



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CAT-1

FALL SEMESTER 2026-2027

SLOT: C1+TC1

Programme Name & Branch : B.Tech - Computer Science and Engineering (Cyber Security, Artificial Intelligence and Data Engineering)
Course Code and Course Name : BCSE308L - Computer Networks
Faculty Name(s) : Dr. VIJAYAN R, Dr. NAVANEETHAN C, Dr. AASEEGHA M D
Class Number(s) : VL2026270102539, VL2026270102535, VL2026270102542

Date of Examination : 11:08:2026

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:

CO1- Interpret the different building blocks of Communication network and its architecture.
CO2 Contrast different types of switching networks and analyze the performance of network
CO3 Identify and analyze error and flow control mechanisms in data link layer.

Q. No	Question	M	CO	BL
1	A national emergency response center manages ambulance services across multiple cities. During a large-scale disaster, the communication network continues to operate even after several communication links fail. However, ambulance dispatch messages experience noticeable delays, while patient information remains protected from unauthorized access. a) Identify the three essential network criteria demonstrated in the above scenario. b) Explain how each criterion is reflected in the given situation with suitable justification. c) Recommend suitable measures to improve the criterion that is not performing satisfactorily without affecting the other two criteria.	10	CO1	BL3
2	Protocol layering is commonly observed in many real-life activities. Consider a person travelling on a round-trip vacation by air from their hometown to a resort. The passenger completes activities such as baggage check-in, boarding, takeoff, landing, unboarding, and baggage claim. a) Draw a layered model representing the above journey and map each activity to an appropriate communication layer. b) Explain the function of each layer in the travel analogy. c) Discuss the importance of protocol layering and mention advantages and disadvantages of using a layered architecture.	10	CO1	BL3



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Established by the Vellore Institute of Technology Society, Vellore, Tamil Nadu, India

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3.	a) A multi-specialty hospital requires uninterrupted communication between operation theatres and the central monitoring room. The management wants guaranteed bandwidth and minimal delay during surgeries. Evaluate the suitability of Circuit Switching and Packet Switching for the above application. Recommend the most appropriate switching technique with justification.	5	CO2	BL5
	b) A smart factory sends 7200 bits of sensor information through 4 links . The network operates at 18 kbps . Each packet carries 900 bits of payload and 36 bits of header. The propagation delay per link is 4 ms . Circuit establishment requires 25 ms . Assume that each intermediate switch introduces a queuing delay of 5 ms per packet . Calculate the end-to-end delay for all types of Switching	5	CO2	BL3
4.	A satellite communication system sends the following seven 8-bit words . 10110111 11001110 01101001 11110011 00111010 10011101 01010110 counting from the left. During transmission, - the first bit of the second word flips - the last bit of the fourth word flips - the third bit of the sixth word flips Then, a) Generate the checksum. b) Form the transmitted packets. c) Verify the received packets. d) Determine whether the packets are accepted. e) Explain the working principle of one's complement arithmetic.	10	CO3	BL3
5.	A weather monitoring station transmits 12-bit $M(x) = x^{11} + x^{10} + x^8 + x^6 + x^5 + x^3 + x + 1$ sensor data using the CRC error detection technique with generator polynomial $G(x) = x^3 + x + 1$. During transmission, two non-adjacent bits are corrupted due to electromagnetic interference. (a) Generate the CRC codeword for the original data. (b) Determine the received codeword after introducing errors in the 4th and 9th bit positions (counting from the left). (c) Perform CRC verification at the receiver. (d) State whether the receiver accepts or rejects the frame. (e) Justify why CRC is more suitable than checksum for this application.	10	CO3	BL3