

 SIES Graduate School of Technology RISE WITH EDUCATION NMACA+ (Affiliated to University of Mumbai)		End Semester Examination (R-24) FH 2026 Answer Key with marking scheme																						
Branch: IT		Course: Computer Network																						
Year/ Semester: 2026 Semester IV		Course code: ITC402																						
Time: 03 hours		Marks: 80																						
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Q. 1	Attempt any FOUR. (All questions carry equal marks)		20																					
A.	What is DNS -Domain Name System? How does it work? Ans- DNS is a system that converts domain names (e.g., www.google.com) into IP addresses. Working : 1. User enters a domain name. 2. Request goes to DNS resolver. 3. Resolver checks cache; if not found: 4. Queries Root server → TLD server → Authoritative server. 5. IP address is returned to the user. 6. Browser connects to the server using the IP.		5																					
B.	Compare between IPV4 and IPV6 . Ans- <table border="1"><thead><tr><th>Feature</th><th>IPv4</th><th>IPv6</th></tr></thead><tbody><tr><td>Address size</td><td>32-bit</td><td>128-bit</td></tr><tr><td>Format</td><td>Decimal</td><td>Hexadecimal</td></tr><tr><td>Example</td><td>192.168.1.1</td><td>2001:db8::1</td></tr><tr><td>Address space</td><td>Limited</td><td>Very large</td></tr><tr><td>Security</td><td>Optional</td><td>Built-in</td></tr><tr><td>NAT</td><td>Used</td><td>Not required</td></tr></tbody></table>		Feature	IPv4	IPv6	Address size	32-bit	128-bit	Format	Decimal	Hexadecimal	Example	192.168.1.1	2001:db8::1	Address space	Limited	Very large	Security	Optional	Built-in	NAT	Used	Not required	5
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C.	Draw and explain UDP datagram. Ans- ----- Source Port (16 bits) ----- Destination Port (16 bits) ----- Length (16 bits) ----- Checksum (16 bits) ----- Data (variable) -----		5																					

	Explanation: - Source & Destination Port → Identify applications - Length → Size of datagram - Checksum → Error checking - Data → Actual message																			
D.	Differentiate between Circuit- Switched and Packet switching . Ans- <table border="1" data-bbox="500 520 1174 810"> <thead> <tr> <th>Feature</th><th>Circuit Switching</th><th>Packet Switching</th></tr> </thead> <tbody> <tr> <td>Path</td><td>Dedicated</td><td>Shared</td></tr> <tr> <td>Example</td><td>Telephone</td><td>Internet</td></tr> <tr> <td>Data transfer</td><td>Continuous</td><td>In packets</td></tr> <tr> <td>Delay</td><td>Fixed</td><td>Variable</td></tr> <tr> <td>Efficiency</td><td>Low</td><td>High</td></tr> </tbody> </table>	Feature	Circuit Switching	Packet Switching	Path	Dedicated	Shared	Example	Telephone	Internet	Data transfer	Continuous	In packets	Delay	Fixed	Variable	Efficiency	Low	High	5
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E.	Write a note on TCP timer. Ans- TCP uses timers for reliable transmission: - Retransmission Timer: Resends lost packets - Persistence Timer: Avoids deadlock (zero window) - Keepalive Timer: Checks connection status - Time-Wait Timer: Ensures old packets are removed	5																		
F.	List out DLL Design Issues and explain it. Ans- Framing: Dividing data into frames Error Control: Detecting/correcting errors (CRC) Flow Control: Controls data rate (Stop & Wait) Access Control: Channel access in shared medium Addressing: Uses MAC addresses	5																		
Q.2	Attempt any FOUR. (All questions carry equal marks)																			
A.	Explain application layer protocols: HTTP, FTP, and SNMP. Ans- (a) HTTP (HyperText Transfer Protocol) - Used for web communication between client and server - Stateless protocol (no memory of previous requests) - Works on port 80 (HTTP) and 443 (HTTPS) - Methods: GET, POST, PUT, DELETE (b) FTP (File Transfer Protocol) - Used to transfer files between systems - Uses two connections: Control (port 21) and Data (port 20) - Supports upload/download and authentication (c) SNMP (Simple Network Management Protocol) - Used for network monitoring and management - Components: Manager, Agent, MIB - Operations: GET, SET, TRAP																			

B.	What is a sliding window? Explain the Go Back N protocol? Ans- Sliding Window: • Flow control technique allowing multiple frames to be sent before receiving ACK • Improves efficiency vs Stop-and-Wait Go-Back-N Protocol: • Sender can send N frames without waiting • If error occurs, retransmits from the erroneous frame onward • Receiver accepts only in-order frames	
C.	Draw OSI reference model and explain the functions and protocols Explain different types of network topologies in of different layers. Ans-  Explanation of Layers: 1. Physical Layer ○ Transmits raw bits over medium ○ Deals with cables, signals, voltage 2. Data Link Layer ○ Framing, error detection, MAC addressing ○ Example: Ethernet 3. Network Layer ○ Routing and logical addressing (IP) 4. Transport Layer ○ End-to-end delivery, reliability ○ Protocols: TCP, UDP 5. Session Layer ○ Establishes, manages, terminates sessions 6. Presentation Layer ○ Data formatting, encryption, compression	

	7. Application Layer - Interface for user applications - Protocols: HTTP, FTP, SMTP	
D.	Explain 3 way handshaking in TCP. Ans- Steps: SYN: Client sends request to server SYN-ACK: Server acknowledges ACK: Client confirms Purpose: - Establish reliable connection - Synchronize sequence numbers	
E.	Explain OSPF and BGP in detail. Ans- a) OSPF (Open Shortest Path First) - Interior Gateway Protocol (IGP) - Uses Dijkstra's algorithm - Metric: Cost - Fast convergence, supports hierarchy (b) BGP (Border Gateway Protocol) - Exterior Gateway Protocol (EGP) - Used between autonomous systems - Path vector protocol - Policy-based routing Difference: - OSPF → within network - BGP → between networks (Internet backbone)	
F.	Explain Twisted pair and Coaxial cable in detail. Ans- (a) Twisted Pair Cable - Two wires twisted to reduce noise - Types: UTP, STP - Used in LANs - Cheap, easy installation (b) Coaxial Cable - Central conductor + insulation + shield - Better noise immunity than twisted pair - Used in cable TV, broadband Comparison: - Twisted Pair → low cost, less bandwidth - Coaxial → higher bandwidth, more expensive	
Q.3	Attempt any FOUR. (All questions carry equal marks)	20
A.	What is congestion? What are the causes of congestion?	5

	Ans- Congestion: Congestion occurs when the network has too much data traffic, causing delay, packet loss, and reduced performance. Causes: • High traffic load • Limited bandwidth • Slow routers/processors • Packet retransmissions • Poor network design	
B.	Explain any three unguided Transmission Media. Ans- 1. Radio Waves • Used for wireless communication • Long-distance transmission • Example: Wi-Fi, broadcasting 2. Microwaves • Line-of-sight communication • Used in satellite and mobile networks 3. Infrared • Short-range communication • Used in remote controls, sensors	5
C.	Write note on Ethernet Protocol. • Ans- Most widely used LAN protocol • Works at Data Link Layer • Uses CSMA/CD (Carrier Sense Multiple Access with Collision Detection) • Data transmitted in frames • Uses MAC addresses Features: • High speed • Reliable and cost-effective	5
D.	Describe Multiple access Protocol in detail. Ans- Used when multiple devices share a communication channel. Types: 1. Random Access (ALOHA, CSMA/CD) ○ Devices transmit randomly ○ Collisions possible 2. Controlled Access ○ Devices take turns ○ Example: Polling, Token Passing 3. Channelization ○ Channel divided into parts ○ Example: FDMA, TDMA, CDMA	5
E.	What is Gateway, Hub, Switch. Ans- Gateway • Connects different networks	5

	• Works at higher layers • Example: Internet gateway Hub • Broadcasts data to all devices • Works at Physical Layer • No intelligence Switch • Sends data to specific device • Uses MAC address • Works at Data Link Layer	
F.	Explain different types of network topologies in of different layers. Ans- Bus • Single backbone cable • Low cost, but failure affects entire network Star • Central hub/switch • Easy to manage, hub failure stops network Ring • Data flows in circular manner • Failure breaks network Mesh • Fully connected • High reliability, costly Tree • Hierarchical structure • Used in large networks	5