Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA/M.Sc.IT 2024-25 Mid-Term Examination

Semester: 2 **Date: 11-3-2025**
Subject Code: 05201253/ 05202157 - Time: (1hr:30min)
Subject Name: Data Communications and Networking/ Computer Networking (M.Sc. (IT)) **Total Marks: 40**

Instructions:
1. Figures to the right indicate full marks.
2. Make suitable assumptions wherever necessary.

Q.1	**Answer the following.**	**[10]**
(a)	**3 short questions of 1 mark each**	[3]
	(i) List the components of data communication.	
	(ii) Define the Transmission Control Protocol/Internet Protocol (TCP/IP)	
	(iii) Name the different types of multiplexing techniques used in data transmission	
(b)	**Objective type/MCQs/True-False/Fill in blanks (7 questions of 1 mark each)**	[7]
	1.Identify What kind of sequence number does TCP use? a) byte-oriented sequence number b) packet-oriented sequence number c) Randomly generated fixed sequence numbers d) none of them	
	2. Choose the FALSE statement. a) Bridges filter network traffic based on IP addresses. b) Hubs share bandwidth among all attached devices. c) Switch provides dedicated bandwidth for each LAN segment.	
	3. Which transmission medium uses light signals to transmit data over long distances? a) Twisted pair b) Coaxial cable c) Fiber optics d) Radio waves	
	4. Fill in the blanks: _____ cable consists of a central conductor, an insulating layer, a metallic shield, and an outer cover, commonly used for cable TV and networking.	
	5. Map the devices with their associated layer in the TCP/IP model. A. NIC — 1. Physical Layer B. Router — 2. Data Link Layer C. Bridge — 3. Network Layer D. Hub — 4. Transport Layer	
	6. What is the primary purpose of the transmission Control Protocol (TCP)? A) Providing connectionless communication B) Ensuring reliable data transmission C) Reducing network congestion D) Encrypting network packets	
	7. How does window management in TCP help in controlling data flow? A) By encrypting data before transmission B) By regulating the amount of data a sender can transmit before receiving an acknowledgment C) By ensuring packets are sent in a random order D) By closing the connection after every packet transmission	
Q.2	**Answer the following.** (2 or 3 mark questions)	**[10]**
(a)	Two Questions of 2 Marks	[4]
	(i) Explain how fiber optic cables provide better performance compared to twisted pair and coaxial cables in data transmission.	(02)
	(ii) Describe the key difference between circuit switching and packet switching in terms of data transmission efficiency.	(02)
(b)	Two Questions of 3 Marks	[6]
	(i) Explain the key differences between the OSI model and the TCP/IP model in terms of layers and	(03)

	functionality.	
	(ii) A hospital needs to connect different departments within the same building to share patient records efficiently. Which type of network would be most suitable, and why?	(03)
Q.3	Attempt any **TWO.**	**[10]**
	(i) A company is setting up a new network and wants to ensure proper communication between devices. Apply your knowledge of the OSI model to explain how data travels from a sender to a receiver, mentioning key functions of different layers.	(05)
	(ii) Analyze the differences between circuit switching, packet switching, and message switching in terms of efficiency, reliability, and delay. Which method would be most suitable for real-time communication like video conferencing, and why?	(05)
	(iii) Evaluate the effectiveness of Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) in different networking scenarios. Which protocol would you recommend for applications like video streaming and online banking, and why?	(05)
Q.4	**Answer the following.**	**[10]**
(a)	**Analyze the security risks associated with using HTTP instead of HTTPS for an e-commerce website. How can migrating to HTTPS improve security, user trust, and overall website performance? Provide a justified recommendation.**	(05)
(b)	Analyze the impact of blocking **port 25** on email communication. What alternative ports can be used for sending emails, and why? How do different email protocols (SMTP, IMAP, POP3) handle email transmission?	(05)
	OR	
(C)	How do **TLD (Top-Level Domain) servers** interact with authoritative servers and root servers in the DNS resolution process?	(05)