23CMU418N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fourth Semester)

Branch - **COMPUTER SCIENCE**

COMPUTER NETWORKS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following is NOT a common network topology? a) Bus b) Star c) Ring d) Cloud	K1	CO1
	2	Explain how the Network Layer of the OSI model enables effective communication between devices located on different networks. a) Physical Layer b) Data Link Layer c) Network Layer d) Transport Layer	K2	CO1
2	3	Describe how the error detection method utilizes a checksum calculated across the entire data frame. a) Parity Check b) Cyclic Redundancy Check (CRC) c) Hamming Code d) Checksum	K1	CO2
	4	Illustrate how the sender transmits the next frame in the Stop-and-Wait protocol. a) Immediately after transmitting the current frame b) After receiving an acknowledgment for the current frame c) After a fixed timeout period d) When the buffer is full	K2	CO2
3	5	Identify the routing algorithm where each router shares its knowledge of the network with all other routers. a) Distance Vector b) Link State c) Flooding d) Shortest Path First	K1	CO3
	6	Explain the role of the protocol used to dynamically assign IP addresses to devices on a network. a) ARP b) DHCP c) ICMP d) DNS	K2	CO3
4	7	Choose the transport layer protocol that is connectionless and unreliable. a) TCP b) UDP c) ICMP d) IP	K1	CO4
	8	Describe the purpose of the three-way handshake in TCP. a) To establish a connection between two hosts b) To ensure data integrity c) To control congestion d) To perform error detection	K2	CO4
5	9	Identify the protocol used to transfer email messages between mail servers. a) HTTP b) SMTP c) DNS d) FTP	K1	CO5
	10	Recognize the public-key cryptography algorithm known for its use in digital signatures and encryption. a) DES b) AES c) RSA d) MD5	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the key features and characteristics of bus, star, ring, and mesh network topologies.	K2	CO1
		(OR)		
	11.b.	Illustrate the role of each layer in the OSI model and how they collectively contribute to the overall communication process.		
2	12.a.	Analyze the significance of forward error correction (FEC) techniques in enhancing the robustness and reliability of data transmission over noisy channels.	K3	CO2
		(OR)		
	12.b.	Evaluate the role of local loops, trunks, and switching centers in the architecture of the public switched telephone network (PSTN) and their impact on the overall communication process.		
3	13.a.	Evaluate the impact of the limited address space within the IPv4 addressing scheme.	K3	CO3
		(OR)		
	13.b.	Analyze the significance of routing protocols in ensuring efficient and reliable data delivery across interconnected networks.		
4	14.a.	Critically evaluate the effectiveness of the sliding window mechanism in addressing flow control challenges within the TCP protocol.	K4	CO4
		(OR)		
	14.b.	Assess the impact of socket programming interfaces on the development and evolution of network-centric applications.		
5	15.a.	Evaluate the significance of the Diffie-Hellman key exchange algorithm in enabling secure communication over insecure channels.	K4	CO5
		(OR)		
	15.b.	Examine the impact of Pretty Good Privacy (PGP) on the development of secure messaging standards and its contribution to enhancing digital privacy.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Critically evaluate the suitability of NRZ, NRZI, Manchester, and 4B/5B encoding techniques for various digital transmission media and applications, considering factors such as clock recovery, DC balance, bandwidth utilization, noise immunity, and overall system performance.	K4	CO1
2	17	Analyze the potential impacts and implications of the widespread adoption of Wi-Fi networks on the future of wireless communication.	K4	CO2
3	18	Evaluate the suitability of different LAN technologies for various applications and environments, considering factors such as performance, cost, security, and ease of deployment.	K4	CO3
4	19	Synthesize the role of timers in TCP congestion control, analyzing their interplay with other congestion control mechanisms and their overall contribution to the robustness and efficiency of the TCP protocol.	K5	CO4
5	20	Construct an argument for the continued relevance and evolution of firewall technologies in the face of emerging cyber threats and evolving network architectures.	K5	CO5

Z-Z-Z END