


VIT

Vellore Institute of Technology

Final Assessment Test – November 2025

Course: UBCA201L - Computer Networks

Class NBR(s): 2813

Time: Three Hours

Slot: E2+TE2

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	Understand the fundamental concepts of network models.
CO2	Analyze the internetworking devices.
CO3	Evaluate the functions of Data Link layer and Medium Access Control.
CO4	Construct the network with an IP address and identify the shortest path transport layer protocols and congestion control algorithms.
CO5	Inspect the rudiments of Application layer protocols and network security.

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) Discuss about the various functionalities provided by Session and Physical layer. [5] CO1 BL2

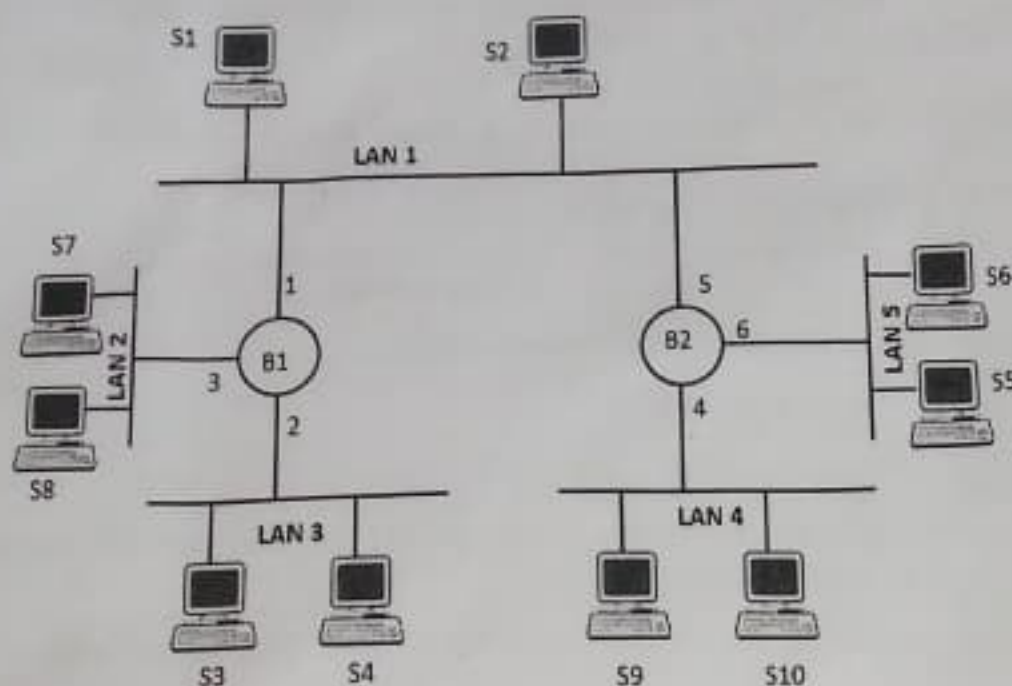
- b) Categorize the following types of networks as LAN, MAN, WAN. [5]

Network Description

- i) A company with its headquarters computer in London and branch office computer throughout Asia, Europe, and North America.
- ii) A club consisting of two workstations and one printer.
- iii) A city traffic control system managed by a network of 700 computers.
- iv) A network used by commercial service providers such as Indian Airlines at multiple locations.
- v) A Campus network consisting of about 500 computers.

2. a) Ten stations (S1-S10) are connected to an extended LAN through transparent bridges (B1 and B2), as shown in Figure. Initially, the forwarding tables are empty. Suppose the following stations transmit frames as follows. [5] CO2 BL3
- i) S7 transmits to S1
 - ii) S3 transmits to S7
 - iii) S5 transmits to S2
 - iv) S6 transmits to S5
 - v) S4 transmits to S6

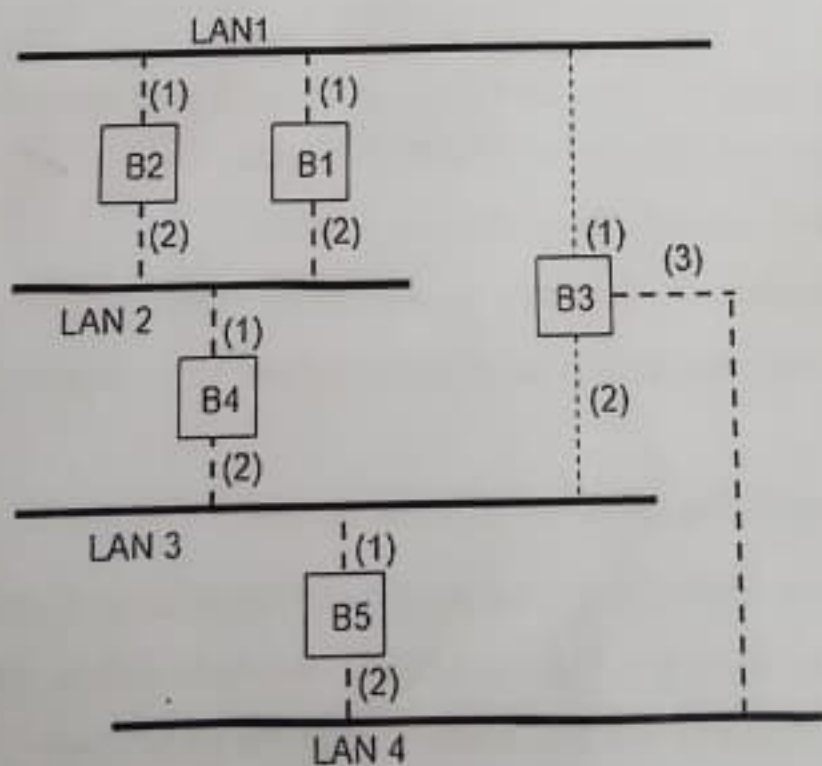
Fill in the forwarding tables with appropriate entries and function after the frames have been completely transmitted.



b) Given the data word 10100111 and the divisor is $1+x+x^2+x^4$, Show the generation of the code word at the sender site. [5]

3.a) Write the spanning tree algorithm and apply the steps to construct the spanning tree for the extended LAN given in the figure below.

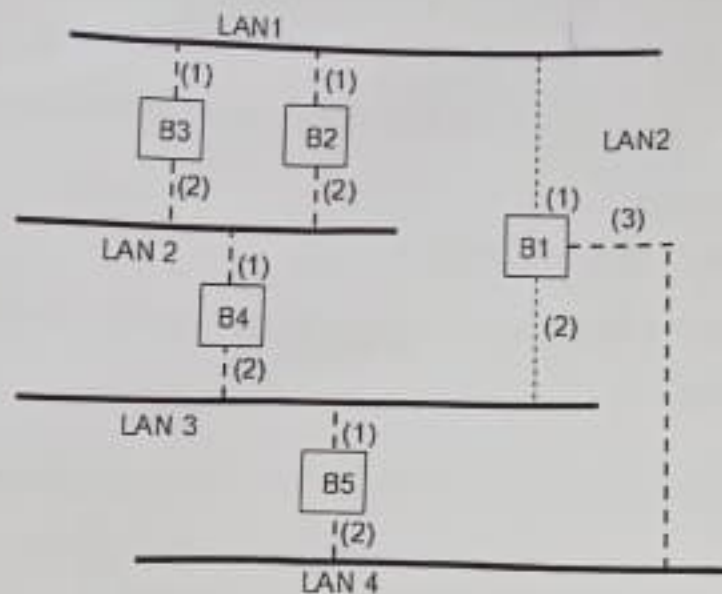
CO2 BL3



OR

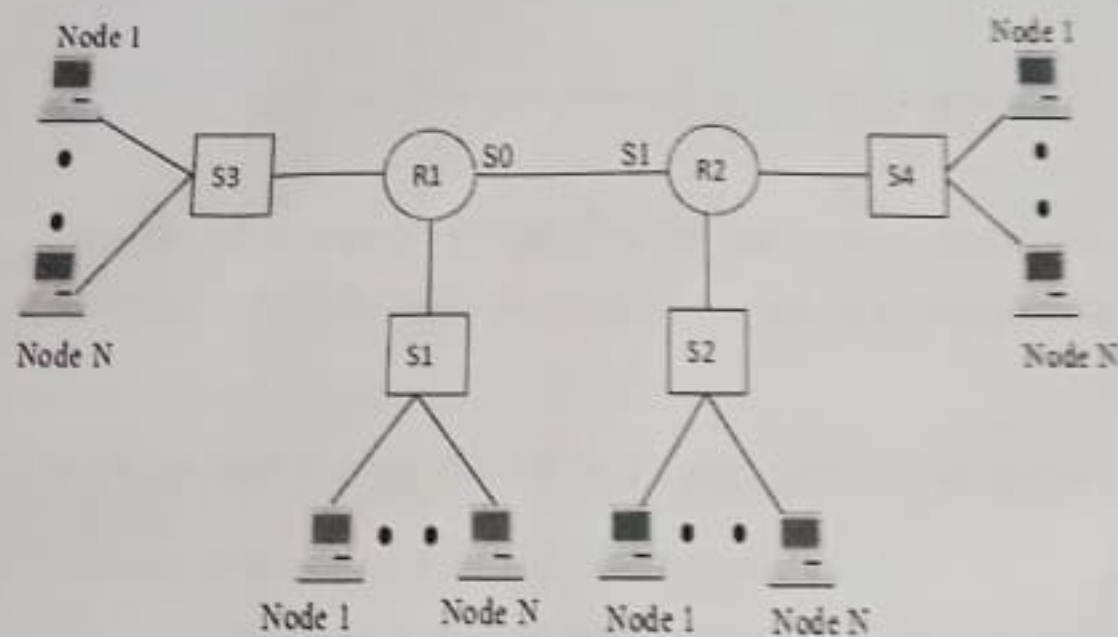
- 3.b) Write the spanning tree algorithm and apply the steps to construct the spanning tree for the extended LAN given in the figure below.

CO2 BL3



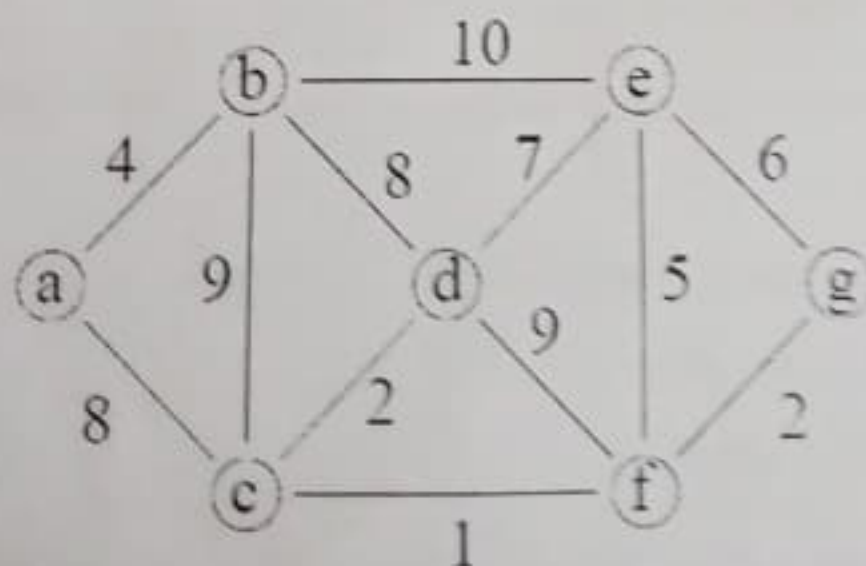
4. Consider a 3-bit sequence number and illustrate with an example that proper choice of maximum window size ensures efficient working of Selective repeat ARQ mechanisms. CO3 BL3
5. a) Illustrate the format of an HDLC frame and provide a brief description of its structure. [5] CO3 BL1
- b) i) Perform byte stuffing for the following PPP frame transmitted. [5]
 Data to be sent is 5E 7D 7E 24 7E 7D 34 7E 7E 7E 5E 7D
- ii) Perform byte destuffing for the following PPP frame received.
 7D 5E 7D 5F FE 54 7D 5D 7D 5E 63 7D 5D 7D 5E
6. Briefly describe the differences between the following concepts in the context of the Data Link Layer: CO3 BL2
- 1-persistency vs. non-persistency
 - 1-persistency vs. p-persistency
 - ALOHA vs. slotted ALOHA
7. Figure shows a site with a given network address and mask. The organization needs thousand subnetworks, each with an equal number of hosts. The administration has proposed to make five subnetworks from available thousand subnetworks as shown in the Figure. The ISP has allocated the IP address: 171.71.0.0 for this site. Using this IP address, to start the subnet from 881th subnet: CO4 BL3

- Find the range of Host IDs assigned to each subnet.
- Assign 1st host ID of each subnet as the gateway address.
- Node1 assigned the 2nd host id and node number n assign the last host id.
- Router1 and Router 2 serial port to assign first and last usable address in the 885th subnet.
- Find the broadcast ID of each subnet.
- Redraw the network diagram by representing the Host ID, subnetwork ID, gateway address.



8.a) Write the Bellman-Ford algorithm and apply the same to the network given below to find the set of shortest paths from node (g) to other nodes.

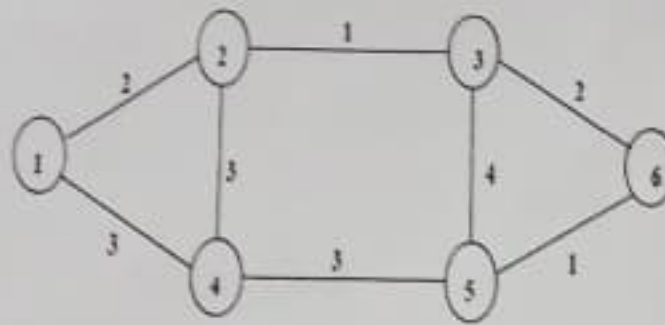
CO4 BL3



OR

- 8.b) Explain Dijkstra's algorithm and apply the same to the network given below to find the set of shortest paths from node 2 to other nodes.

CO4 BL3



9. The following is a dump of a TCP header in hexadecimal format.
 0500 0022 0000 0110 0000 0001 9002 00FF 0000 0010
- What are the source port number and destination port number?
 - What are the sequence number and acknowledgment number?
 - What is the length of the header in bytes and the type of the segment?
 - What is the window size and urgent pointer value?
 - Determine whether the sender of the TCP packet likely calculated the checksum for this packet, based on the checksum field in the provided header.
10. a) Determine which of the following a FQDN is and which is a PQDN.
- xxx
 - xxx.yyy.
 - xxx.yyy.net
 - zzz.yyy.xxx.edu.
- b) Find the given domain is either generic or country specific or inverse domain.
- www.vit.ac.in
 - yyy.org
 - 142.128.10.11
 - zzz.ac.jp
 - www.gmail.com
 - yyy.mil

[4] CO5 BL3

[6]

⇒⇒⇒ BH/K/TY ⇒⇒⇒