



VIT

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

REG.NO.:

SLOT: F1 + TF1

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2026-2027

Session: **IVI**

Programme Name & Branch : B.Tech. AI/ML & Cyber Security
Course Code and Course Name : BACSE203- Computer Networks
Faculty Name(s) : Dr. G. Mohanraj, Dr. SUDHA M & Dr. PRIYA M
Class Number(s) : VL2026270102617, 2606 & 2593
Date of Examination : 03-10-2026
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 - Analyze, 5 - Evaluate, 6 - Create)
- Course Outcomes:
CO2 - Analyze the error and flow control mechanisms for connecting a network.
CO3 - Design and configure efficient networks using switching, IP, routing, NAT multicast, and IPv6, to optimize scalability and performance

Q. No	Question	M	CO	BL
1.	A smart laboratory has 8 sensor devices that need to communicate with a coordinator within a 10 m range. Each device periodically transmits a small amount of data, and the system must minimize interference and power consumption. Identify the suitable Bluetooth/IEEE 802.15.1 communication arrangement. Determine how the devices can be organized for communication. Explain the role of the master/coordinator and participating devices.	10	2	2
2.	A corporate branch office sends a 4,000-byte IPv4 datagram (including a 20-byte IP header) over a routed path to the headquarters. The path consists of three links with varying Maximum Transmission Units (MTUs): Link 1 has an MTU of 4,000 bytes, Link 2 has an MTU of 1,500 bytes, and Link 3 has an MTU of 600 bytes. Calculate the exact number of fragments generated when the packet passes through Link 2 and Link 3. For each fragment arriving at the destination, specify the Total Length, Flags (DF, MF), and Fragment Offset. Show your step-by-step mathematical calculations.	10	3	4
3.	a) A company connects four offices using routers A, B, C, and D. A virtual circuit is required between Host X connected to A and Host Y connected to D through A → B → C → D. Create a virtual circuit image for this question. Assign suitable virtual-circuit identifiers at each router and construct the forwarding table containing Incoming VC ID, Incoming Interface, Outgoing VC ID, and Outgoing Interface.	5	3	2



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	b) An organization is granted a block of addresses with the beginning address 192.168.10.0/24. The organization needs three subblocks of addresses for its three subnets: one subblock of 15 addresses, one subblock of 45 addresses, and one subblock of 90 addresses. Design the subblocks.	5	3	3
4.	Consider the following network: Apply Dijkstra's shortest-path algorithm starting from A, then determine the shortest path from A to B, C, D, E, F, and G, and then construct the final global routing table for all routers showing destination, cost, and next hop.	10	3	4
5.	a) The IPv6 packet header was redesigned to be more efficient than the IPv4 header by using a streamlined, fixed 40-byte format and removing several unnecessary fields. Identify five fields from the IPv4 header that were either completely removed or modified into an entirely new field in the standard IPv6 header. For each field, briefly state what replaced it or why it was eliminated to improve routing efficiency.	5	3	2
	b) A large university network operates AS 65010 with routers R1, R2, R3, and R4. R1 and R4 are border routers connected to external ASes using BGP, while R2 and R3 are internal routers that exchange routes using an IGP. Four external networks — 172.16.0.0/16, 192.168.10.0/24, 203.0.113.0/24, and 10.50.0.0/16 — are advertised through R1 and R4. The IGP topology provides paths from R2 to the BGP next-hops. Construct the BGP routing table showing the BGP next-hop for each prefix at router R2. Using the given IGP topology and link costs, determine the shortest internal path from R2 to each BGP next-hop. Construct the final combined routing table at R2, showing the destination prefix, BGP next-hop, and actual IGP forwarding path.	5	3	2
