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Internal Assessment Test 2 – December 2025

Sub:	Computer Networks					Sub Code:	BCS502	Branch:	CSE	
Date:	02.12.2025	Duration:	90 mins	Max Marks:	50	Sem / Sec:	V (A, B & C)		OBE	

Answer any FIVE FULL Questions

		MARKS	CO	RBT
1 (a)	Given a classless address as 167.199.170.82/27. Find the following: a)The number of addresses in the network b) Find the first address c)Find the last address	3	CO3	L3
1 (b)	Find the class of the following classful IP addresses: a) 01110111 11110011 10000111 11011101 b) 11101111 11000000 11110000 00011101 c) 11011111 10110000 00011111 01011101	3	CO3	L3
1 (c)	With the help of a neat diagram, explain IPV6 datagram packet format.	4	CO2	L2
2 (a)	Illustrate the working of Dynamic Host Configuration Protocol(DHCP) with suitable diagrams.	8	CO3	L2
2 (b)	Differentiate classless and classful addressing of IPV4.	2	CO3	L3
3(a)	Discuss Go-Back N Protocol with a neat diagram.	4	CO3	L2
3(b)	Discuss all the fields in TCP Segment format with a neat diagram.	6	CO3	L2

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3(b)	Discuss all the fields in TCP Segment format with a neat diagram.	6	CO3	L2

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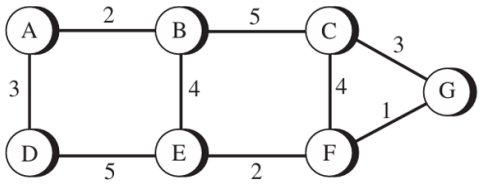
4(a)	Illustrate the connection establishment and termination in TCP/IP with suitable sketches.	5	CO3	L2
4(b)	Explain FTP and its two connections.	5	CO3	L2
5(a)	Apply the link state routing algorithm for the given graph below to find the path from source node A to all other nodes. 	6	CO4	L3
5 (b)	Outline Distance Vector Routing algorithm for routing the packets from source to destination.	4	CO4	L2
6(a)	With the help of suitable diagrams, explain the working of SSH for secure network communication.	6	CO3	L2
6 (b)	Define the following: a) Domain Name System b) Name Space and its types c) Domain d) Zone	4	CO3	L2

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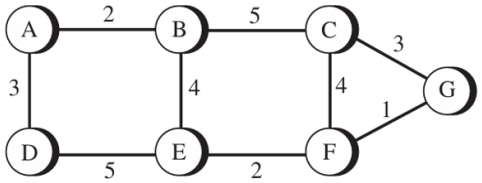
5(a)	Apply the link state routing algorithm for the given graph below to find the path from source node A to all other nodes. 	6	CO4	L3
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6(a)	With the help of suitable diagrams, explain the working of SSH for secure network communication.	6	CO3	L2
6 (b)	Define the following: e) Domain Name System f) Name Space and its types g) Domain h) Zone	4	CO3	L2

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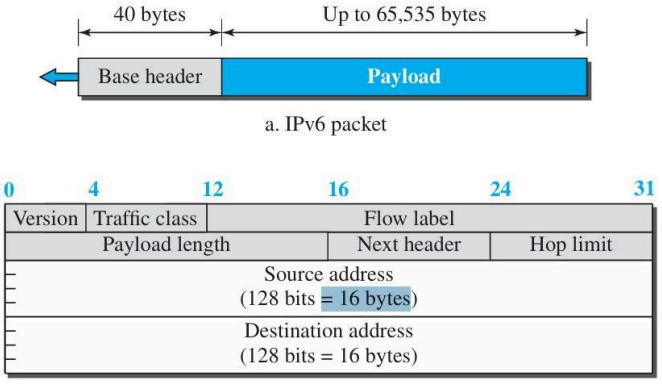
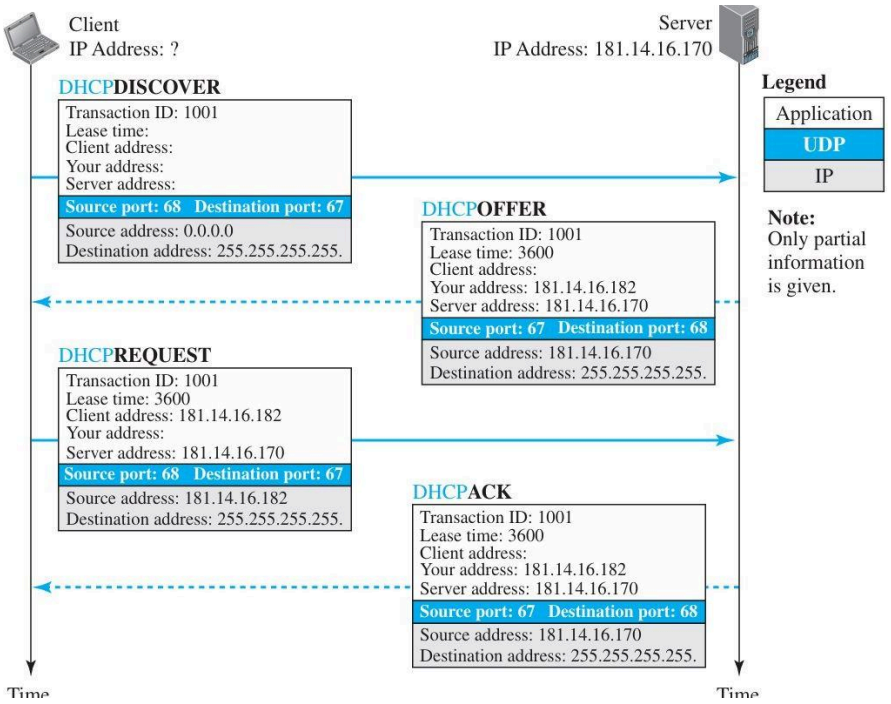
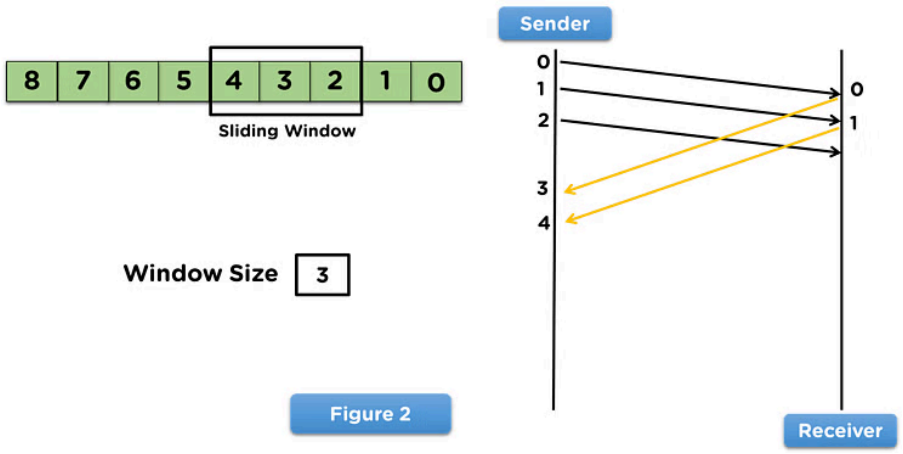
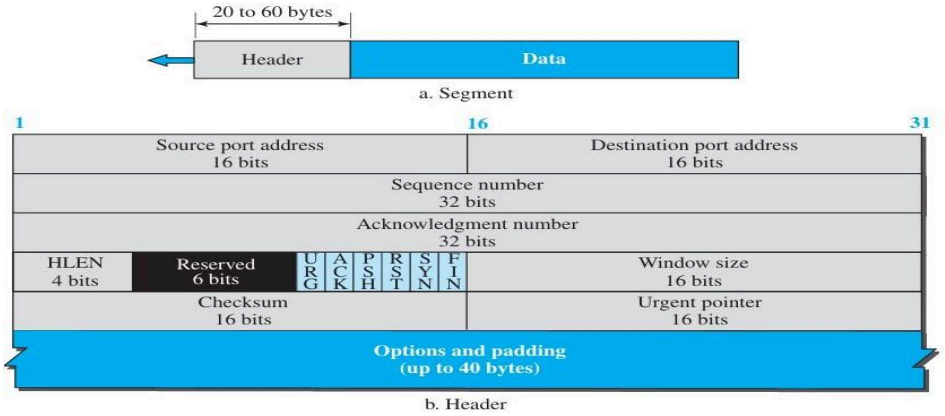
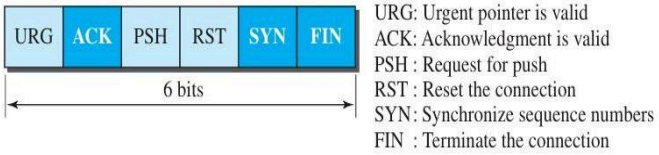
Answer any FIVE FULL Questions

		MARKS	CO	RBT
1 (a)	Given a classless address as 167.199.170.82/27. Find the following: a)The number of addresses in the network The number of addresses in the block is found as N = 232-n =32 b) Find the first address : The first address can be found by keeping the first 27 bits and changing the rest of the bits to 0s. Address: 167.199.170.82/27 10100111 11000111 10101010 01010010 First address: 167.199.170.64/27 10100111 11000111 10101010 01000000 c)Find the last address The last address can be found by keeping the first 27 bits and changing the rest of the bits to 1s. Address: 167.199.170.82/27 10100111 11000111 10101010 01011111 Last address: 167.199.170.95/27 10100111 11000111 10101010 01011111	3	CO3	L3
1 (b)	Find the class of the following classful IP addresses: a) 01110111 11110011 10000111 11011101 -Class A b) 11101111 11000000 11110000 00011101 -Class D c) 11011111 10110000 00011111 01011101- Class C	3	CO3	L3
1 (c)	With the help of a neat diagram, explain IPV6 datagram packet format. **Figure 22.6** *IPv6 datagram* 	4	CO2	L2

	● Version. The 4-bit version field defines the version number of the IP. For IPv6, the value is 6. ● Traffic Class: Used to distinguish different payloads with different delivery requirements. ● Flow label: Provides flow of the data. ● Payload Length: Length of IP datagram excluding the header. ● Next header: The next header describes the type of the data that follows the base header.			
2 (a)	Illustrate the working of Dynamic Host Configuration Protocol(DHCP) with suitable diagrams.  Explanation: After a block of addresses are assigned to an organization, the network administration can manually assign addresses to the individual hosts or routers can be done automatically using DHCPDHCP is an application-layer program using client-server paradigm, that helps TCP/IP at the network layer.	8	CO3	L2
2 (b)	Differentiate classless and classful addressing of IPV4. **Classful Addressing** ● IP addresses are divided into **fixed classes**: A, B, C, D, E.	2	CO3	L3

	• Each class has a **fixed default subnet mask** (A: /8, B: /16, C: /24). • **Network and host portions are fixed** based on the class. • Leads to **wastage of IP addresses** because networks are too large or too small. • **No flexible subnetting** (very limited). • Used in the **early days of the internet** (now obsolete) **Classless Addressing (CIDR)** • **No fixed classes**. • Uses **prefix notation (/n)** to define how many bits are network. • **Flexible subnetting** — can create networks of any size. • Helps in **efficient usage of IP addresses**. • Allows for **route aggregation (supernetting)**. • Used in **modern networking**.			
3(a)	Discuss Go-Back N Protocol with a neat diagram. Diagram-  Figure 2 Explanation: • Go – Back – N ARQ: provides for sending multiple frames before receiving the acknowledgment for the first frame. It uses the concept of sliding window, and so is also called sliding window protocol. The frames are sequentially numbered and a finite number of frames are sent. If the	4	CO3	L2

	acknowledgment of a frame is not received within the time period, all frames starting from that frame are retransmitted.			
3(b)	Discuss all the fields in TCP Segment format with a neat diagram. **Figure 24.7** *TCP segment format*  **Figure 24.8** *Control field*  	6	CO3	L2

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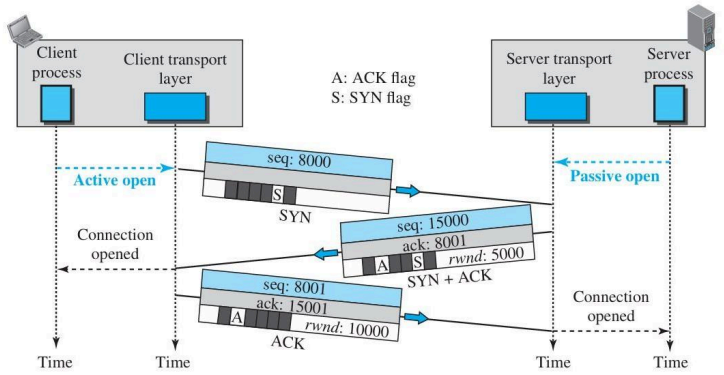
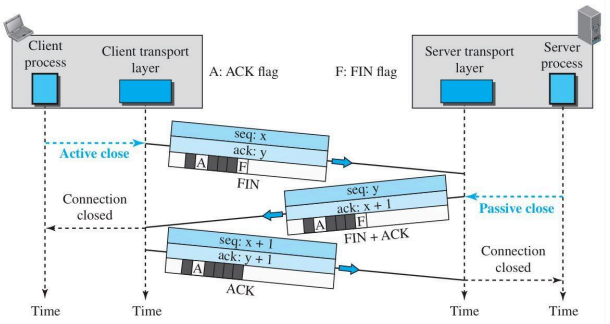
4(a)	Illustrate the connection establishment and termination in TCP/IP with suitable sketches. Connection Establishment:	5	CO3	L2

Figure 24.10 *Connection establishment using three-way handshaking*



Connection Termination:

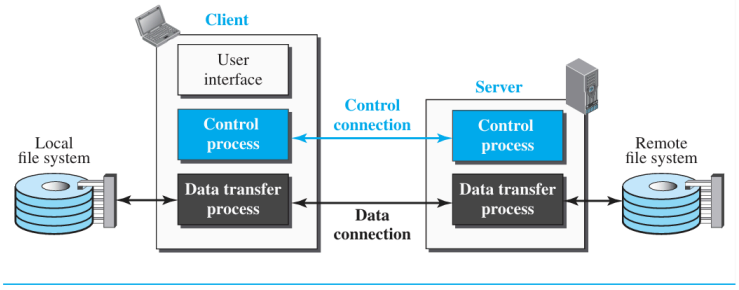
Figure 24.12 *Connection termination using three-way handshaking*



4(b)	Explain FTP and its two connections.	5	CO3	L2

- File Transfer Protocol (FTP) is the standard protocol provided by TCP/IP for copying a file from one host to another.

Figure 26.10 *FTP*



- Control Connection: Remains connected during the entire interactive FTP session.
- Data Connection: Opened and then closed for each file transfer activity.
- When a user starts an FTP session, the control connection open.

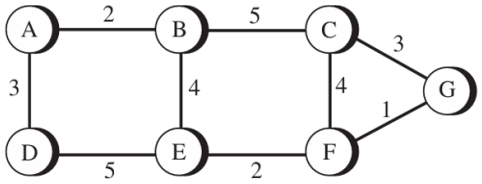
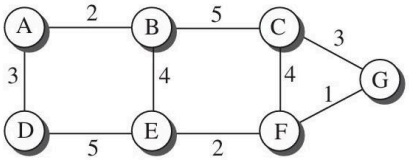
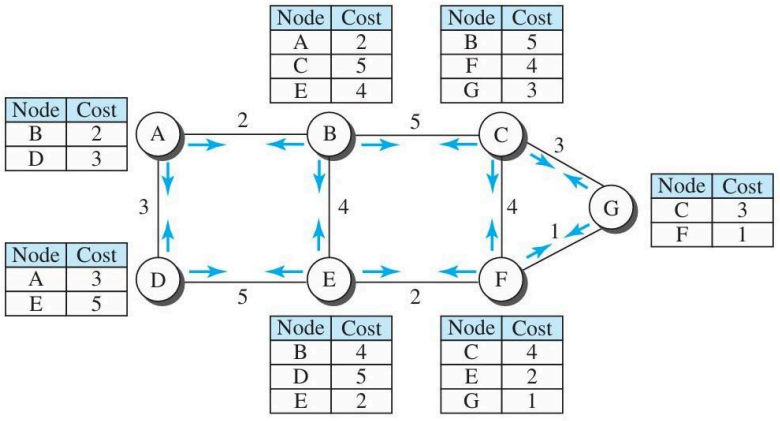
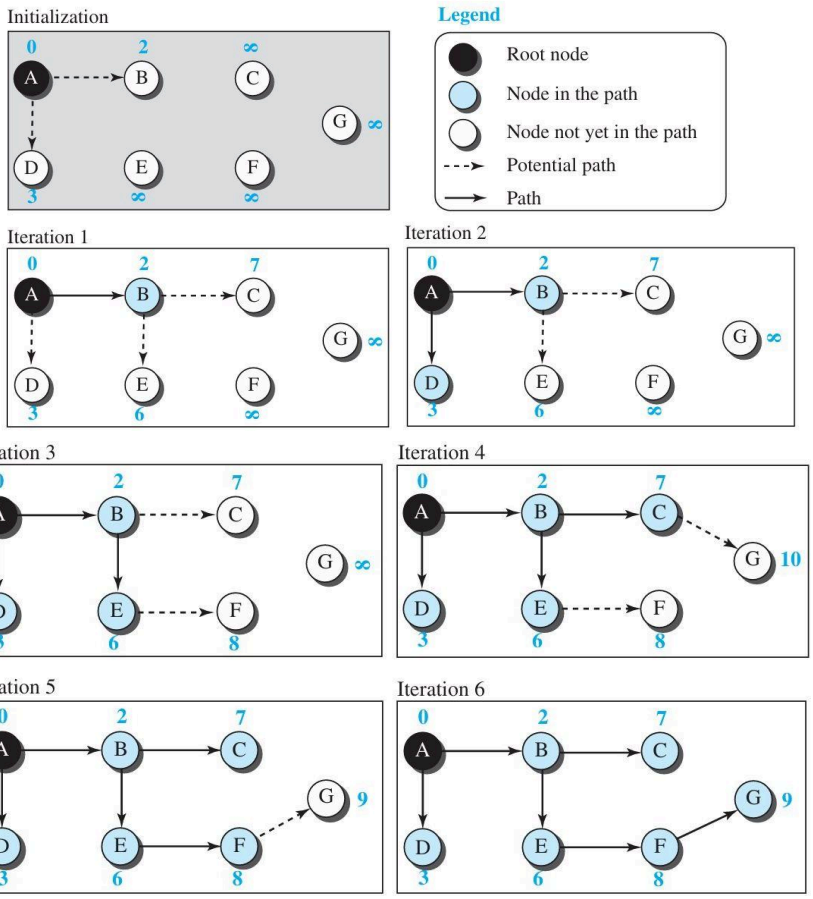
	• While the control connection is open, the data connection can be opened and closed multiple times if several files are transferred. • FTP uses two well-known TCP ports: port 21 is used for the control connection, and port 20 is used for the data connection.			
5(a)	Apply the link state routing algorithm for the given graph below to find the path from source node A to all other nodes.  **Figure 20.8** *Example of a link-state database*  a. The weighted graph b. Link state database **Figure 20.9** *LSPs created and sent out by each node to build LSDB*  	6	CO4	L3

Figure 20.10 *Least-cost tree*



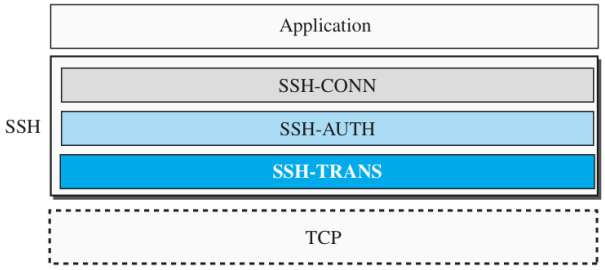
5 (b)	Outline Distance Vector Routing algorithm for routing the packets from source to destination.	4	CO4	L2

Table 20.1 *Distance-Vector Routing Algorithm for a Node*

```
1   Distance_Vector_Routing ( )
2   {
3       // Initialize (create initial vectors for the node)
4       D[myself] = 0
```


Table 20.1 *Distance-Vector Routing Algorithm for a Node (continued)*

```
5       for (y = 1 to N)
6       {
7           if (y is a neighbor)
8               D[y] = c[myself][y]
9           else
10              D[y] = ∞
11      }
12      send vector {D[1], D[2], …, D[N]} to all neighbors
13      // Update (improve the vector with the vector received from a neighbor)
14      repeat (forever)
15      {
16          wait (for a vector Dw from a neighbor w or any change in the link)
17          for (y = 1 to N)
18          {
19              D[y] = min [D[y], (c[myself][w] + Dw[y])]    // Bellman-Ford equation
20          }
21          if (any change in the vector)
22              send vector {D[1], D[2], …, D[N]} to all neighbors
23      }
24  } // End of Distance Vector
```

6(a)	With the help of suitable diagrams, explain the working of SSH for secure network communication. ● Originally designed to replace TELNET. ● Used for several purposes such as remote logging and file transfer. Two versions of SSH ● SSH-1 : Deprecated because of security flaws ● SSH-2 **Figure 26.25** *Components of SSH* 	6	CO3	L2
6 (b)	Define the following: a) Domain Name System: ● TCP/IP protocols uses the IP address, which uniquely identifies the connection of a host to the Internet. ● People prefer to use names instead of numeric addresses. ● The Internet needs a directory system to map a name to an address. ● A central directory system cannot hold all the mapping. ● The solution is to distribute the information among many computers in the world. b) Name Space and its types: Names must be unique because the addresses are unique.Name space that maps each address to unique name can be organized in two ways: ● Flat ● Hierarchical c) Domain ● Each node in the tree has a domain name. ● A full domain name is a sequence of labels separated by dots. ● The domain names are always read from the node up to the root. ● The last label is the label of the root (null). ● If a label is terminated by a null string, it is called a fully qualified domain name FQDN else it is called Partially qualified domain name PQDN	4	CO3	L2

	d) Zone ● Complete domain is divided among many servers. ● A zone refers to the portion for which a specific DNS server has administrative authority. ● Server makes a database called a zone file and keeps all the information for every node under that domain. Explain each 1 Mark			

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