

	(a) They broadcast routing updates to all devices on the network. (b) They send routing updates only to neighboring routers (c) They use multicast to share routing information with all routers (d) They rely on manual configuration for route exchange		
11.	Which protocol is commonly used for DNS queries and responses? (a) HTTP (b) FTP (c) TCP (d) UDP	5	1
12.	Which IP address is associated with limited broadcast in IPv4? (a) 127.0.0.1 (b) 0.0.0.0 (c) 255.255.255.255 (d) 192.168.1.1	3	1
13.	In Stop and wait protocol every 4 th packet is lost and we need to send total 10 packets so how many transmission it took to send all the packets? (a) 10 (b) 13 (c) 14 (d) 15	4	3
14.	In Binary Phase Shift Keying (BPSK), how many bits are modulated per symbol? (a) 1 bit (b) 2 bits (c) 4 bits (d) 8 bits	2	3
15.	Which switching technique is well-suited for bursty data traffic and efficient use of network resources? (a) Circuit switching (b) Datagram switching (c) Virtual circuit switching (d) Packet switching	3	2
16.	The hamming distance between 1010011011 and 1001010111 is _____? (a) 3 (b) 4 (c) 5 (d) 6	4	3
17.	Identify the layer which provides service to the user (a) Application Layer (b) Session Layer (c) Physical Layer (d) Data Link Layer	1	2
18.	In a sliding window protocol, the sender window size determines how many unacknowledged frames can be sent. (True / False)?	4	4
19.	The HTTP protocol uses a three-way handshake for establishing a connection between a client and a server (True / False)?	5	1
20.	The Nyquist bit-rate theorem states that the maximum bit rate of a channel is proportional to its bandwidth (True / False) ?	2	1

SECTION-B (20 marks)

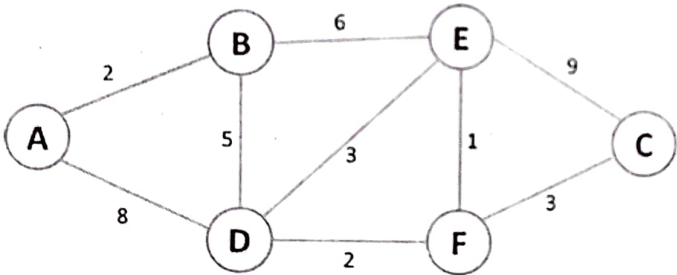
Note: Attempt any FOUR questions. Each question carries 5 marks.

Q.No.	Questions	CO	BL
1.	Explain the 3-way handshake in the transport layer. Outline the steps of this process for establishing a connection between sender and receiver. Highlight its importance in ensuring reliable communication.	5	L5
2.	Consider a data unit is to be transmitted is 01110011, 01100100, 01000001, 01100010. Find the transmitted checksum codeword for the given data. Also show the receivers identification for error detection.	4	L3
3.	Compare Shannon's Channel Capacity theorem and Nyquist's Bit Rate theorem, highlighting differences and their relevance in digital communication.	2	L4
4.	Explain the star and mesh network topologies, highlighting their strengths and limitations. Then, propose a hybrid network topology that combines features from both to enhance network reliability, scalability, and data transmission efficiency.	1	L2

5.	Describe the Domain Name System (DNS) and its fundamental role in the internet infrastructure. Explain the process of DNS resolution, including the roles played by the recursive resolver, authoritative name server, and root name server. Provide an example of how DNS works when translating a domain name into an IP address.	5	L2
6.	Explain how Round-Trip Time (RTT) affects the performance of HTTP-based applications in the context of the World Wide Web (WWW). Provide examples of how increased RTT can lead to latency and impact the user experience while browsing websites.	5	L2

SECTION-C (20 marks)

Note: Attempt any TWO questions. Each question carries 10 marks.

Q.No.	Questions	CO	BL
1.	(i) Explain the Sliding Window protocol and highlight its differences from the Stop and Wait and Go-Back-N protocols. In the context of the Sliding Window protocol, elaborate on the roles of sender and receiver windows, and how they contribute to efficient data transmission. (6 Marks) (ii) A bit stream 1110010101 is being transmitted using the standard CRC method. The generator polynomial is $x^3 + x^2 + 1$. Determine the codeword that will be transmitted (4 Marks)	4	L5
2.	(i) Determine the shortest path from node A to node C and extend the calculations for all remaining nodes. Create the adjacency matrix and illustrate the intermediate steps of the Dijkstra Algorithm.  (6 Marks) (ii) Examine and differentiate the Virtual Circuit and Datagram approaches in terms of their distinct characteristics related to Connection establishment, Efficiency of resource utilization, Handling of network Overload, Delay in data transmission, and susceptibility to Packet Loss. (4 Marks)	3	L5
3.	Illustrate the OSI Network Architecture visually and subsequently provide a detailed breakdown of the functionalities encompassed by each distinct layer. (10 Marks)	1	L4
4.	Write short notes on any TWO: (a) Multiplexing Techniques (b) TCP/IP Protocol Stack (c) Pulse Code Modulation (d) Reverse DNS	1, 2, 5	L1

BL – Blooms Taxonomy Levels (1 – Remembering, 2 – Understanding, 3 - Applying, 4 – Analyzing, 5 – Evaluating, 6 – Creating)