KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060
CONTINUOUS ASSESSMENT TEST III
(Regulations 2020)

Month and Year	: December 2023	Roll Number	:
Programme	: B.Tech.	Date	:
Branch	: IT	Time	: Choose an item.
Semester	: V	Duration	:
Course Code	: 20ITT51	Max. Marks	:
Course Name	: COMPUTER NETWORKS		

PART - A (10 × 2 = 20 Marks)

ANSWER ALL THE QUESTIONS

1.	Name the categories of port numbers and provide the range for each category. Ports with numbers 0–1023 are called system or **well-known ports**; ports with numbers 1024-49151 are called user or **registered ports**, and ports with numbers 49152-65535 are called **dynamic, private** or ephemeral ports.	CO4	K1
2.	Expand the terms: HTTP, SMTP, SSH, SNMP. HTTP stands for Hyper Text Transfer Protocol, FTP for File Transfer Protocol, Simple Network Management Protocol (SNMP), Secure Shell (SSH)	CO5	K1
3.	Station A needs to send a message consisting of 9 packets to station B using a sliding window (window size 3) and go-back-N error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost), then what is the number of packets that A will transmit for sending the message to B? Station A needs to send a message consisting of 9 packets to Station B using a sliding window with a window size of 3. Every 5th packet transmitted by A gets lost, but no ACKs from B ever get lost.	CO4	K3
4.	Distinguish between UDP and TCP. (any four)	CO4	K2

Basis	Transmission Control Protocol (TCP)	User Datagram Protocol (UDP)
Type of Service	TCP is a connection-oriented protocol. Connection orientation means that the communicating devices should establish a connection before transmitting data and should close the connection after transmitting the data.	UDP is the Datagram-oriented protocol. This is because there is no overhead for opening a connection, maintaining a connection, or terminating a connection. UDP is efficient for broadcast and multicast types of network transmission.
Reliability	TCP is reliable as it guarantees the delivery of data to the destination router.	The delivery of data to the destination cannot be guaranteed in UDP.
Error checking mechanism	TCP provides extensive error-checking mechanisms. It is because it provides flow control and acknowledgment of data.	UDP has only the basic error-checking mechanism using checksums.
Acknowledgment	An acknowledgment segment is present.	No acknowledgment segment.

	Sequence	Sequencing of data is a feature of Transmission Control Protocol (TCP). this means that packets arrive in order at the receiver.	There is no sequencing of data in UDP. If the order is required, it has to be managed by the application layer.		
	Speed	TCP is comparatively slower than UDP.	UDP is faster, simpler, and more efficient than TCP.		
	Retransmission	Retransmission of lost packets is possible in TCP, but not in UDP.	There is no retransmission of lost packets in the User Datagram Protocol (UDP).		
	Header Length	TCP has a (20-60) bytes variable length header.	UDP has an 8 bytes fixed-length header.		
	Weight	TCP is heavy-weight.	UDP is lightweight.		
	Handshaking Techniques	Uses handshakes such as SYN, ACK, SYN-ACK	It's a connectionless protocol i.e. No handshake		
	Broadcasting	TCP doesn't support Broadcasting.	UDP supports Broadcasting.		
	Protocols	TCP is used by HTTP, HTTPs, FTP, SMTP and Telnet.	UDP is used by DNS, DHCP, TFTP, SNMP, RIP, and VoIP.		
	Stream Type	The TCP connection is a byte stream.	UDP connection is a message stream.		
	Overhead	Low but higher than UDP.	Very low.		
	Applications	This protocol is primarily utilized in situations when a safe and trustworthy communication procedure is necessary, such as in email, on the web surfing, and in military services.	This protocol is used in situations where quick communication is necessary but where dependability is not a concern, such as VoIP, game streaming, video, and music streaming, etc.		

5. List the three basic ideas applied for management with SNMP. — CO4 — K2

- Managed Objects:
- Management Information Base (MIB):
- SNMP Operations

6. Differentiate between persistent and non-persistent connections in HTTP. — CO5 — K2

Persistent HTTP	Non-Persistent HTTP
The server leaves the connection open after sending a response.	Requires 2 RTTs per object.
Subsequent HTTP messages between the same client/server are sent over an open connection.	OS overhead for each TCP connect
The client sends requests as soon as it encounters a referenced object.	Browsers often open parallel TCP conn to fetch referenced objects.
As little as one RTT for all the referenced objects.	Here, at most one object can be sent ov TCP Connection.

7. Host A is sending data to host B over a full duplex link. The transmission time for packet transmission is 50 µs and the propagation delay over the link is 200 us. Calculate the round-trip time (RTT) for a packet? — CO4 — K3

Given:
Transmission time (T) = 50 µs
Propagation delay (D) = 200 µs

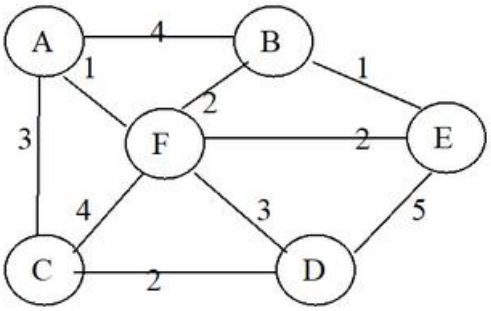
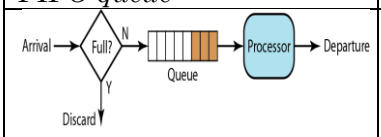
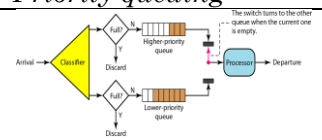
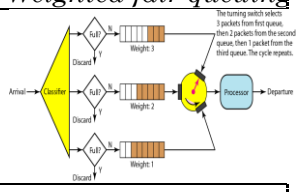
In a full duplex link, we have separate paths for sending and receiving data. Therefore, the RTT consists of the time taken for the packet to travel from host A to host B and the time taken for the acknowledgment (ACK) to travel back from host B to host A.

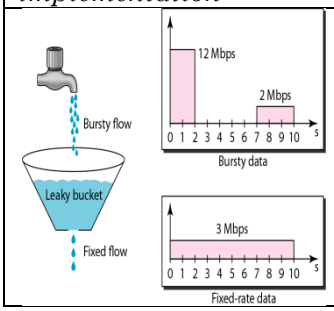
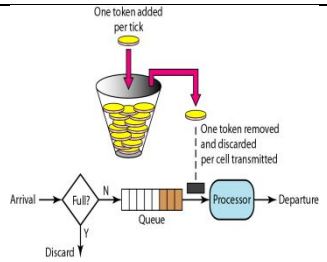
	RTT = 2 * (Transmission time + Propagation delay) RTT = 2 * (T + D) Substituting the given values: RTT = 2 * (50 µs + 200 µs) RTT = 2 * 250 µs RTT = 500 µs Therefore, the round-trip time (RTT) **for a packet in this scenario is 500 µs**.		
8.	The following is the content of a UDP header in hexadecimal format ABCI00AA01AA0000, Find the To find the Destination Port and Source Port number, we can convert the hexadecimal values to their decimal representation. Converting the Destination Port (2 bytes) from hexadecimal to decimal: ABCI (in hexadecimal) = 43981 (in decimal) 00AA (in hexadecimal) = 170 (in decimal) Concatenating the two decimal values gives us the Destination Port number: Destination Port = 43981 * 65536 + 170 = 2883694546 Converting the Source Port (2 bytes) from hexadecimal to decimal: 01AA (in hexadecimal) = 426 (in decimal) 0000 (in hexadecimal) = 0 (in decimal) Concatenating the two decimal values gives us the Source Port number: Source Port = 426 * 65536 + 0 = 27965456 Therefore, based on the given UDP header, the Destination Port number is **2883694546 and the Source Port number is 27965456.Destination and Source Port number.**	CO4	K3
9.	Recall the services provided by Application Layer (any four) • Application Layer provides a facility by which users can forward several emails and it also provides a storage facility. • This layer allows users to access, retrieve and manage files in a remote computer. • It allows users to log on as a remote host. • This layer provides access to global information about various services. • This layer provides services which include: e-mail, transferring files, distributing results to the user, directory services, network resources and so on. • It provides protocols that allow software to send and receive information and present meaningful data to users. • It handles issues such as network transparency, resource allocation and so on. • This layer serves as a window for users and application processes to access network services. • Application Layer is basically not a function, but it performs application layer functions. • The application layer is actually an abstraction layer that specifies the shared protocols and interface methods used by hosts in a communication network. • Application Layer helps us to identify communication partners, and synchronizing communication. • This layer allows users to interact with other software applications. • In this layer, data is in visual form, which makes users truly understand data rather than remembering or visualize the data in the binary format (0's or 1's). • This application layer basically interacts with Operating System (OS) and thus further preserves the data in a suitable manner. • This layer also receives and preserves data from it's previous layer, which is Presentation Layer (which carries in itself the syntax and semantics of the information transmitted). • The protocols which are used in this application layer depend upon what information users wish to send or receive. • This application layer, in general, performs host initialization followed by remote login to hosts.	CO5	K2

10.	Give the purpose of WWW. To provide a decentralized system of **interconnected documents and resources available over the Internet.** It was created to facilitate the sharing and retrieval of information on a global scale. The WWW allows users to access and navigate through web pages, websites, multimedia content, and various online services.		CO5	K1

Part – B (3 × 10 = 30 Marks)

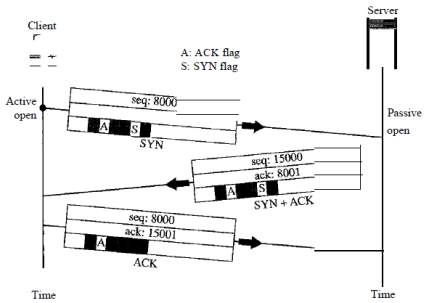
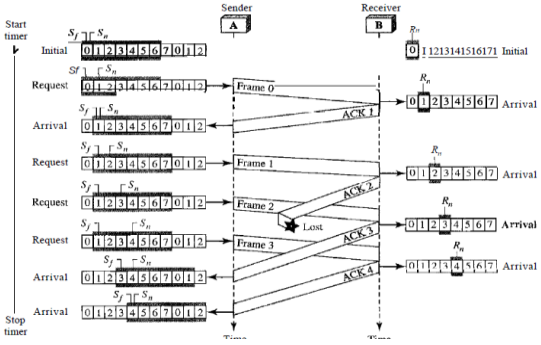
ANSWER ANY FOUR QUESTIONS

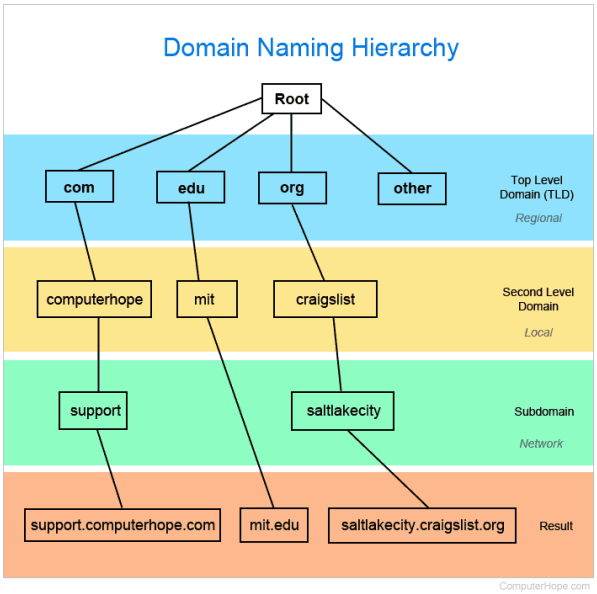
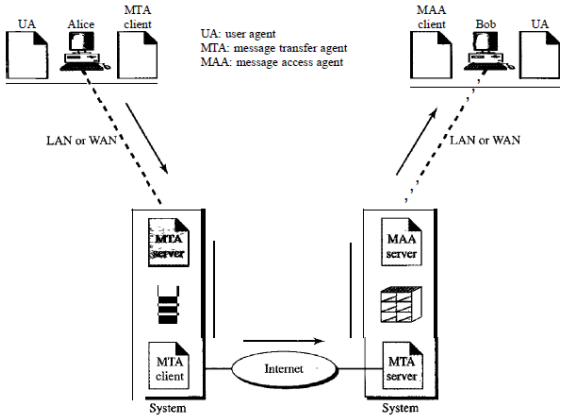
11.		Write the simplified version of Dijkstra's algorithms and apply this algorithm to find the shortest path tree and the forwarding table for node A in the figure  given below function dijkstra(G, S) for each vertex V in G distance[V] <- infinite previous[V] <- NULL If V != S, add V to Priority Queue Q distance[S] <- 0 while Q IS NOT EMPTY U <- Extract MIN from Q for each unvisited neighbour V of U tempDistance <- distance[U] + edge_weight(U, V) if tempDistance < distance[V] distance[V] <- tempDistance previous[V] <- U return distance[], previous[] AFB 3 AC 3 AFD 4 AF 1 AFE 3 Algorithm :5 marks Forwarding table : 4 Explanation 01	(10)	CO3	K 3
12.		Illustrate the significance of QoS and explain the various techniques to improve QoS. **Scheduling** Packets wait in a buffer (queue) until the node (router) is ready to process them. *FIFO queue*  *Priority queuing*  *Weighted fair queuing*  **Traffic Shaping or Policing**	(10)	CO4	K 2

		Leaky bucket implementation	*Token bucket*			
						

1. **Traffic Shaping or Policing**
2. **Resource Reservation**
3. **Admission Control**

Explanation :07
Diagrams :03

13.	i)	• Elaborate the three-way hand shaking process that is used for TCP connection establishment. In TCP, connection-oriented transmission requires three phases: • connection establishment, • data transfer, and • connection termination  • Explanation :03 • Diagrams :02	(5)	CO4	K 1
	ii)	With a neat diagram, explain the operations of Go-Back-N protocol used in transport layer. It uses the principle of protocol pipelining in which the multiple frames can be sent before receiving the acknowledgment of the first frame. If we have five frames and the concept is Go-Back-3, which means that the three frames can be sent, i.e., frame no 1, frame no 2, frame no 3 can be sent before expecting the acknowledgment of frame no 1. In Go-Back-N ARQ, the frames are numbered sequentially as Go-Back-N ARQ sends the multiple frames at a time that requires the numbering approach to distinguish the frame from another frame, and these numbers are known as the sequential numbers.  Explanation :03 Diagrams :02	(5)	CO4	K 2

14.	i)	Discuss about various terminologies used for namespace in Domain Name System. domain namespace is a name service provided by the Internet for Transmission Control Protocol networks/Internet Protocol (TCP/IP). DNS (domain name system) is broken up into domains, a logical organization of computers that exist in a larger network. Below is an example of the hierarchy of domain naming on the Internet.  Explanation :03 Diagrams :02	(5)	CO5	K 2
	ii)	Using a common scenario, illustrate the architecture of e-mail. In the fourth and most common scenario, Bob is also connected to his mail server by a WAN or a LAN. After the message has arrived at Bob's mail server, Bob needs to retrieve it. Here, we need another set of client/server agents, which we call message access agents (MAAs). Bob uses an MAA client to retrieve his messages. The client sends a request to the MAA server, which is running all the time, and requests the transfer of the messages.  Explanation :03 Diagrams :02	(5)	CO5	K 2

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	18	55	27	-	-	-