



VIT

Vellore Institute of Technology
(Approved to be a University under section 3 of the U.G. Act, 1956)

Final Assessment Test - April 2025

Course: BCSE308L - Computer Networks

Class NBR(s): 3834

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

Answer ALL Questions
(10 X 10 = 100 Marks)

1. A company is planning to set up a computer network for its office and is considering different network topologies. [10]
 - a) Explain the structure and working of Bus, Ring, Star, and Mesh topologies with neat diagrams.
 - b) Compare these topologies based on fault tolerance, cost, performance, and scalability.

2.
 - a) What are the key advantages and disadvantages of circuit-switched and packet-switched networks in terms of latency, reliability, and resource utilization? [5]
 - b) Define transmission impairment and explain how attenuation, noise, and distortion affect network performance. [5]

3.
 - a) A sender wants to transmit the following 8-bit binary data using Checksum Error Detection: [7]

Data Blocks:

10110101

11001100

01101110

10011001

Perform the checksum calculation at the sender side and verify the correctness at the receiver side. Assume 1's complement addition for checksum computation.
 - b) Explain the working of Carrier Sense Multiple Access with Collision Detection (CSMA/CD) and how it handles data collisions in Ethernet networks. [3]

- 4.a)
 - i) Explain the five classes (A, B, C, D, and E) of IPv4 addressing, including their range and subnet mask. [5]
 - ii) Explain how CIDR (Classless Inter-Domain Routing) improves IP address utilization compared to classful addressing. [5]

OR

- 4.b) i) What are special IP addresses in IPv4? List at least four types and provide examples. [5]
- ii) Compare the header format of IPv4 and IPv6 based on: [5]
- Number of fields
 - Fragmentation
 - Address size

5.a) You are given the 192.168.1.0/24 network. You need to divide it into four subnets, ensuring that each subnet can accommodate the following number of hosts: [10]

Subnet 1 → 100 hosts

Subnet 2 → 50 hosts

Subnet 3 → 25 hosts

Subnet 4 → 10 hosts

Determine:

- The subnet mask for each subnet.
- The network address of each subnet.
- The first and last usable IP addresses for each subnet.
- The broadcast address for each subnet.

OR

5.b) Consider the Distance Vector Algorithm. When the link cost between X and Y changes: [10]

For Fig. 1 (a): Demonstrate why a decrease in cost (from 3 to 1) propagates quickly through the network.

For Fig. 1 (b): Explain why an increase in cost (from 3 to 90) leads to slow convergence, often due to the count-to-infinity problem.

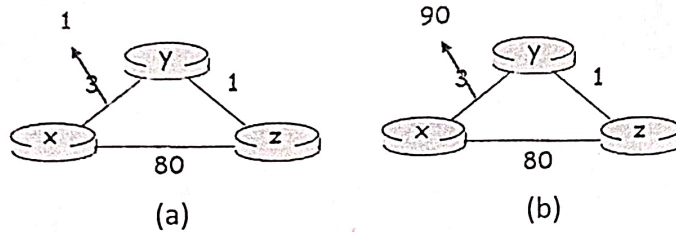


Fig. 1

6. Using Dijkstra's Algorithm, compute the shortest path tree from Router A to all other routers in the network shown in Fig. 2 [10]

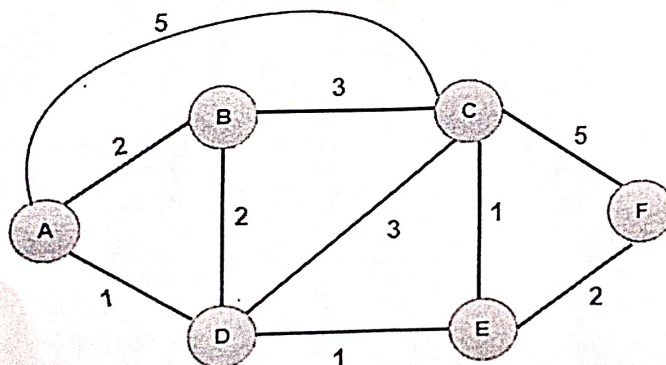


Fig. 2

7. a) Describe the congestion control mechanisms used in TCP, including Slow Start, Congestion Avoidance, Fast Retransmit, and Fast Recovery. [5]
b) What are the different queuing mechanisms used for congestion management in networks? Explain their role in ensuring Quality of Service (QoS). [5]
8. a) Explain the sequence of commands and responses in an FTP session for retrieving a list of files in a directory. Include the significance of status codes like 220, 331, 230, and 150 in the process. [5]
b) Compare and contrast the working principles of FTP and HTTP. How do they handle data transmission differently? [5]
9. Discuss the role of SMTP and SNMP in network communication. Explain how SMTP facilitates email transmission and how SNMP helps in network management. Provide real-world examples of their applications. [10]
10. A 7-bit data 1011001 is to be transmitted using even parity Hamming Code with four parity bits. [10]
i) Find the positions of the parity bits and determine their values.
ii) Construct the final 11-bit Hamming Code.
iii) Suppose the received code is 11011010011. Identify and correct the error, if any.

⇔⇔⇔ W/D/TY ⇔⇔⇔