VIT

Reg. No. : 22BRA1168

Final Assessment Test (FAT) - November/December 2023

Programme	B.Tech.	Semester	FALL SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. Subbulakshmi T	Slot	F1+TF1
		Class Nbr	CH2023240100685
Time	3 Hours	Max. Marks	100

PART-A (8 X 10 Marks)
Answer all questions

01. Indian Leadership Academy(ILA) is an online corporate training provider company for IT-related courses. The company is setting up its new campus in Kolkata. You as a network expert have to study the physical locations of various blocks and the number of computers to be installed. The physical location of ILA consists of the following blocks, (i) Administrative Building with 20 computers (ii) Finance Building with 120 computers, and (iii) Faculty Studio Building with 40 computers respectively. [10]

Table 1: Block to Block Distances (in Mts.)

From	To	Distance
Administrative Building	Finance Building	60
Administrative Building	Faculty Studio Building	120
Finance Building	Faculty Studio Building	70

a. Suggest the most appropriate block-to-block cable layout to connect all three blocks for efficient communication. (2 marks)

b. Which type of network out of the following is formed by connecting the computers of these three blocks? Justify your answer. (3 marks)

c. LAN, b. MAN, c. WAN

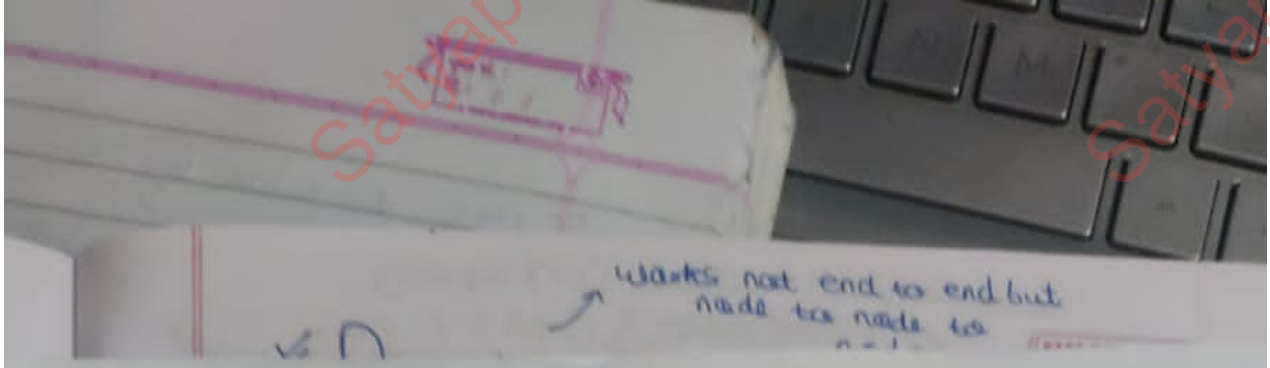
d. Identify the protocol stack applicable to the network type you have selected above. Elaborate on the same. (5 marks)

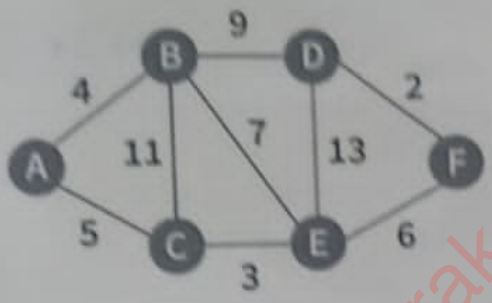
02. What is the total delay (latency) for a frame of size 3 million bits that is being sent on a link with 10 routers having a queuing time of 4 μs and a processing time of 2 μs? The length of the link is 2000 km. The speed of light inside the link is 2×10^8 m/s. The link has a bandwidth of 3 Mbps. Which component of the delay is dominant? [10]

03. In VIT wireless network, each station is trying to transmit long (multi-frame) files. After each frame is sent, they contend for the channel. Suggest the strategy that needs to be followed in the VIT network to avoid collision in the data link layer. Explain in detail. [10]

04. Perform subnetting for the Class C IP with four subnets each with increasing powers of 2 starting from 2(2^2). The given IP is 203.45.31.0. Write the subnet mask, the first and last address of every subnet, and the number of addresses in every block. How many remaining addresses are available after allocating for these 4 subnets? [10]

05. Use Dijkstra's algorithm to find the shortest path tree and the forwarding table for node A in the given weighted graph. [10]





06. Compare and contrast the IPv4 header with the IPv6 header. [10]

07. Additive Increase Additive Decrease (AIAD), Multiplicative Increase Additive Decrease (MIAD), and Multiplicative Increase Multiplicative Decrease (MIMD) are a few additional policies for fairness in congestion reduction. Illustrate the stability and convergence of these three policies with a neat sketch. [10]

08. Explain the workings of email and its role in communication. (a.) Identify the core protocol used for email application **[2 Marks]**. (b.) Discuss the features and illustrate how it facilitate the transfer of messages between hosts **[8 Marks]**. [10]

PART-B (1 X 8 Marks)
Answer all questions

09. The following is a dump (contents) of a UDP header in hexadecimal format. Each (2 marks) [8]

06 32 00 0D 00 1C E2

a. What is the Source port number?
b. What is the destination port number?
c. What is the total length of the user datagram?
d. What is the length of the data?

PART-C (1 X 12 Marks)
Answer all questions

10. Identify the connection-oriented transport layer protocol that establishes a logical path between the source and destination. Elaborate how this is carried out. [12]

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Finance Building	Vacu

a. Suggest the most appropriate t
efficient communication. (2 marks)
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three blocks? Justify your answer. (
c. LAN, b. MAN, c. WAN
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05. Use Dijkstra's algorithm to find the sho
given weighted graph.

VIT
Vellore Institute of Technology

Reg. No. : 22BCE1310

Final Assessment Test (FAT) - November/December 2023

Programme	B.Tech.	Semester	FALL SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. Kanchana Devi V	Slot	C2+TC2
		Class Nbr	CH2023240101181
Time	3 Hours	Max. Marks	100

Section 1 (10 X 10 Marks)
Answer all questions

01. a. Mr. Robin is a network administrator in an organization. He is assigned to design a network with eight devices to be arranged using mesh topology. Find out the number of links required to arrange the network. Also, discuss the consequences if a connection fails in this network. **[4 Marks]** **[10]**

b. Identify the OSI/ISO layers from the data given below and elaborate them. **[3 Marks]**

(i) The layer which converts the message into segments.

(ii) The layer which is responsible for Host – Host delivery

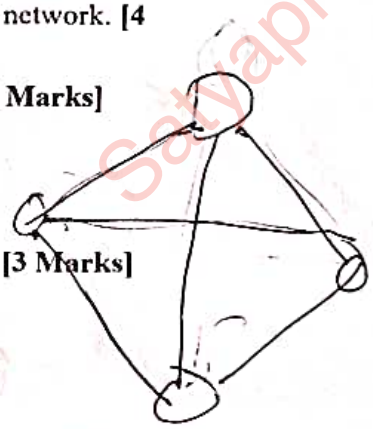
(iii) The layer that divides the data into frames

c. Specify the abbreviations and port numbers for the protocols provided below. **[3 Marks]**

(i) SMTP

(ii) HTTP

(iii) FTP



02. Ms. Moana is 3rd year student of VIT Chennai. She wants to have telephonic conversation with her parents residing in Mumbai. She uses a traditional telephone line to make the conversation. **[10]**

(i) Explain the switched network that enables this service along with delay diagram. **[3 Marks]**

(ii) Imagine a frame of size 2.5 million bytes is sent on a 1500 km link which has the bandwidth of 3 Mbps with 5 routers placed in between. The routers have 0.1 millisecond queuing time and 2 microsecond processing time. The speed of light in the link is 2×10^8 m/s. Find the Latency? Find the dominant and negligible factors of the delay. **[7 Marks]**

03. A bitstream with polynomial $x^9+x^7+x^3+x^2+1$ is transmitted using CRC method. The generator polynomial $x^5+x^4+x^2+1$. **[10]**

(i) Find the data transmitted? **[5 Marks]**

(ii) If the third from the last bit is inverted during the transmission, calculate the method by which the receiver detect the error. **[5 Marks]**

04. Mr. Juhan sends a message to Mr. Anub. On manipulation of external factors, the message got modified and reached Anub. As Anub is not aware of error detection and correction protocol. Suggest a suitable error detection and correction protocol and develop a manual with detailed procedure to teach him how to detect and correct error. **[10]**

05. _____ is based on media access protocol to sense the traffic on a channel (idle or busy) before transmitting the data. Illustrate the same with three different access modes. **[10]**

06. (i) Illustrate the difference between Go-back-n and Selective Repeat Protocol **[2 Marks]** **[10]**

(ii) For the given sequence, using sliding window flow control draw the sliding windows of size 7 between the sender A and receiver B, **[4X2=8 Marks]**

a. Frames 0, 1 and 2 are sent; frames 0 through 2 are acknowledged.

b. Frame 3 is sent; frame 3 is acknowledged.

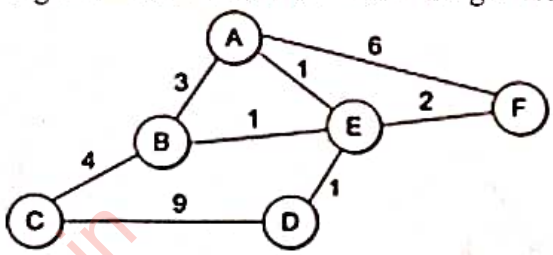
c. Frames 4 and 5 are sent; frames 4 and 5 are acknowledged.

d. Frames 6, 7 , 0 and 1 are sent; frames 6 through 1 are acknowledged.

07. (i) Compare and contrast the fields in the main headers of IPv4 and IPv6. **[5 Marks]** **[10]**

(ii) A router receives a packet with the destination address 192.54.87.12. Show that how the router find the network address of the destination. **[5 Marks]**

08. Identify the protocol and routing in which each node shares the knowledge of its neighborhood with every other node. Use the same protocol to find the shortest routes with appropriate algorithm between all nodes for the given map. **[10]**



09. Imagine there are 100 systems in a network where every system uses TCP protocol. Due to heavy traffic, the performance of the network gets slow down. How do TCP overcome this situation to increase the performance of the network? Elaborate in detail. **[10]**

10. Mr. Scooby is interested to visit **www.xyz.com** to download some files. When he types the website name in the web browser, an IP address for the given name is retrieved from an authoritative server to facilitate the requested services. **[10]**

(i) Identify the protocol which provides the IP address for the given name. **[2 marks]**

(ii) Discuss the operations involved in the background with a neat diagram. **[8 marks]**

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VIT Vellore Institute of Technology

Reg. No. : 22BAI1076

Final Assessment Test (FAT) - November/December 2023

Programme	B.Tech.	Semester	FALL SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. Pradeep Kumar T.S	Slot	F2+TF2
		Class Nbr	CH2023240100688
Time	3 Hours	Max. Marks	100

Part A (4 X 10 Marks)
Answer all questions

01. A 100-byte message is sent through a private internet using the TCP/IP protocol suite. If the protocol adds a 10-byte header at each layer, what is the efficiency of the system (the ratio of the number of useful bytes to the number of total bytes). What happens if the same 100-byte message is passed across all the layers of OSI? [10]

02. You are a network engineer at a large university. The university has a 100 Mbps link between the main campus and a satellite campus. The link is used for a variety of traffic, including voice, video, and data. You are tasked with designing a network upgrade to increase the capacity of the link. Being a network engineer, you are supposed to use either circuit switching or packet switching to handle the load, congestion, video audio streaming, and peak demands and use the link most efficiently. [10]

Which switching method do you recommend? Justify your reasons.

03. Imagine you are the IT manager for a medium-sized company that is expanding its office space to accommodate more employees. You are tasked with designing the network infrastructure for this new office. In this scenario, you have to consider both wired and wireless connectivity options. [10]

- How would you leverage IEEE 802.3 (Ethernet) standards to ensure reliable and high-speed wired network connections within the office environment, taking into account factors like scalability, bandwidth, and cable types?
- Simultaneously, you need to provide seamless wireless connectivity for employees and guests. How would you utilize IEEE 802.11 (WLAN) standards to design a secure and efficient wireless network, considering aspects like wireless security protocols, coverage areas, and interference mitigation in a densely populated office space?

Please outline your approach to integrating both IEEE 802.3 and IEEE 802.11 standards to create a robust and comprehensive network infrastructure that meets the company's current and future connectivity needs.

04. Suppose you are an IT administrator for a medium-sized company, and you need to ensure that your employees can securely send and receive emails. Your company uses various email clients (Outlook, Thunderbird, etc.) and email servers (Microsoft Exchange, Postfix, etc.). Explain the various application layer protocols that work in the above context. Highlight the differences between the protocols and when you might prefer one over the other. [10]

Part B (4 X 15 Marks)
Answer all questions

05. a. You are given a Hamming(15,11) codeword with a single-bit error. Your task is to: (8 Marks) [15]

- Start with an 11-bit data word, e.g., 11011001110.
- Calculate the values of the parity bits based on the data bits.
- Append the parity bits to the data word to create the codeword.
- Decode the received 15-bit codeword and identify the location of the error.
- Correct the error using the parity bits.
- Provide the corrected data word.

b. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x^3+1. (7 Marks)

What is the actual bit string transmitted? Suppose the third bit from the left is inverted during transmission. How will the receiver detect this error?

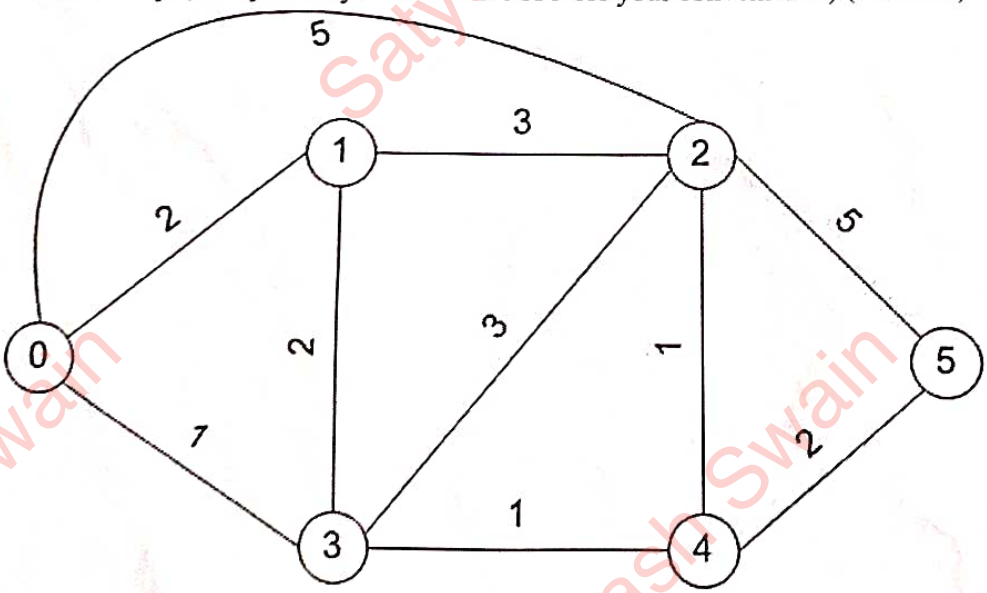
06. Girtel is an Internet Service Provider that holds a block of 256 addresses. It needs to divide the addresses to 256 customers. Does it need subnetting? Design the topology and suggest the need for subnetting. [15]

Mask	*Network Address*	*Next-Hop Address*	*Interface Number*
/26	140.6.12.64	180.14.2.5	m2
/24	130.4.8.0	190.17.6.2	m1
/16	110.70.0.0	----------	m0
/16	180.14.0.0	----------	m2
/16	190.17.0.0	----------	m1
Default	Default	110.70.4.6	m0

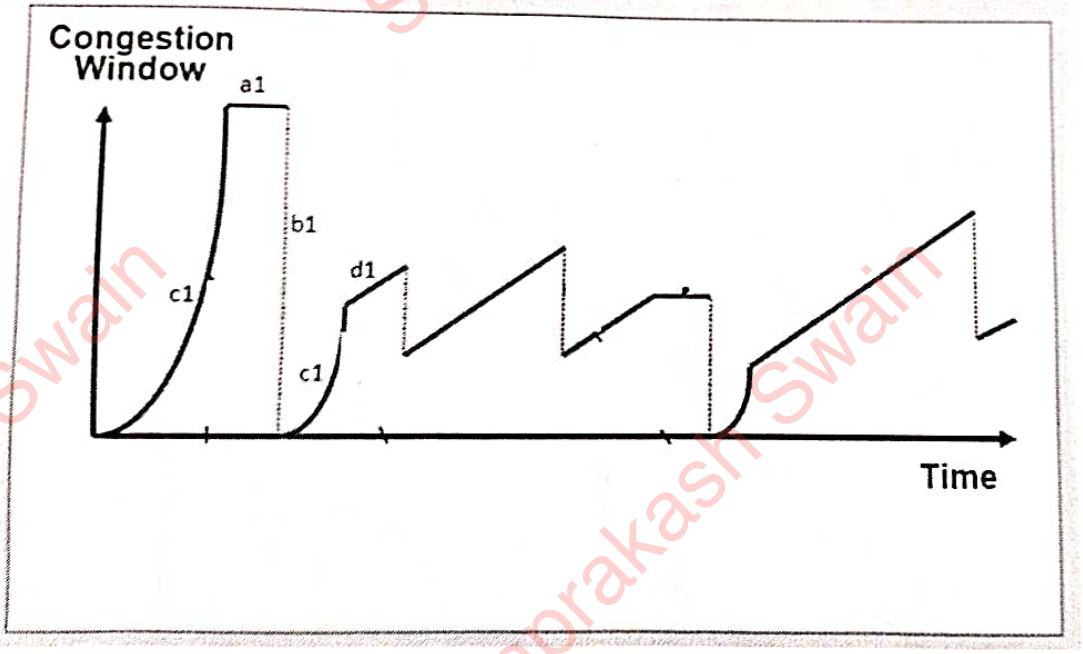
07. The following diagram shows the connectivity of 6 routers through a cost involved between the routers. Identify the routing table of all the nodes in case of [15]

(i) Distance Vector Routing and (8 Marks)

(ii) Link State Routing. Suggest among the two cases, which one performs better in terms of connectivity. (NB: you may use RIP or OSPF for your convenience) (7 Marks)



08. In the following diagram, the congestion window vs. time is given for a TCP network with congestion. Comment on the parameters a1, b1, c1, and d1 from the graph. In the entire graph, how many times the 3 duplicate ACKs were received at the sender and how many times did the time-out occur? [15]



(ii) Redo the problem (i) showing what happens when the 2nd data frame transmission (SN=1) is lost.

10. Given a classless IPv4 Block **160.110.96.0/23**. Design subnetting scheme for the topology shown in Fig 3. You must subnet the block as specified in Table 1 since each LAN or WAN requires enough IP addresses to support the number of hosts. **[10]**

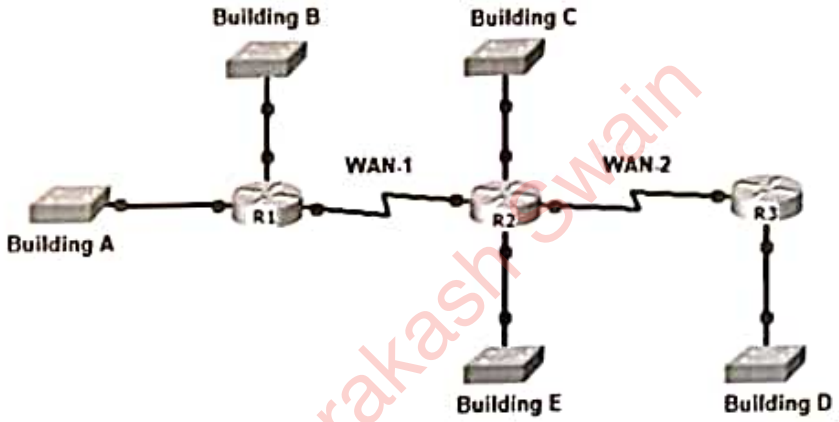


Fig. 3

Table 1 : Requirement of Number of Address

Building	Number of Addresses
Building A	200
Building B	100
Building C	50
Building D	20
Building E	10
WAN-1	2
WAN-2	2

Present the solutions in the form of table showing each subnet block, the subnet prefix, the range of addresses in that subnet block and analyze number of addresses wasted in that subnet block

11. For the network shown in Fig. 4, find the shortest path between source 1 to all other nodes using Dijkstra's algorithm. **[10]**

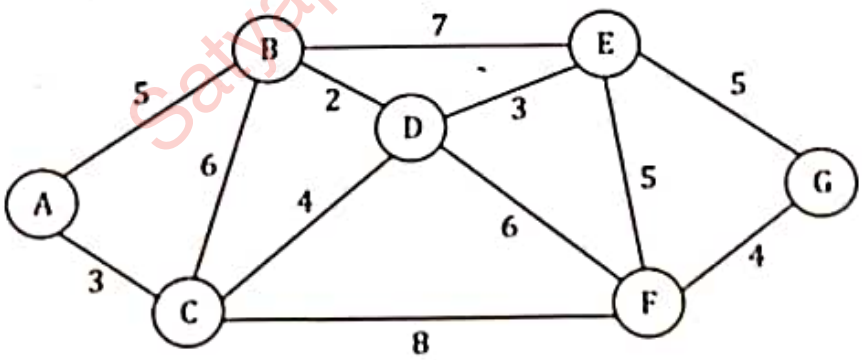


Fig. 4

12. (i) Explain with a neat diagram the three way handshake process during the connection establishment phase of the connection-oriented transport layer protocol. **[5 marks]** **[10]**

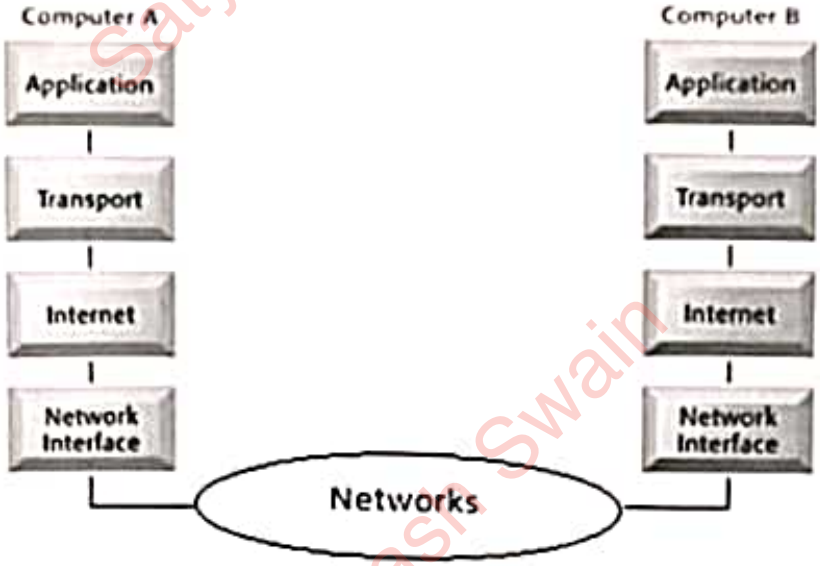


Fig. 2

Briefly Illustrate how the message(s) generated by Computer A's application is delivered to the Computer B's application over the internetwork by answering to the following questions in your illustration.

(i) Which communication layer helps to find the destination node on the internet? What do they do to deliver the packets?

(ii) If a message packet is lost, which communication layer is taking care of the lost packet? How does it operate to recover the lost packet?

(iii) Complete the following table by specifying the address type for each layer of the TCP/IP Model and the name of the PDU (protocol data unit).

Layer	Protocol Data Unit	Address	Example of Address
Application			
Transport			
Network			
Data Link			
Physical			

08. Assume that processing delay, queuing delay and control overhead-bits are ignored. Consider the message size as 30,000bits, the propagation time is 10ms per hop and packet length is 1000 bits and link rate per hop 10000 bps and call set up time is 2ms. Find the total time for both the circuit and packet switching networks when number of intermediate nodes as (i) 5, (ii) 10, (iii) 15, (iv) 20. Analyze the impact of increasing the number of intermediate nodes on the total delay in both circuit and packet switching networks. Provide comments on the network performance in terms of total delay. **[10]**

09. Using the Go-Back N protocol, illustrate with a flow diagram if a sender with a window size 3 and has six data frames to send. Label all the data frames with the Sequence Numbers and returning ACKs with the corresponding numbers. **[10]**

(i) Assume no frame is lost during transmission. Show how the window slides over as acknowledgements arrive and new frames are transmitted, when operated under Go-Back N protocol.

VIT

Reg. No. :

Final Assessment Test (FAT) - November/December 2023

Programme	B.Tech.	Semester	FALL SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. DEEPA NIVETHIKA	Slot	G1+TG1
		Class Nbr	CH2023240100901
Time	3 Hours	Max. Marks	100

Section A (8 X 10 Marks)
Answer all questions

01. A is downloading a picture shared by a friend B in a Google drive. Is A using 7 layers of OSI protocol or 5 layers of TCP/IP protocol suite? Explain your choice with needful diagrams and reasons. If your choice is for some other protocol, explain it with needful diagrams and functionalities. **[10]**

02. Explain the difference in functionalities between session and presentation layers. User A uses EBCDIC (Extended Binary Coded Decimal Interchange Code) and User B uses ASCII (American Standard Code for Information Interchange). Can User A communicate with User B using the protocol standards available? Explain with reasons the layer that can help A communicate with B in communication protocol? **[10]**

03. Consider the network shown in Fig1. Switch ports are numbered from 1,2,3,4. Two paths are drawn, one from A to F and the second from B to C. Each link is labelled with its Virtual Circuit Identifier (VCI) numbers. Path AF use VCIs 15,13, 7, 6, 10, 5 and BD use VCIs 8, 9, 11, 3. Construct switching tables for these two path establishment and explain your answer with a neat diagram. Switching table should have incoming outgoing ports and VCIs. **[10]**

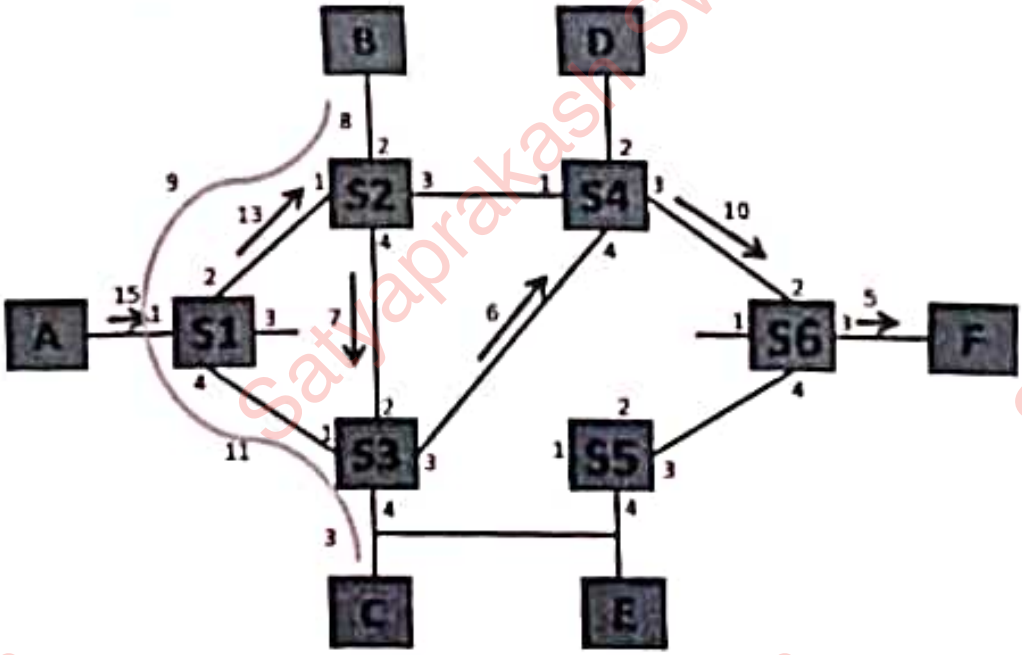


Fig 1

04. Encode the word "Hi" into odd parity hamming code, provided the ASCII value of A is 65 and the ASCII value of a is 97. [10]

(i) Write down the data transmitted. (5 Marks)

(ii) Suppose the 4th bit from the LSB is flipped, check and correct the error bit at the receiver end. (5 Marks)

05. Data communication takes place between Alice and Nian through TCP protocol, consider Alice as client and Nian as Server. Initial sequence number from Alice to Nian to establish connection is 4000, and from Nian to alice is 11000. The data bytes from Alice to Nian ranges from 4001 to 6000. The window size is assumed to be 2 and Alice sends 1000 bytes during each transmission. Whereas the data bytes from Nian ranges from 11001 – 13000. Explain all stages of communication for the above said scenario in TCP with all the necessary diagrams with sequence numbers and flags. [10]

06. You are requested to support Adhish, who wants to create a message. Its performance should not get affected with packet loss, latency, jitter and throughput. For this purpose you are supposed to explain about the various congestion detection, congestion prevention mechanisms. Explain each of them in detail. [10]

07. A machine called lab1.cse.vit.ac.in exists in computer science department at VIT University and a user on eve.research.iitm.ac.in launches a query to resolve the name lab1.cse.vit.ac.in. We assume that none of the servers have the resolution of the name cached, thus all queries must be resolved and the final IP address must be obtained from the authoritative server in VIT University. Draw a picture that illustrates the query resolution process and explain the same. [10]

08. You are observing Link State Packets (LSPs) entering a router. [10]

Link State Packets:

	Router A		Router B		Router C		Router D		Router E		Router F	
Links	C	1	A	2	A	1	B	5	A	3	C	8
Links	B	2	D	5	F	8	E	3	F	1	E	1
Links	E	3	-	-	-	-	F	1	D	3	D	1

Based on the above LSPs, construct the topology of the network in question. [3 Marks]

Use the Dijkstra's shortest path algorithm to determine the shortest path from A to D. Specify the shortest path between A and D and its respective cost. [7 Marks]

Section B (5 X 5 Marks)

Answer all questions

09. Suppose some router R has the following entries in its forwarding table: [5]

Destination Network	Next Hop
160.0.129.0/24	Interface 0
10.0.4.0/22	Interface 1
128.140.0.0/16	Interface 2
0.0.0.0/0	128.140.0.1

The table below lists some IP header fields for 4 packets labeled P1–P4. Based on this header information, fill in the last column ("Destination") to indicate where router R forwards the packets — your answer should be one of the router's interface number, or "drop", if the router would drop the packet.

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Reg. No. :

Final Assessment Test (FAT) - May 2024

Programme	B.Tech.	Semester	WINTER SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. Karmel A	Slot	D1+TD1
		Class Nbr	CH2023240501845
Time	3 Hours	Max. Marks	100

General Instructions:

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

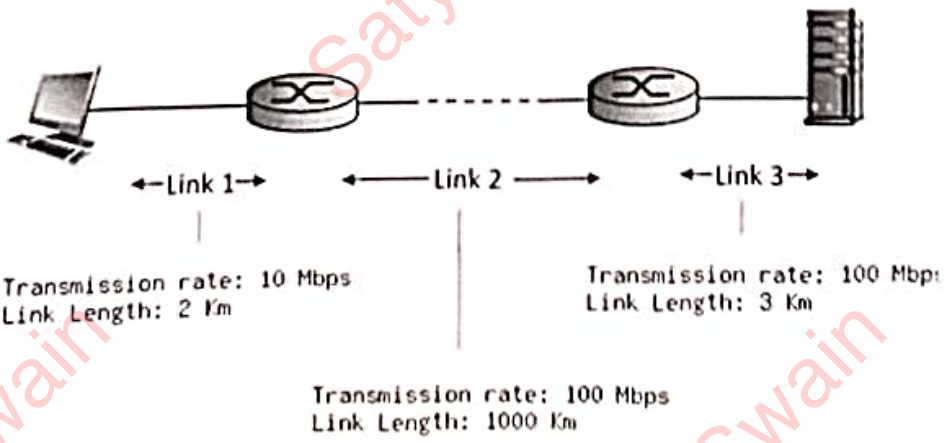
Answer all questions (10 X 10 Marks = 100 Marks)

01. i. Identify and elaborate on the term that refers to how a network is laid out physically, along with its advantages and disadvantages. **[4 Marks]** [10]

ii. Contemplate a situation in which a client computer's licensed antivirus program needs regular updates and synchronizations with signatures from the remote server. For the given scenario, illustrate the different protocols that function in each of the OSI layers. **[6 Marks]**

02. (i) Why packet switching outperforms better than circuit switching? Substantiate your answer. Also, discuss various timing delays involved in circuit switching and datagram switching.**[4 Marks]** [10]

(ii) Evaluate the end-to-end delay (including the transmission delays and propagation delays on each of the three links, but ignoring queuing delays and processing delays) from when the left host begins transmitting the first bit of a packet to the time when the last bit of that packet is received at the server at the right. The speed of light propagation delay on each link is 2.4×10^8 m/sec. Note that the transmission rates are in Mbps and the link distances are in Km. Assume a packet length of 10000 bits. Give your answer in milliseconds. **[6 Marks]**



03. Given that the data word 1010011110 is sent from a system with the generator 10111. Identify the error detection method that is applicable and show the generation of the codeword at the sender side. Analyze the codeword received. [10]

04. a. In the traditional Ethernet protocol, the frames are sent with the CRC. If the frame is corrupted, the receiving node just discards it. Is this an example of a Stop-and-wait Protocol? Justify the further processing of the frame. [5 marks] [10]

b. Assume that the sender in the stop-and-wait protocol has a single slot in which to store the frame to send or the copied frame that has been sent. Explain the same in detail by sketching what would happen if a packet were sent from the network layer to the data link layer at this precise moment. [5 marks]

05. i) Imagine multiple game stations are connected in a common medium for transferring real-time data. Identify and explain the different methods where each game stations apply the concept of sensing the medium to detect whether the channel is idle or busy with least collision compared to ALOHA. **[5 Marks]** [10]

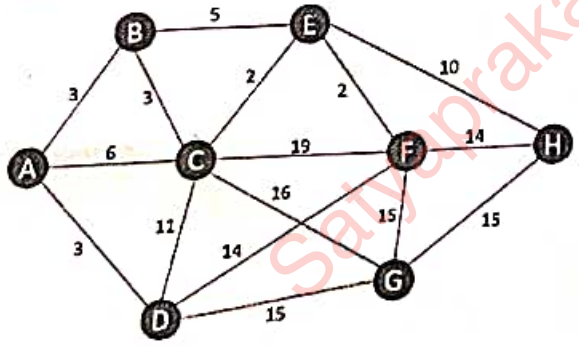
ii) Compare and contrast the above identified methods with respect to action taken while the channel is idle and busy with the diagrammatic representations. **[5 Marks]**

06. An organization is granted the block 112.0.0.0/8. The administrator wants to create 1000 subnets: [10]

(a) Find the subnet id, subnet mask and number of addresses in each subnet. [2 mark]
(b) Find the first and last allocatable addresses in first and last subnet. [4 marks]
(c) Find the first and last allocatable addresses in 42nd subnet. [4 marks]

07. Consider the below sample network. [10]

a. Construct the Link State Database at each node using link state packet information.
b. Construct the Link State Database for the whole network.
c. Construct the Least cost tree for node A by applying Dijkstra's algorithm



08. ABC bank and XYZ Prudential have teamed up to speed up the home loan delivery mechanism for its customers. Since a lot of transactions are required to be made across the various branches, the traffic between the stations is expected to peak during the peak hours. Additionally, the various stations are all under a reliable delivery service. Given the amount of traffic generated, design and describe a technique that will help the two partners in controlling congestion in the network through an appropriate congestion window, congestion policy, avoidance mechanisms and early congestion detection mechanisms. [10]

09. Assume Mr.Rex is working as a Network Administrator in Aflex Technologies at Delhi. Rex's manager asked him to give a report on performance and usage statistics of all the devices connected in the network. Illustrate about the protocol will help him to generate the specified report? Discuss the same in detail. [10]

10. (a) Consider a transition where the client initializes by sending a request message and the server replies by sending a response. With a proper diagram, illustrate the HTTP transaction between the client and the server. [8 marks] [10]

(b) Why does FTP use two well-defined ports where the other protocols in general use only one port? [2 marks]

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Reg. No. : 22BCE1351

Final Assessment Test (FAT) - May 2024

Programme	B.Tech.	Semester	WINTER SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. PRIYANKA MISHRA	Slot	D2+TD2
		Class Nbr	CH2023240503359
Time	3 Hours	Max. Marks	100

General Instructions:

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

Answer all questions (10 X 10 Marks = 100 Marks)

01. a. Mr. XX is a network administrator in an organization. He is assigned to design a network with eight devices to be arranged using mesh topology. Find out the number of links required to arrange the network. Also, discuss the consequences if a connection fails in this network. **[3 Marks]** **[10]**

b. A significant question in networking is the performance of the network, how good is it? Write about the various metrics used to check this. **[3 Marks]**

c. A computer network is build up from several components, which makes it possible to transfer data from one device to another and makes smooth communication between two different devices. Identify and discuss the main components of a computer network. **[4 Marks]**

02. a. In networking, identify the switching technique that optimize the use of the channel capacity available in digital telecommunication networks, such as computer networks, and minimize the transmission latency. Also, this type of switching entertains a pre-defined path which helps in transmitting the packets. **[3 Marks]** **[10]**

b. Elaborate on how the pre-defined path is established when there are three switches placed between source and destination. **[7 Marks]**

03. a. Given the 8-bit data signal [ON_OFF_ON_ON_OFF_ON_OFF_OFF], generate the 13-bit composite word using the Hamming code that corrects single errors. **[5 Marks]** **[10]**

b. Identify the process of managing the rate of data transmission among nodes to prevent a fast sender from overwhelming a slow receiver. Illustrate the same with various types and corresponding pros and cons. **[5 Marks]**

04. a. A block of address is granted to a small organization. We know that one of the addresses is 210.16.37.39. Find the class, first and last address in the block. Specify how many addresses are there in this particular block? **[4 Marks]** **[10]**

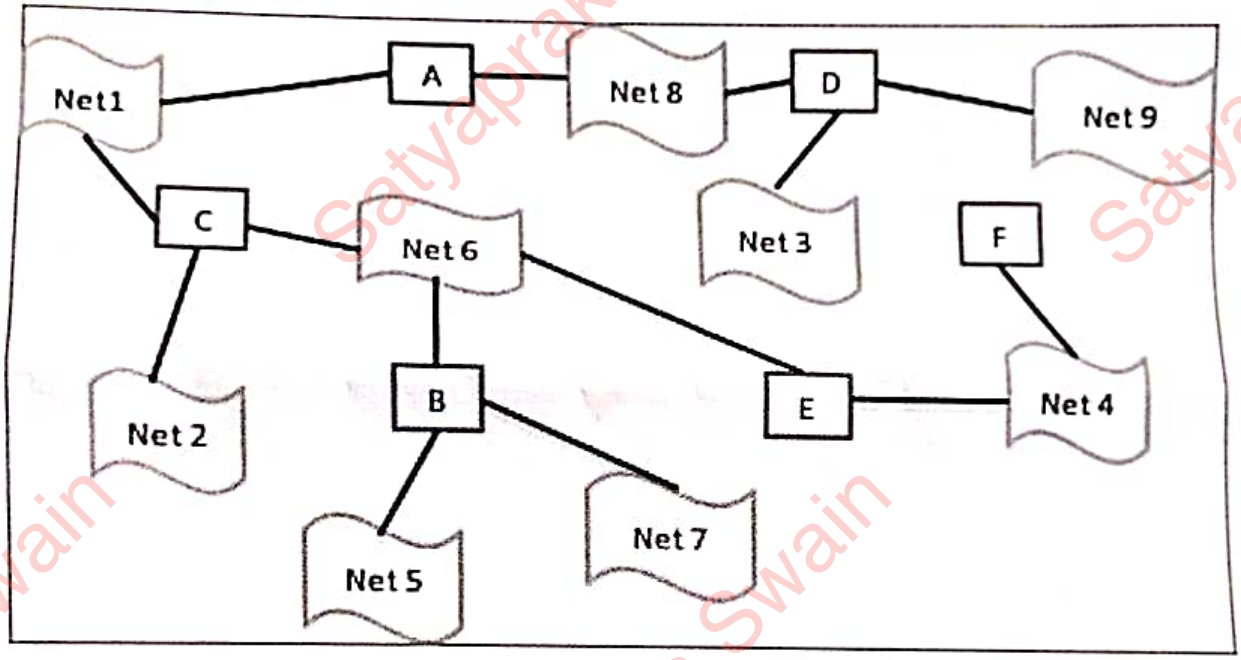
b. A router receives a packet with the destination address 192.54.87.12. Show how does the router find the network address of the destination. **[6 Marks]**

05. a. Assume in a **pure aloha network**, a station transmits fames of length 100 bytes each, over the shared channel of 1.5Mbps. Find then the length of time in which possibility of collision occurs. **[3 Marks]** [10]

b. Assume in a **slotted aloha network**, a station transmits frames of length 100 bytes each, over the shared channel of 1.5Mbps. Find the length of time in which possibility of collision occurs. **[3 Marks]**

c. In CSMA/CD, assume station transmits 2000 Byte frame on a link of 1.7Kbps at time t_1. At time t_4 the station receives a jamming signal. The station takes its second attempt to transmit the frame. Calculate the waiting time the station takes before re-transmission. **[4 Marks]**

06. Consider an Autonomous System (AS) with routers A to F, as shown below. [10]
Assume the AS uses a Distance Vector Routing protocol. Explain distance vector routing algorithm with supporting protocol. Construct the initial and final routing table of routers from A to F.



07. a. Discuss in detail the packet communications and the value set to the flags in the TCP header during the following scenarios: **[4 Marks]** [10]

- The client requests a new connection with the server.
- The server accepts the connection request from the client and initiates communication packets.
- The server abruptly disconnects the connection due to overloading.
- The client finishes the packet exchanges and request for a disconnection with mutual approval from server.

b. TCP transmits data in full-duplex mode using connection-oriented transmission. In what way this connection oriented transmission is carried out in TCP, elaborate the method with neat diagram. **[6 Marks]**

08. Consider the telecommunication service plan of TESLA which provides unlimited broadband internet home plans with attractive tariff. The quality manager at TESLA Circles Mobile Tariff department, Austin uses leaky bucket traffic shaping mechanism to control the amount and rate [10]

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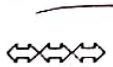
09. a. Identify the protocol of application layer which translates the human readable domain names to machine readable IP addresses. **[2 Marks]** [10]

b. Discuss the working and types of the same. Demonstrate on how this protocol route the traffic to the requested web application from client end. **[8 Marks]**

10. A FTP application is establishing connection to transfer files from sender to receiver through the network. Demonstrate the FTP application with connection oriented packet switched networks. [10]



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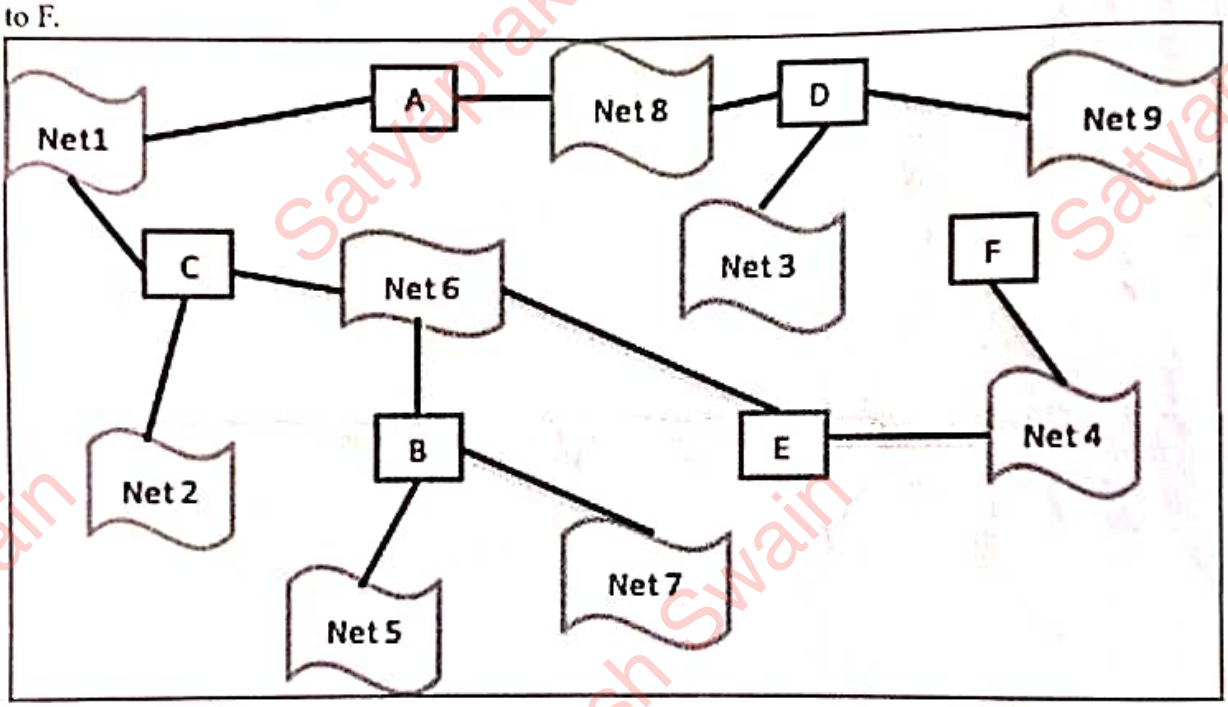

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