

**VIT**Vellore Institute of Technology
(Deemed to be University under section 3 of Urd. Act. 1976)

SLOT: C2

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2025-2026

Programme Name & Branch : B.Tech.Computer Science and Engineering and Business Systems
Course Code and Course Name : CBS3001, Computer Networks
Faculty Name(s) : Dr. Arivoli A, Dr. Sudhakar K
Class Number(s) : VL2025260502270, VL2025260502088
Date of Examination : 29.1.26
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
 1. Interpret the different building blocks of Communication network and its architecture.
 2. Contrast different types of switching networks and analyse the performance of network
 3. Implement various error detection and correction mechanisms, flow control mechanisms and various routing

Q. No	Question	Module	Marks	CO	BL
1.	Students are attending an online lecture using a video conferencing application. During the session, the audio and video streams are frequently interrupted. It is observed that some data packets arrive out of order or are missing, even though the application continues to function without crashing and sufficient network bandwidth is available. Identify the suitable network reference model applicable to this scenario. Draw and explain the architecture of the identified model, clearly indicating its layers and functions. a) Identify the layer responsible for ensuring reliable data delivery in this scenario with explanation. (5) b) Discuss the importance of packet sequencing at this layer and explain how it affects the quality of real-time multimedia communication.(5)	1	10	C01	BL2
2.	a. A banking network requires high fault tolerance and secure communication between every branch. Identify the most suitable topology and explain with neat diagram (5) b. A network uses a fully interconnected mesh topology to connect 18 nodes together. Considering full-duplex mode links, calculate the number of total links required and the number of I/O ports required in each node. (5)	1	10	C01	BL2
3.	a) An FDM system has 12 channels, each of bandwidth 4 kHz. If the guard band between channels is 1 kHz.	2	5	C02	BL3



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	1. Calculate the total bandwidth required. 2. If the number of channels is increased to 16 while keeping the same channel bandwidth and guard band, determine the new total bandwidth required. 3. Explain the purpose of guard bands in FDM systems. What problem may arise if guard bands are reduced?				
	b) Explain how TDM and WDM improve bandwidth utilization. Compare their performance in high-speed communication systems.		5		
4.	a) Explain the working principle of VLAN and how it logically segments the network despite using the same physical infrastructure. b) A college campus provides Wi-Fi connectivity using a single Access Point (AP) for multiple classrooms. Some wireless devices cannot directly hear each other but communicate with the same AP. During peak usage, data collisions occur at the AP even when devices sense the channel as idle. In other cases, certain devices unnecessarily delay transmission despite no actual interference. These issues affect network throughput and lead to retransmissions and delays in communication. Consider the above scenario and explain the hidden terminal and exposed terminal problems in WLAN with suitable examples and diagrams. How does RTS/CTS solve these problems?	2	5		
			5	C02	BL2
5.	A sender wants to transmit the 4-bit data word 1011 using Hamming (7,4) code. i) Determine the number and positions of parity bits. ii) Construct the 7-bit Hamming code word using even and odd parity. iii) Assume that during transmission, the 5th bit of the code word is received in error. Detect and correct the error using Hamming code.	3	10	C03	BL3
