	RV COLLEGE OF ENGINEERING® Department of Computer Science and Engineering CIE-I : Question Paper	
Course : (Code)	**COMPUTER NETWORKS (CY245AT))**	**Semester : IV**

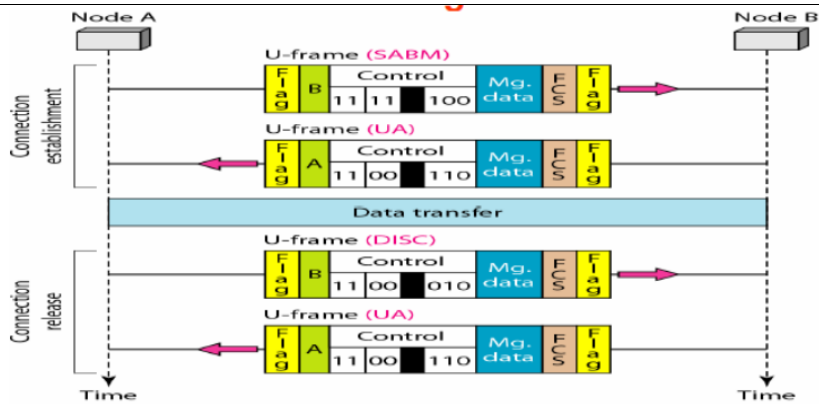
Date : Apr 2025	**Duration :** 120 minutes	**Staff : CSE/ISE/AI-ML**	
Name :	**USN** :	**Section :**	**CSE/ISE/AI-ML**

Answer all questions

Sl.no	Questions	Marks	L1-L6	CO
1	A system uses a 4-layer protocol hierarchy**,** where each layer adds a 6-byte header to a 15-byte message**.** What fraction of the network bandwidth is occupied by headers?	2	3	3
2	A parallel transmission system sends 8 bits simultaneously and operates at 2 MHz. How many bytes can be transmitted in one second?	2	3	3
3	A 20-byte message needs to be transmitted using byte stuffing**.** If the message contains 4 flag bytes and 3 escape bytes, what will be the final frame length after stuffing?	2	4	5
4	Identifying the OSI model Layer Based on Functionality for the following scenarios: i. A user is trying to access a website, but the request fails due to a DNS resolution error. Which OSI layer is responsible for this issue, and how can it be resolved? ii. A user reports that their laptop is connected to Wi-Fi, but they are unable to browse the Internet. The network adapter shows an IP address conflict**.** Identify the OSI layer causing the issue and suggest a solution.	2	3	3
5	In a virtual circuit network**,** a connection setup takes 50 ms**,** and data transfer takes 200 ms**.** If the connection is used for 5 packets**,** calculate the average delay per packet**.**	2	4	4

Part B

Sl. no	Questions	Marks	L1 - L6	CO
1.	Draw and explain the OSI 7-layer architecture**,** highlighting the functionality of each layer and the concept of encapsulation.	10	L2	CO2
2 a.	Discuss the features of PPP protocols. Explain the transition phases of PPP**.**	6	L2	CO3
b.	Identify type of frame and meaning of following HDLC transmission:	04	L4	CO4

				
3 a.	Compare the implementation of connectionless and connection-oriented services in the network layer. Explain with real-world examples where each is preferred.	6	L2	CO4
b.	Explain the working of store-and-forward packet switching with a suitable diagram. Discuss its advantages and disadvantages compared to circuit switching.	4	L2	CO1
4 a,	Identify the type of address for the following addresses" i. principal@rvce.edu.in ii. www.rvce.edu.i iii. 192,17.2.50.4 iv. 1C18 : 1B32 : C450 : 62A5 : 34DC : AE24 : 15BC : 6A5D	4	L4	CO5
b.	Explain Parallel Transmission **a**nd Serial Transmission with suitable diagrams. Discuss their advantages and disadvantages in different network applications.	6	L1	CO1
5 a.	Describe a scenario where CSMA/CD fails and CSMA/CA becomes essential. Discuss working principle of CSMA/CA,	10	L1	CO5

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 life long learning for emerging technology.
CO4	Exhibit network configuration, protocol usage and performance evaluation in networks.
CO5	Demonstrate the solutions using various algorithms/protocols available to address networking issues using modern tools by exhibiting team work and effective communication.

	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4	CO5
Marks	16	26	6	12	-	-	10	10	12	12	14

	RV COLLEGE OF ENGINEERING® Department of Computer Science and Engineering CIE-I : Question Paper	
Course : (Code)	**COMPUTER NETWORKS (CY245AT))**	**Semester : IV**

Date : Apr 2025	**Duration :** 120 minutes	**Staff : CSE/ISE/AI-ML**	
Name :	**USN** :	**Section :**	**CSE/ISE/AI-ML**

Answer all questions

Sl.no	Questions	Marks	L1-L6	CO
1	Total header size=4×6=24 bytes Total transmitted size=Message size+Total header size =15+24=39 bytes The fraction of the total bandwidth used for headers is:23/39= 0.6154≈61.54%	2	3	3
2	Total bits per second=8×2,000,000 = 16,000,000 bits per second Total bytes per second=160,000,000/8=2,000,000 bytes per second	2	3	3
3	The final frame length after byte stuffing is **27 bytes**.	2	4	5
4	i. Application Layer ii. Network Layer	2	3	3
5	Total Delay=Setup Time+Data Transfer Time =50+200=250 ms Average Delay per Packet=/Total Delay/ Number of Packets=250/5=50ms	2	4	4

Part B

Sl.no	Questions	Marks	L1-L6	CO
1.	Diagram 4M, Function of Each Layer 4M, ENCAPSULATION Concept: 2M	10	L2	CO1
2 a.	Features: 2M, Trasition Diagram: 4M	6	L2	CO2
b.	Identify type of frame and meaning of following HDLC transmission: **U-Frame Connection Setup**	04	L4	CO4
3 a.	Any 6Differnces 6*1	6	L2	CO2
b.	Buffer-Verify Checksum –Forward: 2m Diagram:2M	4	L2	CO1
4 a,	Identify the type of address for following addresses” 1. Special Address 2. Special Address 3. IP Address 4. MAC Address	4	L4	CO5
b.	**Parallel Transmission** and **Serial Transmission: Definition 2M** Advantages and disadvantages in different network applications:4M	6	L1	CO1
5 a.	**CSMA/CD** and **CSMA/CA** mechanisms.: 8M scenario where **CSMA/CD** fails and **CSMA/CA** becomes essential: Wireles network: 2M	10	L1	CO1

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

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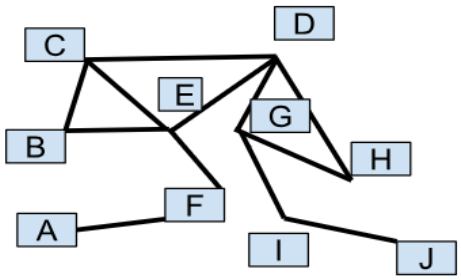
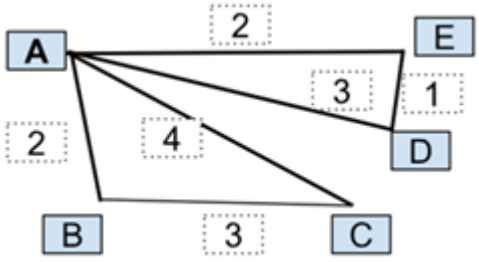
	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4	CO5
Marks	16	26	6	12	-	-	16	26	6	8	4

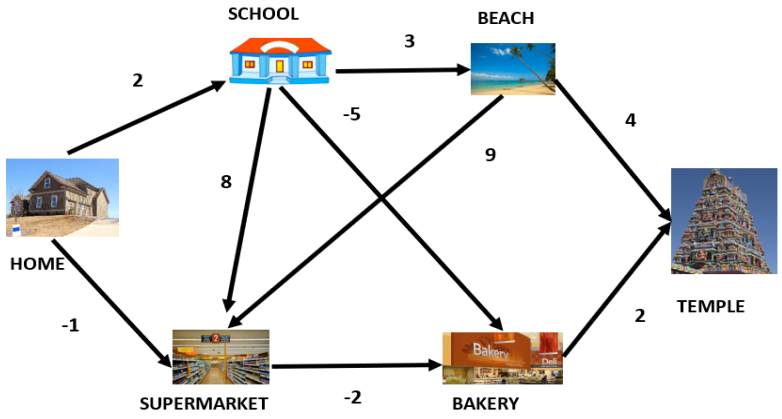
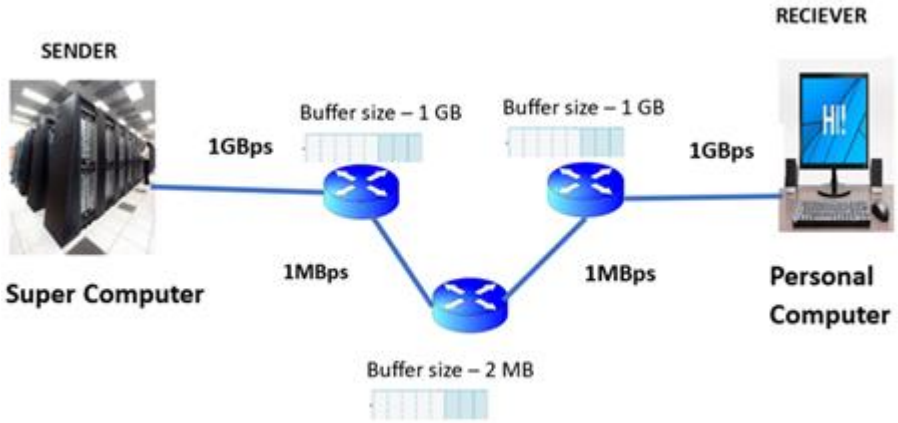
	RV COLLEGE OF ENGINEERING® **Department of Computer Science and Engineering** **CIE-II : Question Paper (OPEN BOOK/OPEN WEB)**			
Course : (Code)	**COMPUTER NETWORKS (CY245AT))**		**Semester : IV**	
Date : May 2025	**Duration :** 120 minutes		**Staff : CSE/ISE/AI-ML**	
Name :	**USN** :		**Section :**	**CSE/ISE/AI-ML**

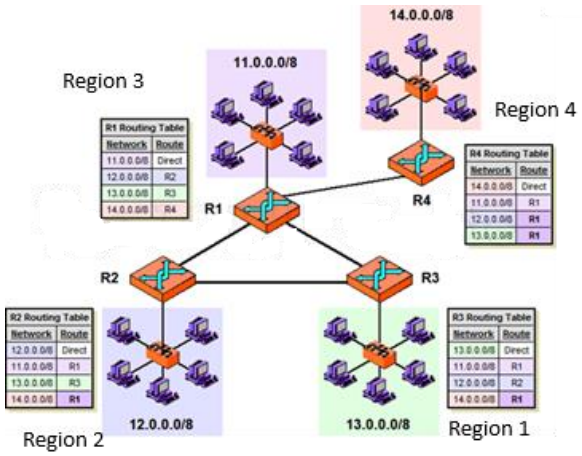
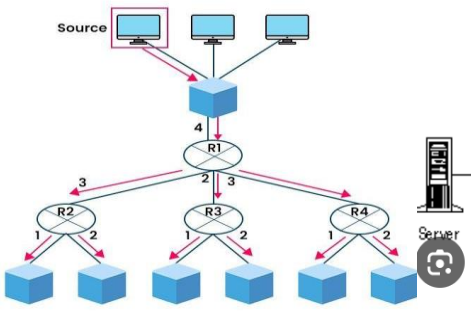
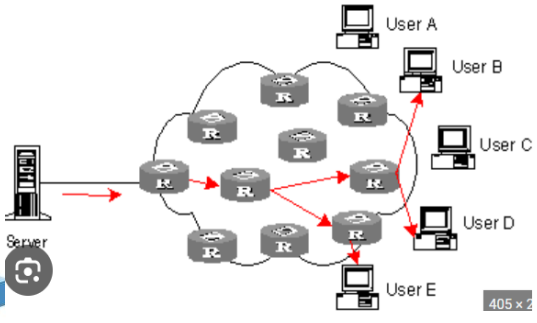
Answer all questions

PART A

Sl.no	Questions	Marks	L1-L6	CO
1	Calculate the number of packets generated due to flooding in the network given in Part B question No 1. To route the packets from Home to all other locations, calculate the number of packets generated at every place and total number of packets generated in the network.	2	3	3
2	Draw a multicast spanning tree which transmits packets from node A to Group 1, 2 and 3 simultaneously to all 3 groups (tree common to reach all 3 groups).  GROUP1 nodes: A, E, C, H. GROUP2 nodes: A, B, E. GROUP3 nodes: C,G,J	2	3	3
3	Draw Reverse path forwarding tree for diagram given in PART B Question No.1 for a path from home to BEACH via BAKERY (from home visiting bakery to reach BEACH) assuming all are POSITIVE edges.	2	4	5
4	Draw 2 unique sink trees for node E for diagram given below: 	2	3	3
5	Write all possible unique paths in spanning trees from B to E covering all the nodes for graph given in PART A Question No 4.	2	4	4

Part B

Sl. no	Questions	Marks	L1-L6	CO
1.	Apply a suitable routing algorithm and find the shortest path from Home to all the other locations. Draw the adjacency matrix for the given network model.  	10	3	2
2	 Observe the diagram of datagram subnet above and answer the following i. Identify the all-probable reasons for congestion in a network topology ii. Identify the necessity for flow control iii. List all the possible solutions to control the congestion and justify how the particular solution solve the problem	10	3	3
3	For the network diagram given in PART A Question No. 4, populate the routing table entries for all the nodes using Distance vector routing and answer the following scenarios: i. The initial routing table entries for the given graph in PART A Question No 4. ii. Show the routing table entries after good news that, there is an edge with distance value 1 from C to D. iii. Show the routing table entries after the edge from D to E crashes and leads to a count-to-infinity problem.	10	3	5

4.a	Write hierarchical routing table for one of the routers in subnet 13.0.0.0. Assume IP addresses and hop count as the metric. 	4	3	4
4.b	In your perspective, identify any 2 most important/significant metrics needs to be monitored which plays an important role to identify congestion and to have control over the congestion in the datagram subnet and justify why the suggested metric plays a significant role for the following scenarios: i. At any moment in the network, there is less memory available for queuing packets in a very long queue in router. ii. At any moment in a network the one of the routers in a heavily loaded path crashes.	6	4	1
5.a	Justify that, for the network diagram given in Question 5 b) Figure 2, for the path from Server to User E, hop-by-hop Choke packets take action against congestion more quickly than the Choke packet.	4	4	1
5.b	Observe the network and Identify one of the best suitable and efficient routing methods (Choose among these: Broadcasting, Flooding, Link state routing and Multicasting) for each of the three networks shown in Figures. Also explain how it works and justify why it is suitable for the relevant network?  **Figure 1.**  **Figure 2.**	6	4	1

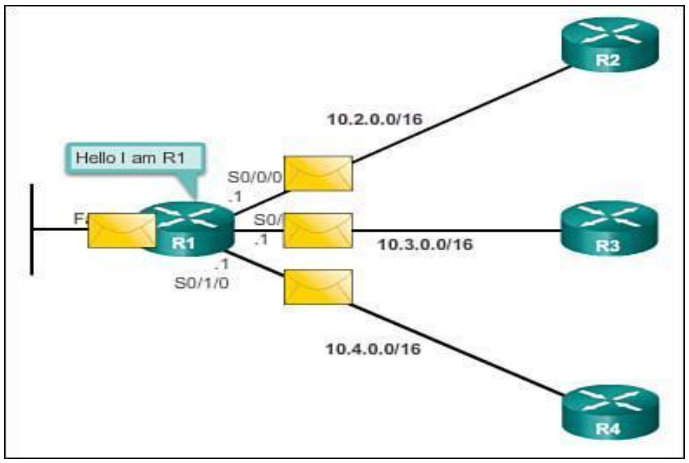


Figure 3. a

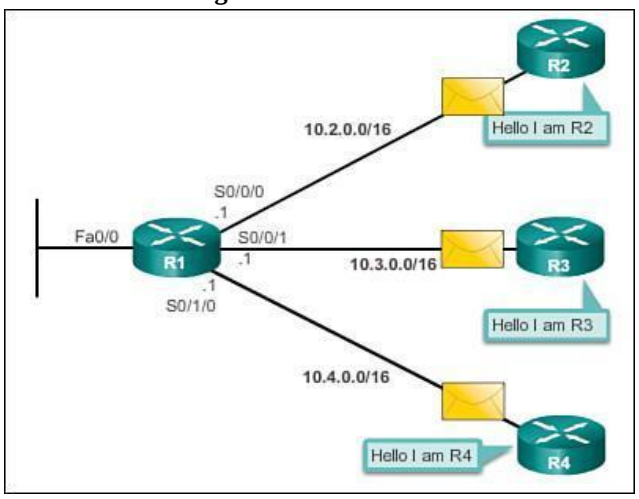


Figure 3. b

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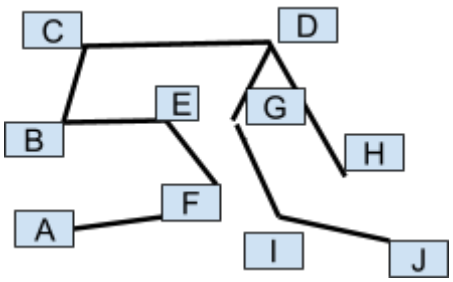
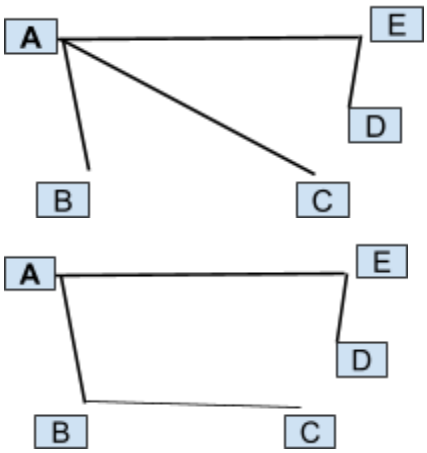
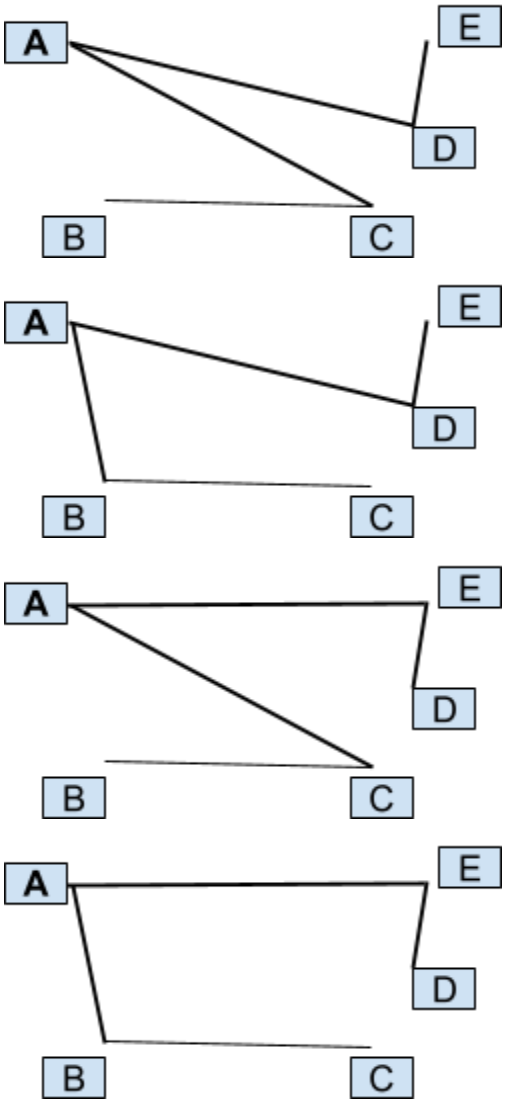
	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4	CO5
Marks	-	-	40	20	-	-	12	10	16	6	16

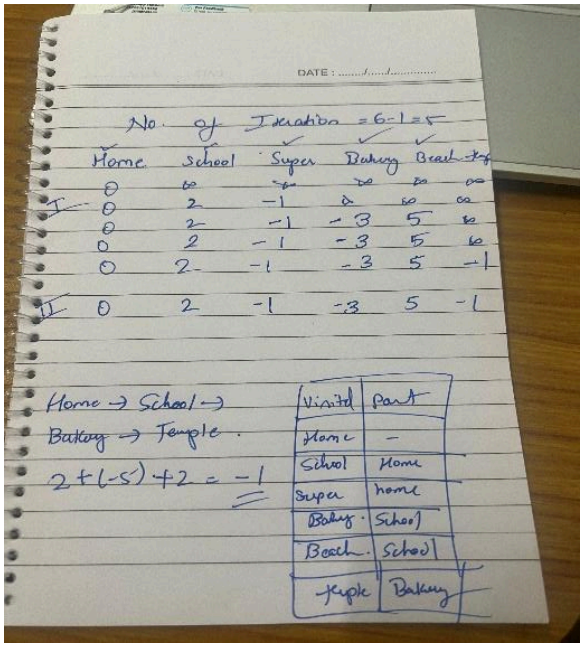
	RV COLLEGE OF ENGINEERING® **Department of Computer Science and Engineering** **CIE-II : Scheme (Open Book)**		
Course : (Code)	**COMPUTER NETWORKS (CY245AT))**	**Semester : IV**	
Date : Apr 2025	**Duration :** 120 minutes	**Staff : CSE/ISE/AI-ML**	
Name :	**USN** :	**Section :**	**CSE/ISE/AI-ML**

Answer all questions

Sl.no	Questions	Marks	L1-L6	CO
1	To route the packets from Home to all other locations, calculate the number of packets generated at every place and total packets:----1M Home-> School= 2 Home-> Super market=2 Home->Beach=5 Home-> Bakery=6 Home-> Temple=8 Workout: Packets generated at every node: Home=2 School=3 Supermarket=1 Beach=2 Bakery=1 Temple=0 Total packets: 9—----------1M	2	3	3
2	 Construction of spanning tree —2M	2	3	3
3	Home-> School->Beach->Supermarket->Bakery—---------2M	2	4	5
4	2 unique trees, —----------2M	2	3	3

				
5	4 unique trees—each tree—0.5M*4=2M 	2	4	4

Part B

Sl.no	Questions	Marks	L1-L6	CO
1.	 Problem solving – 8 marks + 2 marks matrix	10	2	1
2 a.	Identification of problems—3M + Justification—-3M=6M i. It's a super computer, so packet arrival rate exceeds outgoing link capacity ii. Link capacity decreases between router A and B iii. Buffer/memory storage is less in router B iv. Bursty traffic Identification of the necessity for flow control Fast sender, slow reciever List the solutions—2M + Justification—2M=4M i. Warning bit ii. Choke packet	10	2	2
3	Initial table—----------2M | | A | B | C | D | E | | A | 0 | 2 | 4 | 3 | 2 |	5	2	1

b.

B	2	-	3	5	4
C	4	3	-	7	6
D	3	5	7	-	1
E	2	4	6	1	-

Table after good news:------4M

	A	B	C	D	E
A	0	2	4	3	2
B	2	-	3	**4**	4
C	4	3	-	**1**	**2**
D	3	**4**	**1**	-	1
E	2	4	**2**	**1**	-

Table after Bad news—-------4M

	A	B	C	D	E
A	0	2	4	3	2
B	2	-	3	5	4
C	4	3	-	7	6
D	**8** looks at E and updates to 8 ie 3+5 from E Next hop 13+3=16	5	7	-	**5** looks at A and updates to 5 ie, 2 initia,l value of A ie, 2+3 Next hop 8+5=13 . .

<table>
<tr><td></td><td>
<table>
<tr><td></td><td>.
.
.
.
Next hop
18+3=21
.
.Infinity</td><td></td><td></td><td></td><td>.
Next hop
16+2=18
.
.
.
Infinity</td></tr>
<tr><td>E</td><td>2</td><td>4</td><td>6</td><td>1</td><td>-</td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>4 a.</td><td>Hierarchical routing table
<table>
<tr><th>Destination</th><th>Line</th><th>Hop</th></tr>
<tr><td>13.0.0.1</td><td>-</td><td>-</td></tr>
<tr><td>13.0.0.2</td><td>13.0.0.2</td><td>1</td></tr>
<tr><td>13.0.0.3</td><td>13.0.0.3</td><td>1</td></tr>
<tr><td>13.0.0.4</td><td>13.0.0.4</td><td>1</td></tr>
<tr><td>13.0.0.5</td><td>13.0.0.5</td><td>1</td></tr>
<tr><td>Region 2</td><td>R3</td><td>2</td></tr>
<tr><td>Region 3</td><td>R3</td><td>2</td></tr>
<tr><td>Region 4</td><td>R3</td><td>3</td></tr>
</table>
</td><td>4</td><td>4</td><td>5</td></tr>
<tr><td>b.</td><td>Metrics—1M + Justification—-2M—----------> 3M
i) Queue Length and Number of packets generated
Queue length need to be optimal not too high
Number of packets generated-Rate of packets generated reduced if queue is almost full and increased if que is almost free

Metrics—1M + Justification—-2M—----------> 3M
ii) Packets discard Rate and Packets stent rate
Packets discarded is increasing, then some node is crash or some problem along the path probably congestion and pallets sent rate need to be reduced</td><td>6</td><td>1</td><td>1</td></tr>
<tr><td>5 a.</td><td>Correct explanation of working of Hop-by-Hop choke packets—---2M
Justifying the answer with respect to time taken is less by hop-by-hop with example or assumption scenario with respect to given figure and path—-------2M</td><td>4</td><td>1</td><td>1</td></tr>
<tr><td>5 b.</td><td>2M split up:
Identification of Method —-1M</td><td>6</td><td>4</td><td>1</td></tr>
</table>

	Justification—--1M **For each figure—-2M*3=6M** ● Fig. 3b. Link State–HELLO Packet to discover neighbor as Figure shows communication as Hello from node to node. ● Fig.1 BroadCast- Efficient to reachout nodes quickly in minimum number of hops ● Fig.2 Multicast: To send to group of nodes along the path shown in figure.			

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	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4	CO5
Marks	16	26	6	12	-	-	16	26	6	8	4

	RV COLLEGE OF ENGINEERING® Department of Computer Science and Engineering IMPROVEMENT CIE : Question Paper	
Course : (Code)	**COMPUTER NETWORKS (CY245AT)**	**Semester : IV**

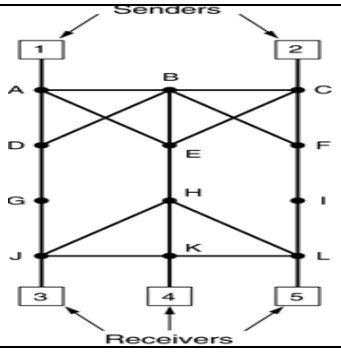
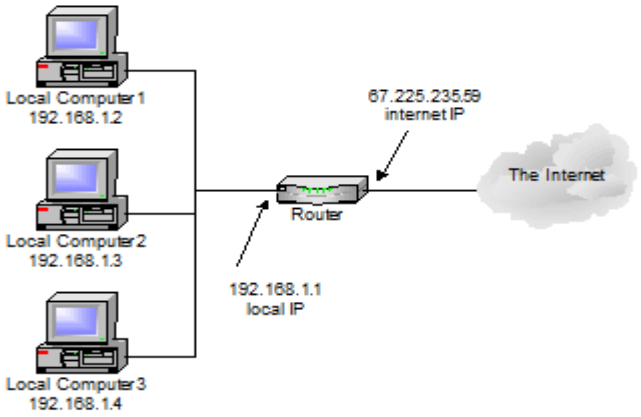
Date : June 2025	**Duration :** 120 minutes	**Staff : CSE/ISE/AI-ML**	
Name :	**USN** :	**Section :**	**CSE/ISE/AI-ML**

Answer all questions

Sl.no	Questions	Marks	L1-L6	CO
1.	What is a potential downside of load shedding in network applications?	1	2	2
2.	_____ protocol is used by IntServ to reserve resources along the data path	1	2	3
3.	What are Private IP addresses? Give their ranges for each.	2	2	3
4.	_____ is the nonprofit corporation, which manages the network number to avoid conflicts.	1	2	3
5.	The dotted decimal notation of an IP address expressed in hexadecimal as AC101E38 is _____.	1	3	3
6.	In an IPv4 packet, a value of IHL > 5 implies _____.	1	3	2
7.	If you need to divide a network into at least 5 subnets, with each subnet supporting a minimum of 16 hosts, which Classful subnet mask would be appropriate to use?	2	4	5
8.	Write the abbreviated address for the following IPv6 address: FE80:0000:0000:0000:0202:B3FF:FE1E:8329	1	4	5

Part B

Sl.no	Questions	Marks	L1-L6	CO
1 a.	Differentiate between Leaky Bucket algorithm and Token Bucket algorithm	5	2	2
1 b.	A router has the following (CIDR) entries in its routing table: **Address/mask** | **next hop** 135.46.56.0/22 | interface 0 135.46.60.0/22 | interface 1 192.53.40.0/23 | router 1 default | router 2 For each of the following IP addresses, what does the router do if packet with that address arrives? (i) 135.46.63.10 (ii) 135.46.57.14 (iii) 135.46.52.2 (iv) 192.53.40.7 (v) 192.53.56.7	5	4	5
2 a.	For the given network topology, R3 requests bandwidth 2 MBps from S1, R3 requests bandwidth 1 MBps from S2, R4 requests bandwidth 2 MBps from S1, R5 requests bandwidth 1 MBps from S2. What is the bandwidth required to be reserved at Routers A, B, C, E, H, J, K, L ?	6	4	4

				
b.	Illustrate the working of NAT for the following scenario, when Local Computer wants to communicate with the Internet. 	4	4	4
3 a.	Distinguish between Integrated Services and Differentiated Services. Describe the scheme of Assured Forwarding with the help of relevant diagram.	6	3	3
b.	Identify the class for the following addresses: i. 00000001 00001011 00001011 11101111 ii. 11000001 10000011 00011011 11111111 iii. 14.23.120.8 iv. 252.5.15.111	4	3	4
4 a.	What is Internetworking? How is tunneling used to implement internetworking? Explain.	6	2	2
b.	Demonstrate the different types of fragmentation used in Internetworking.	4	3	3
5 a.	Explain the significance of the following fields in the IPv4 header: (i) TOS; (ii) DF and MF; (iii) Fragment offset; (iv) Protocol.	6	3	3
b.	Briefly discuss about UDP and TCP protocols.	4	2	2

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Marks	-	20	22	18	-	-	-	17	21	14	8

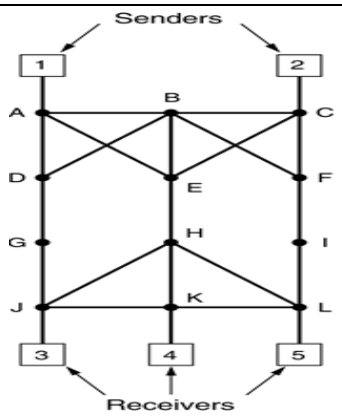
	RV COLLEGE OF ENGINEERING® Department of Computer Science and Engineering IMPROVEMENT CIE : SCHEME		
Course : (Code)	**COMPUTER NETWORKS (CY245AT))**	**Semester : IV**	
Date : June 2025	**Duration :** 120 minutes	**Staff : CSE/ISE/AI-ML**	
Name :	**USN** :	**Section :**	**CSE/ISE/AI-ML**

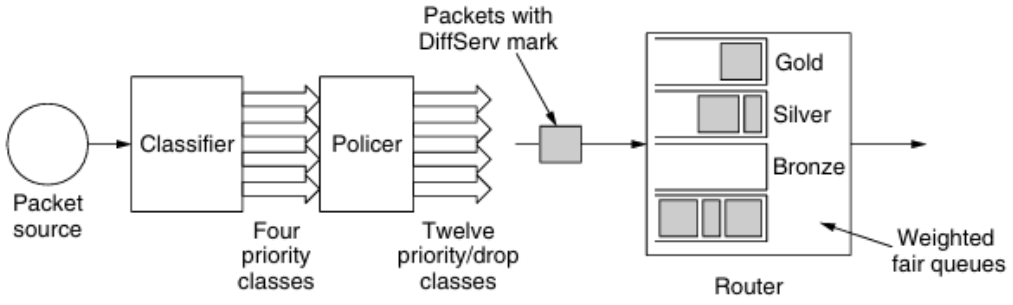
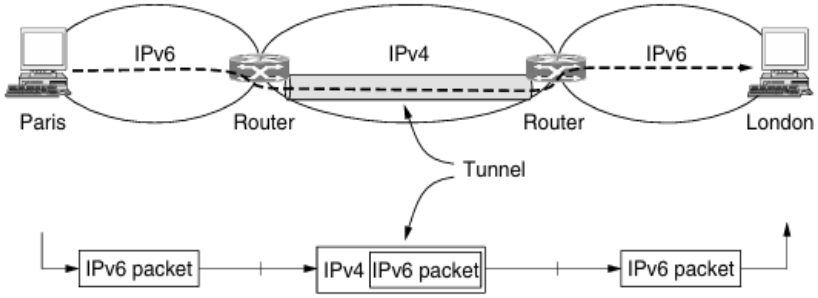
Answer all questions

Sl.no	Questions	Marks	L1-L6	CO
1.	*Loss of important data or degraded service quality*	1	2	2
2.	*RSVP (Resource Reservation Protocol)*	1	2	3
3.	***Private IP addresses*** *are IP addresses reserved for use within private networks (like home, office, or enterprise networks).* *Range:* *10.0.0.0 – 10.255.255.255* *172.16.0.0 – 172.31.255.255* *192.168.0.0 – 192.168.255.255*	2	3	3
4.	***IANA/ICANN***	1	3	3
5.	*172.16.30.56*	1	3	3
6.	*In an IPv4 packet, an Internet Header Length (IHL) value greater than 5 indicates that the IPv4 header contains optional fields beyond the minimum 20 bytes. The IHL field specifies the header length in 32-bit words, and a value of 5 corresponds to the minimum header size of 20 bytes.*	1	2	2
7.	*Use* ***Class C*** *with subnet mask* ***255.255.255.224*** *(/27) to create at least 5 subnets with at least 16 hosts each.*	2	4	5
8.	*FE80::202:B3FF:FE1E:8329*	1	4	5

Part B

Sl. no	Questions	Marks	L1 - L6	CO
1 a.	Differences between leaky bucket algorithm and token bucket algorithm	5	2	1
b.	**(i) 135.46.63.10** The first 22 bits of 135.46.63.10 is network address, is 135.46.60.0. The router forwards the packet to Interface 1. **(ii) 135.46.57.14** Given that the first 22 bits of the IP above address, we have 135.45.56.0 which corresponds to the network address of the first row. The packet will be forwarded to Interface 0. **(iii) 135.46.52.2**	5	4	5

	In like manner, we got 135.45.52.0 which does not match the first three rows of network addresses. The packet gets forwarded to default gateway which is Router 2. **(iv) 192.53.40.7** We consider the fisrt 23 bits of the above network address, the class 192.53.40.0 is found to match the network address of the third row. The packet gets forwarded to Router 1. **(v) 192.53.56.7** Taking the first 23 bits of the above IP address as network address, we have 192.53.56.0. It does not match the network addresses of the first three rows. The packet will be forwarded to default gateway which is Router 2			
2 a.	**A 4** **B 0** **C 2** **E 5** **H 5** **J 3** **K 2** **L 1**  Total bandwidth reserved at routers A, B, C, E, H, J, K, and L is 24 MB/sec	6	3	4
b.	The basic idea behind NAT is for the ISP to assign each home or business a single IP address (or at most, a small number of them) for Internet traffic. *Within* the customer network, every computer gets a unique IP address, which is used for routing intramural traffic. The three reserved ranges are: 10.0.0.0 – 10.255.255.255/8 (16,777,216 hosts) 172.16.0.0 – 172.31.255.255/12 (1,048,576 hosts) 192.168.0.0 – 192.168.255.255/16 (65,536 hosts)	4	3	4
3 a.	Differences between Integrated Services and Differentiated Services – 2m Assured Forwarding with the help of relevant diagram: 4m	6	3	3

				
b.	i. 00000001 00001011 00001011 11101111 - Class A ii. 11000001 10000011 00011011 11111111 - Class C iii. 14.23.120.8 - Class A iv. 252.5.15.111 - Class E (Experimental)	4	3	4
4 a.	Internetworking: 1m. Tunnelling: 5m 	6	2	2
b.	Transparent and Non Transparent Fragmentation : 2*2	4	3	3
5 a.	The significance of the following fields in the IPv4 header: 1.5 * 4 (i) TOS; (ii) DF and MF; (iii) Fragment offset; (iv) Protocol.	6	2	3
b.	UDP and TCP protocols : 2*2	4	2	2

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 life long learning for emerging technology.
CO4	Exhibit network configuration, protocol usage and performance evaluation in networks.
CO5	Demonstrate the solutions using various algorithms/protocols available to address networking issues using modern tools by exhibiting team work and effective communication.

	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4	CO5
Marks	-	20	22	18	-	-	-	17	21	14	8

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IV Semester B.E regular / supplementary examinations June/July- 2025
Common to CS/CD/CY/IS/AIML
Course : Computer Networks-CY245AT

Time : 3 Hours **Maximum Marks : 100**

Instructions to the students

1.Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2.Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8, and 9 and 10.

Part A

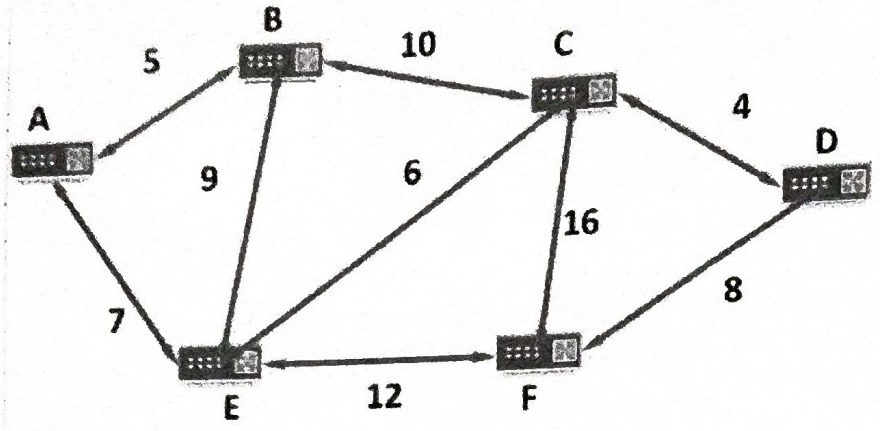
Question No	Question	M	CO	BT
1.1	Give one difference between connection-oriented and connectionless services.	02	2	1
1.2	What are the three main frame types in HDLC?	02	1	1
1.3	What is DAG? Give Example.	02	2	3
1.4	What is Reverse Path Forwarding ? Give an example tree.	02	2	3
1.5	"Flow control relates to the point-to-point traffic between a given sender and a given receiver; congestion control is a global issue". Justify this statement.	02	2	2
1.6	Mention any two limitations of Integrated services.	02	2	2
1.7	What is BGP and its role in internetwork routing?	02	2	2
1.8	If the total transmitted data is 80 bytes and only 50 bytes is application data, what percentage is overhead due to headers?	02	2	3
1.9	How Time Stamping is useful in RTP Protocol.	02	2	2
1.10	Illustrate Request-Response Model.	02	1	2

Part B

Question No	Question	M	CO	BT
2a	A bank is setting up ATMs across a city and needs a secure network to connect them to the central database. Suggest the appropriate network type and transmission method. How will security and reliability be ensured?	08	2	3
2b	Explain the working of CSMA/CA with a diagram. How does it detect and handle collisions in wireless networks?	08	2	2
3a	For the given Network diagram, apply Dijkstra's algorithm and answer the following questions (All are bidirectional arrows) i. Draw the shortest path tree to all nodes from the source node A after applying the algorithm	08	1	3

ii. Write the shortest path from A to D and A to C, along with the cost.

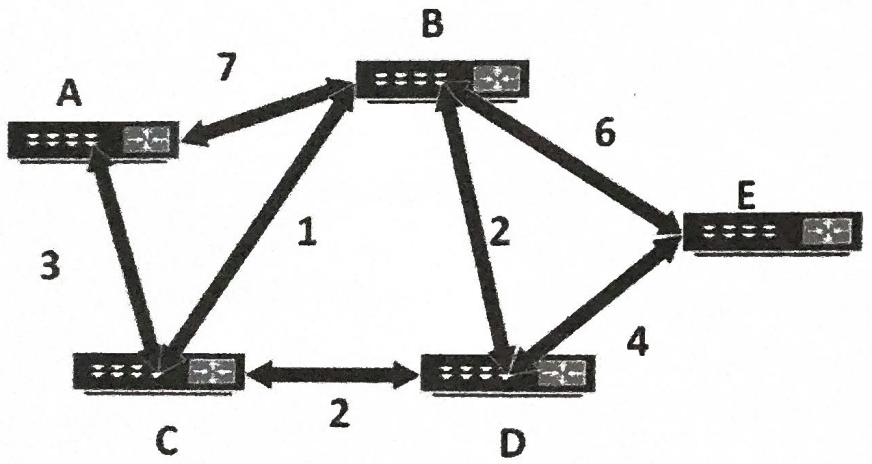
iii. What is the drawback of Dijkstra's algorithm?



3b	Differentiate Virtual circuit subnet and Datagram subnet.	08	2	1

OR

Apply Link State Routing (LSR) to the below diagram and show all the steps. Also find the shortest path from source A to all routers as part of the LSR. (All are bidirectional arrows)



4a		08	1	3
4b	Explain Routing within datagram network. Show the routing table entries with an example.	08	2	2
5a	Assume a virtual-circuit network where each new connection reserves 20 Mbps of bandwidth. The total available bandwidth on a link is 200 Mbps. Each connection lasts 10 seconds. (a) How many connections can be supported simultaneously without causing congestion? (b) If 12 connections are admitted, what is the risk, and how can it be prevented?	06	2	3
5b	Discuss open loop solutions and closed loop solutions with respect to congestion control.	04	2	2
5c	Explain any four benefits and limitations of Integrated Service	06	2	3

OR

6a	Discuss the impact of congestion on network performance. Discuss the symptoms of congestion and general strategies can be employed to detect and control congestion effectively? Provide real-world scenarios where congestion control is critical.	10	3	3

6b	Describe the significance of admission control policies in congestion prevention. How do different admission control schemes impact resource utilization and user satisfaction in a virtual-circuit network?	06	3	4
7a	With a neat sketch explain Address Resolution Protocol.	08	2	2
7b	Explain how Border Gateway Protocol (BGP) manages routing between Autonomous Systems (ASes), using the concepts of transit, customer, and peering relationships.	08	2	5
	OR			
8a	Compare and contrast interior and exterior routing protocols with examples.	04	4	2
8b	Discuss the advantages and disadvantages of fragmentation. Should networks avoid it when possible? Recommend solution strategy. Justify your answer.	06	3	4
8c	List the advantages and disadvantages of IPv6.	06	1	2
9a	During a voice call over an app like WhatsApp, you notice a brief glitch in the audio, but the call continues without interruption. Which transport protocol is most likely to be used for this communication, and why is it preferred in such real-time applications (Characteristics)?	08	2	3
9b	A user opens a web browser and enters the URL of an online bookstore. The browser sends a request to the server, which processes the request, accesses the required data, and sends back an HTML page displaying the list of books. The user then selects a book, and the details are retrieved and displayed without reloading the whole page. Based on this scenario, discuss the steps performed on both the client and server sides to complete this interaction.	08	2	3
	OR			
10a	A file transfer application is sending data over a TCP connection. The sender is allowed to transmit multiple packets without waiting for individual acknowledgments, if the total amount of unacknowledged data does not exceed the receiver's advertised capacity. As the receiver sends acknowledgments, the sender gradually sends more data without restarting the process. Which TCP mechanism is being used to control this flow of data, and how does it help improve the efficiency of data transmission?	08	2	3
10b	During a live online concert stream, users can watch the performance in real-time with synchronized audio and video. Despite occasional minor delays or dropped frames, the stream continues smoothly without interruption. The media player does not wait for every packet to arrive before playback begins, and no retransmission of lost data occurs. A) Which protocol is most likely responsible for handling the delivery of this multimedia content, and why is it suitable for this type of real-time application? B) Also, provide the protocol stack for the same.	08	3	3