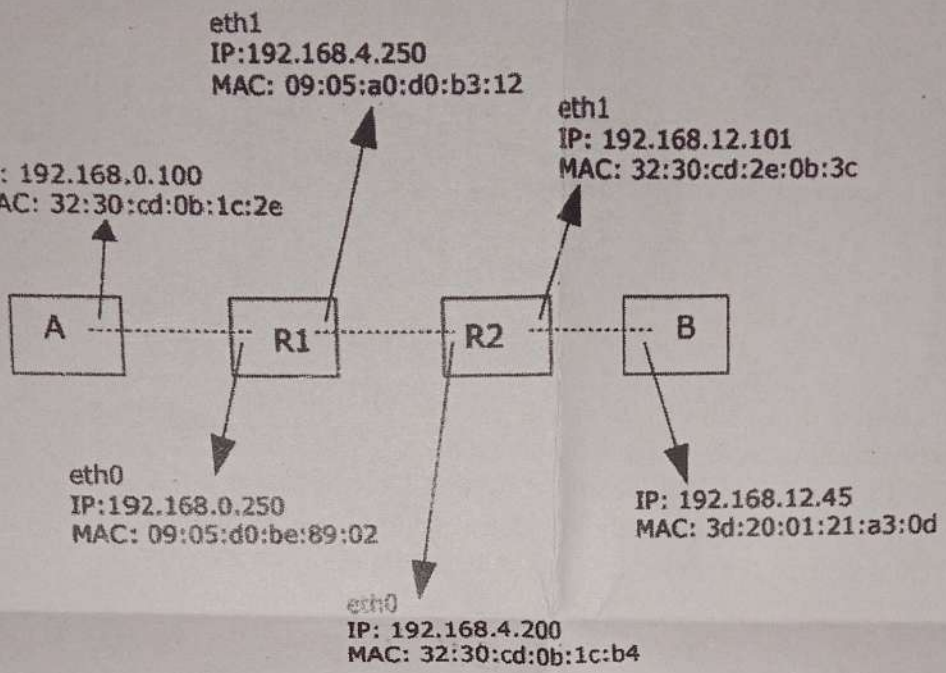
COMPUTER SCIENCE AND ENGINEERING

Date	June 2024	**Maximum Marks**	50
Course Code	CY245AT	**Duration**	90 Minutes
Sem	IV		

Computer Networks (Common to CS, IS, CD, AI & CY)

Sl. No.		PART-B	M	BT	CO
1	(a)	 Answer the following 1. When frame leaves A towards destination B, what will be the destination MAC of the frame? 2. Mention any one probable protocol at datalink and physical layer of this network if the frame is bit oriented framing protocol. 3. Assume R1 does not know the MAC of R2 but knows only IP address, how does it figure out the MAC of R2? 4. If the frame received by R1 from A has error introduced in the way, how will R1 know the frame is corrupted? 5. Write a neat diagram of OSI layers of B and show where the addresses mentioned fits in.	10	4	2
2	(a)	With a neat FSM explain Stop and Wait Protocol. List the disadvantage of this protocol.	10	3	1
3	(a)	Following data is to be sent using PPP protocol. Show the data sent by the sender and explain the various transition phases in PPP. **A B ESC C FLAG ESC FLAG D**	10	4	5
4	(a)	Explain the importance of CSMA (Carrier Sense Multiple Access). Illustrate CSMA/CA with a neat flow diagram and its two major problems.	10	3	1

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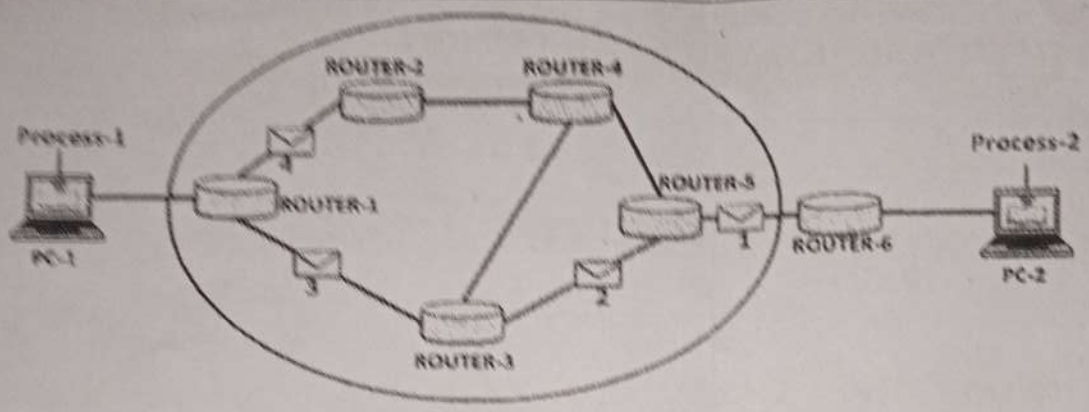
Academic year 2023-2024 (Even Sem)

5 (a) 6+2+2 10 | 4



Router-1's table initially

Destination	Line
R-1	—
R-2	R-2
R-3	R-3
R-4	R-2
R-5	R-3
R-6	R-3

Router-3's table

Destination	Line
R-1	R-1
R-2	R-4
R-3	—
R-4	R-5
R-5	R-5
R-6	R-5

Router-5's table

Destination	Line
R-1	R-3
R-2	R-4
R-3	R-3
R-4	R-4
R-5	—
R-6	R-6

The initial network and routing table is given.

1. Explain Store and Forward concept in the network
2. If router 2 fails or crashes, show how the routing table of router 1 changes. How is the next best path/hop identified to populate the table?
3. Does all datagrams in the above network take same path? Justify your answer.

URSE OUTCOMES:

CN- I

D1: Apply the algorithms/techniques of routing and congestion control to solve problems related to omputer Networks.

O2: Analyse the services provided by various layers of TCP/IP model to build effective solutions

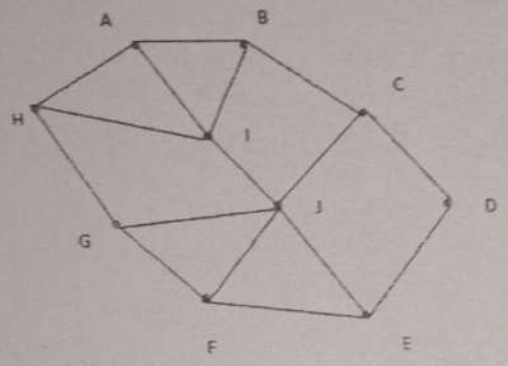
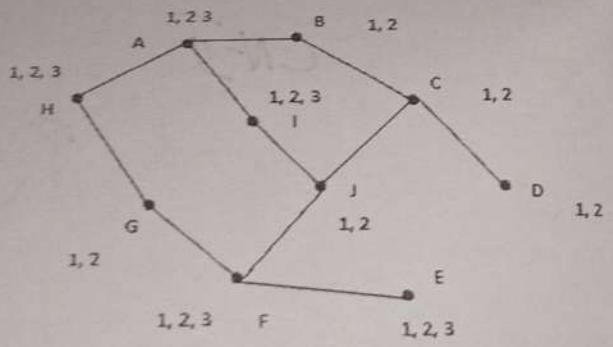
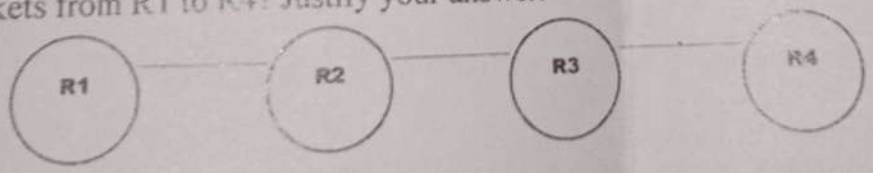
CO3: Design sustainable networking solutions with societal and environmental concerns by engaging in Lifelong learning for emerging technology.

CO4: Exhibit Demonstrate the solutions using various algorithms/protocols available to address network

CO5: Using modern tools by exhibiting team work and effective communication network configura usage and performance evaluation in networks.

Date	July 2024	Maximum Marks	60
Course Code	CY245AT	Duration	120 Minutes
Sem	IV		

OPEN BOOK- CIEII- Computer Networks (Common to CS, IS, CD, AI & CY)

Sl. No.		PART-A (QUIZ)	Marks	BT	CO
1	a	Write a sink tree for Node G in a given network below. Draw a sing tree for node 'J'. Assume that, Node I crash in sometime. Update the sink tree of J and draw its structure after the node I crashes.  Fig. 1(a)	2	3	3
	b	Draw any 2 unique Spanning trees which includes Group1, 2 and 3 nodes for Multicasting.  Fig. 1(b)	2	3	2
	c	Identify the general major cause of congestion and solution to control over congestion in a network when adequate resources are provided.	2	3	
	d	For the following network below, which type of routing scheme is best suitable to route the packets from R1 to R4? Justify your answer.  Fig. 1(d)	2	3	
	e	Can HELLO packet is used for measuring delay? Justify your answer with reason.	2		
		PART-B			
2	(a)	Find the Routing table for all the nodes of a network given below using Bellman Ford algorithm for Distance vector routing and show the routing table entries in every step. Assume the following two different scenarios and show the updated routing tables of all the nodes under each scenario: i) There is good news that, Link is established from F to C with distance value 1. ii) There is a bad news where link between C to D of distance value 1 crashes.	10		

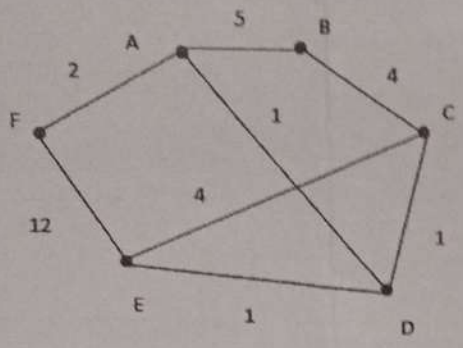
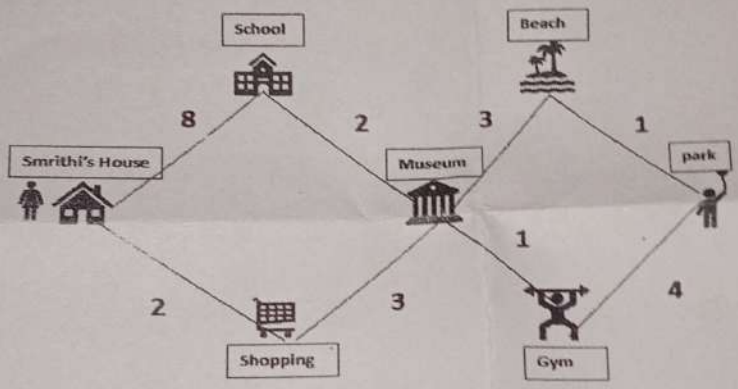


Fig. 2 (a)

3	(a)	In the below scenario, find the following using Dijikstra's algorithm: i) Smrithi has to visit all the places identified as nodes in the network, find the best paths for Smrithi to visit all the places starting from her home. ii) Find out that, from which place she can start with to cover all the places at best shortest distances to visit all the places and show the paths.	10	3	3



CN-II

Fig. 3 (a)

4	(a)	For a Fig. 2(a), show the following stages of link state routing: i) Build the link state packets and show the packet fields for each node ii) Write a Packet buffer for node E with SEND and ACK flag bits	10	4	4
5	(a)	For the Fig.3(a), assume the below scenarios of congestion and provide the solution: i) If network is VC subnet, VC is built from Smrithi's home to Home to Park. Show the path from home to park after congestion occurs at Shopping point ii) If it is a datagram network, there is huge traffic at Museum from Shopping point and Gym. To reduce the congestion at Museum, identify and describe the measures need to be taken to reduce the congestion.	10	4	3
6	(a)	Build a tree for Reverse path Forwarding for node J for network diagram given in Fig. 1(a) and compute the following: i) Mention the number of packets generated at every level of tree ii) Mention total number of packets generated, total number of duplicate packets and total number of packets as part of sink tree.	6+ 2+ 2	4	3

COURSE OUTCOMES:

CO1: Apply the algorithms/techniques of routing and congestion control to solve problems related to Computer Networks.

CO2: Analyse the services provided by various layers of TCP/IP model to build effective solutions

CO3: Design sustainable networking solutions with societal and environmental concerns by engaging in Lifelong learning for emergi technology.

CO4: Exhibit Demonstrate the solutions using various algorithms/protocols available to address networking issues.

CO5: Using modern tools by exhibiting team work and effective communication network configuration, protocol usage and performan evaluation in networks.

CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4
							20	40

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

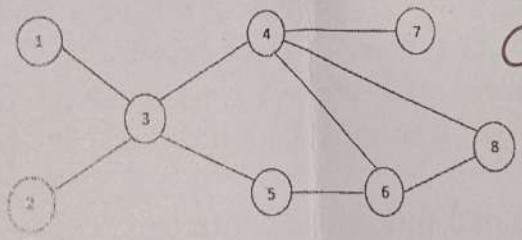
Date	August 2024	**Maximum Marks**	10 + 50
Course Code	CY245AT	**Duration**	120 Minutes
Sem	IV		

COMPUTER NETWORKS
IMPROVEMENT CIE

Sl. No.	PART-A	M	BT	CO
1	Convert the following IPv4 addresses to IPv6. i. 62.54.165.38 ii. 229.154.76.90	2	L3	2
2	Given the CIDR representations, Find the range of IP Addresses in the CIDR block. i. 20.10.30.35 / 27 ii. 100.1.2.35 / 20	2	L3	3
3	A system connected to local LAN needs to transmit a packet to the remote connected system, as well needs to receive packets from outside world, in both them scenarios how the local system would find the IP address and the Hardware address respectively.	2	L4	3
4	A router has an entry of IP address - 160.36.30.110, network mask of 255.255.254.0, in its routing table. Derive the following: i. Broadcast address for the network. ii. Network ID for the network.	2	L4	4
5	Identify type of QoS scheme used in the following scenarios: i. A corporate network is handling a mixture of traffic, including real-time video calls, emails, file downloads, and web browsing. The company wants to ensure that critical applications (like video conferencing and VoIP) receive priority over less critical applications (like bulk data transfers). ii. A company is holding a real-time video conference that requires a guarantee of low latency, high bandwidth, and minimal jitter to ensure smooth communication between participants in different locations.	2	L4	5

Sl. No.		PART-B	M	BT	CO
1		i. Classify the following scenarios under congestion and flow control: a. A data center is handling traffic from multiple clients. b. A cloud server is targeted by a Distributed Denial of Service (DDoS) attack. c. A computer sends too many print jobs too quickly to a networked printer with a small buffer. d. An IoT network with thousands of sensors floods a gateway with data, e. A microcontroller sends data faster than a connected peripheral f. A peer-to-peer file-sharing application leads to excessive traffic across the network, via the local ISP's links. ii. Suppose you have a congested network. Consider the following scenarios and provide your answer. a. Is it always possible to provide QoS on a congested network? b. Is there a way to provide QoS on a congested network? If yes or no, justify your answer.	10	L4	3
2	(a)	A router can process 15 million packets/sec. The load offered to it is 12 million packets/sec on average. i. What is the average waiting time for each packet at a router?	10	L4	

		ii. If a route from source to destination contains 7 routers, how much time is spent being queued and serviced by the router? Suppose there are 4 flows at router waiting to go out on a link having bandwidth 30Mbps. Rates of flow 1,2,3,4 are 8Mbps, 2Mbps, 4Mbps and 6Mbps respectively. If the router has implemented weighted fair queuing (WFQ), provide the equivalent bandwidth share for these flows.			
	(a)	A university has class B address space of 182.17.X.X .It has 45 departments each having 700 hosts. You must design an appropriate subnetting scheme to support the needs of this university. Identify the number of bits for hosts and subnets. Find the subnet mask. Design the first five subnet id's and the range of host addresses on these subnets. How many total hosts can be supported in each subnet if the department grows in future?	10	L3	2
	(a)	State the purpose of TTL field in an IPv4 packet and its operating principle. Consider the following subnet. i. If there is a packet originating at Router 1, what should be the minimum TTL value to reach Routers 2,6,8 respectively? ii. Packet originating at Router 1 destined to Router 7 has TTL=2. Identify the sequence of operations taking place? iii. What is the significance of header checksum field? iv. If most of the fields are intact in the IPv4 header, then why header checksum is computed at each router?	10	L4	4
	(a)	Consider sending a 2400-byte datagram that gets transmitted into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. Determine the following i) How many fragments are generated? ii) List the various IP header fields related to fragmentation. iii) What are the values in the various fields in the IP datagram(s) generated related to fragmentation? iv) Illustrate how IPv6 handles the fragmentation entirely?	10	L4	5



CN-III

URSE OUTCOMES:

Apply the algorithms/techniques of routing and congestion control to solve problems related to Computer Networks.
Analyse the services provided by various layers of TCP/IP model to build effective solutions.
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