


Final Assessment Test – November 2025

 Course: **BITE305L - Computer Networks**

 Class NBR(s): **3122 / 3125 / 3129**

 Time: **Three Hours**

 Slot: **B1+TB1**

 Max. Marks: **100**

➤ **KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE**

➤ **DON'T WRITE ANYTHING ON THE QUESTION PAPER**

COs	CO Statements
CO1	Demonstrate the knowledge of fundamental concepts related to data communication and networks.
CO2	Describe computer transmission media and signaling mechanisms.
CO3	Identify and analyze data link layer error, flow control and MAC issues.
CO4	Develop multiple options for host to network addressing, managing sub networks and internetworking.
CO5	Evaluate communication services and transport protocols.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions

(10 X 10 = 100 Marks)

1. A company is setting up a new network and wants to use the TCP/IP model. The network will consist of multiple devices, including servers, workstations, and printers. Explain how the TCP/IP model would be used to enable communication between these devices, including the role of IP addresses, port numbers, and protocols. **CO1 BL2**
2. Analyze the impact of packet loss and delay on packet-switched networks. How do these issues affect network performance, and what techniques can be used to mitigate them? Provide specific examples to support your answer. **CO2 BL4**
3. A path in a digital circuit-switched network has a data rate of 1 Mbps. The exchange of 1000 bits is required for the setup and teardown phases. The distance between two parties is 5000 km. Answer the following questions if the propagation speed is 2×10^8 m/s. **CO2 BL3**
 - a) What is the total delay if 1000 bits of data are exchanged during the data transfer phase?
 - b) What is the total delay if 100,000 bits of data are exchanged during the data-transfer phase?
 - c) What is the total delay if 1,000,000 bits of data are exchanged during the data-transfer phase?

d) Find the delay per 1000 bits of data for each of the above cases and compare them. What can you infer?

CO3 BL3

a) Given a received Hamming code word 1101001, determine if there is an error in the transmission. If so, identify the position of the error and correct it.

OR

4.b) Evaluate the effectiveness of a CRC-based error detection system using the generator polynomial $G(x) = x^4 + x + 1$. Suppose the system detects an error in the received data 10101010 1010, where the last 4 bits are the CRC checksum. Explain how the system would handle this error and what actions would be taken.

CO3 BL4

5. Consider a LAN where nodes are distributed over a long distance. Evaluate how propagation delay affects the performance of CSMA/CD and propose measures to reduce collision probability with its flow diagram.

CO3 BL5

6.a) The IP packet has arrived with the following information in the header (in hexadecimal):

CO4 BL4

66 01 da 31 00 20 06 80 fe 80 00 00 00 00 00 dd af a2 5c 7c 55 1a 8d
fe 80 00 00 00 00 00 00 e5 52 80 1f a5 bb aa 38. Compute the following:

- Version of the packet
- Hop Limit of the packet
- Size of the Payload data bytes
- Identify the Next Header field and its type.
- Priority of a traffic class
- Source address
- Destination address.

And also, highlight the key differences and similarities between the header formats of IPv4 and IPv6 Packets.

OR

6.b) A block of addresses 165.85.0.0/16 is granted to an organization. They want to distribute these blocks to the groups as follows:

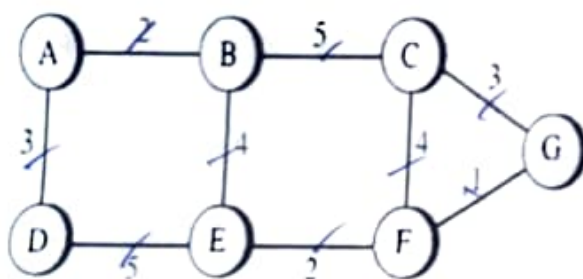
CO4 BL4

- i) The first group has 200 medium-sized businesses; each need 128 nodes.
- ii) The second group has 400 small businesses; each need 32 nodes.
- iii) The third group has 1000 households; each need 16 nodes.

Design the CIDR address allocation for each group of businesses. Evaluate the number and range of allocations that are still available after these allocations.

7. Show the link state packets at each router and prepare the link state database for the given network. Find the least cost tree from the link state database using Dijkstra's algorithm for Router A.

CO4 BL4



8. Analyze the importance of the sequence number and acknowledgment number fields in ensuring ordered and reliable delivery of data in TCP. How would communication be affected if either of these fields were missing or corrupted? Use an example to illustrate your answer with TCP segment format.

CO5 BL4

9. Evaluate the effectiveness of TCP's congestion avoidance mechanism in modern high-speed networks. Do you think AIMD is still optimal today? Support your argument with examples from real-world network scenarios.

CO5 BL5

10. Assume a user wants to automate the upload of log files to a remote FTP server daily. Apply your understanding of FTP commands and modes to describe the steps and commands required to complete this task efficiently.

CO5 BL3