

**VIT**

Vellore Institute of Technology

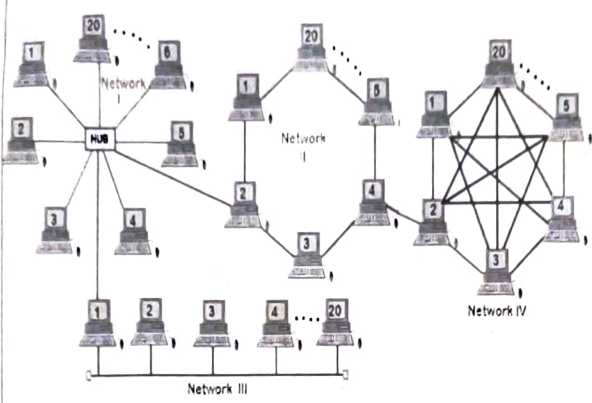
Slot : B2+TB2**School of Computer Science Engineering and Information Systems****Fall Semester 2025-2026****Continuous Assessment Test – I****Programme Name & Branch: B.Tech. (IT)****Course Name & code: BITE305L - Computer Networks****Class Number (s): VL2025260103130, 3128, 3124****Faculty Name (s): Dr.M.PRIYA, Dr. USHA DEVI G & Dr. VIJAYAN R****Exam Duration: 90 Min.****Maximum Marks: 50****General instruction(s): Answer All Questions**

CO1. Demonstrate the knowledge of fundamental concepts related to data communication and networks.

CO2. Describe computer transmission media and signalling mechanisms.

CO3. Identify and analyze data link layer error, flow control, and MAC issues.

Q.No.	Question	Max Marks	CO	BL
1.	An e-banking application is experiencing high communication delays during user transactions. Apply the TCP/IP model to propose a solution that improves response time. For each relevant layer of the TCP/IP model, suggest one specific protocol, mechanism, or technology that can address the issue. Justify how your choices enhance the system's performance and data integrity.	10	1	3
2.	A consortium of banks is building a dedicated communication network to handle inter-bank transactions such as: Real-time fund transfers, Authentication, and authorization of high-value payments, Secure exchange of sensitive customer data, and Audit logging and reporting to regulatory bodies. The network must ensure: Highly secure and private communication, Guaranteed bandwidth and consistent delay, No data loss or interruptions, and Strict compliance with financial regulations 1. Identify which switching technique (circuit switching or packet switching) is more appropriate. Elaborate on the working principle of the appropriate switching. 2. Justify your answer by comparing both techniques in terms of: • Setup time • Bandwidth allocation • Delay and jitter	10	2	3

• Suitability for sensitive, real-time transactions				
3.	Suppose there are 80 devices connected in the network below.  a. Determine the type of topology used by each network. (2 marks) b. Identify the total number of I/O ports required per device in each network. (2 marks) c. Calculate how many dedicated links are required to connect to each network. (3 marks). d. For each of the above networks, discuss the consequences of a connection (link) failure. (3 marks)	10	1	3
4.	A circuit-switched digital communication link connects two offices 3000 km apart. The link has a data rate of 2 Mbps, and 2000 bits are exchanged for the setup and teardown phases. The propagation speed is 2.5×10^8 meters/second. Answer the following: a) What is the total delay if 2000 bits of data are exchanged during the data-transfer phase? b) What is the total delay if 200,000 bits of data are exchanged? c) What is the total delay if 2,000,000 bits of data are exchanged? d) Find the delay per 2000 bits of data for each case. What trend do you observe, and why?	10	2	3
5.	a. A sender needs to send the word “networks” to a receiver. Hint: ASCII Code is represented in hexadecimal for ‘n’ is 6E, ‘e’ is 65, ‘t’ is 74, ‘w’ is 77, ‘o’ is 6F, ‘r’ is 72, ‘k’ is 6B, and ‘s’ is 73. i. Calculate the 16-bit Internet checksum at the sender site. (2 Marks) ii. Find the checksum at the receiver site for the following case: due to a channel error, w is detected as r. (4 Marks) b. A sender wants to transmit the message 110101 using a CRC with a polynomial generator. $G(x) = x^3 + x + 1$. Identify the transmitted codeword in binary. (4 marks)	10	3	3