

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

REG.NO.:

823-36

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CAT-I
FALL SEMESTER 2026-2027

SLOT: F1+TF1

Programme Name & Branch : B.Tech. AI/ML & Cyber Security
Course Code and Course Name : BACSE203- Computer Networks
Faculty Name(s) : Dr.Mohanraj G, Dr.Priya M & Dr.Sudha M
Class Number(s) : VL2026270102617, VL2026270102606 & VL2026270102593
Date of Examination : 14-08-26
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)
- CO1- Interpret the building blocks of networks.
- CO2- Analyze the error and flow control mechanisms for connecting a network.

Q. No	Question	M	CO	BL
1.	A multinational software company is opening a new branch office in Chennai. The office has three departments, with a total of 50 computers connected through switches and routers. Employees need to access shared files, video conferencing, cloud applications, and the Internet with minimum delay. The company also wants reliable communication between different departments and secure communication with the head office. Design a suitable network topology for the office that can adequately meet these business requirements of the office. If users experience slow video conferencing despite having high bandwidth, identify two possible performance metrics responsible for the issue and justify your answer.	10	1	4
2.	A smart railway signalling system continuously transmits train status information 110101100 from trackside control units to the central control station. Since the communication channel is prone to electromagnetic interference, each message is protected using Cyclic Redundancy Check (CRC) before transmission using $x^4 + x^3 + x + 1$ generator. At the receiver, if CRC detects an error, the receiver requests retransmission. a) Determine the CRC remainder and construct the complete transmitted codeword for the given data. b) At the receiver, explain how CRC verifies whether the received frame is error-free. If the division leaves a non-zero remainder, what action should the receiver take?	10	2	3
3.	A manufacturing plant transmits control signals between two PLCs using a digital communication link. During testing, the receiver frequently loses clock synchronization while receiving the bit stream 11110000000011110000. As a network engineer, analyze the transmission and propose a suitable encoding solution. a) Draw the pulse waveform for the given bit stream using the existing NRZ encoding technique and identify the cause of synchronization loss. b) The following 4B/5B mappings are given: • 1111 → 11101 • 0000 → 11110	10	2	3



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	Redraw the waveform using 4B/5B and NRZI encoding and explain how it improves synchronization.			
4.	Write a python program to implement TCP client-server chat program. The client sends the message to the server and server reverse the string and sends back to the client. Display the output of the message transmitted between client and server.	10	1	3
5.	A banking organization uses the Sliding Window Protocol to ensure reliable communication between its primary server and backup server. Explain the purpose of the sender-side parameters (SWS, LAR, and LFS) and the receiver-side parameters (RWS, LAF and LFR) in managing reliable data transmission in this scenario and list three advantages over the Stop-and-Wait protocol.	10	2	2
