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23CMU418N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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 type of transmission media uses light pulses for data transmission? a) Coaxial Cable b) Twisted Pair Cable c) Fiber Optic Cable d) Wireless	K1	CO1
	2	Which encoding technique uses voltage level changes to represent bits? a) NRZ b) NRZI c) Manchester d) 4B/5B	K2	CO1
2	3	Which MAC protocol uses carrier sensing before transmitting and detects collisions through carrier sensing? a) Aloha b) CSMA c) CSMA/CD d) CSMA/CA	K1	CO2
	4	Which technology is an example of a LAN standard that uses CSMA/CD? a) Wi-Fi (802.11) b) Bluetooth c) Ethernet d) Token Ring	K2	CO2
3	5	Which protocol is responsible for resolving IP addresses to MAC addresses? a) DHCP b) ARP c) ICMP d) RIP	K1	CO3
	6	Which addressing scheme is designed to address the depletion of IPv4 addresses? a) Subnetting b) Classless Addressing c) IPv6 d) NAT	K2	CO3
4	7	Which mechanism in TCP prevents the sender from overwhelming the receiver? a) Congestion control b) Flow control c) Retransmission d) Segmentation	K1	CO4
	8	Which TCP extension helps to improve performance for large file transfers? a) Timestamps b) Selective Acknowledgements (SACK) c) Window Scaling d) Urgent Data	K2	CO4
5	9	Which layer of the OSI model is responsible for managing communication sessions between applications? a) Network Layer b) Transport Layer c) Session Layer d) Presentation Layer	K1	CO5
	10	Which protocol is used to transfer email messages between mail servers? a) HTTP b) SMTP c) DNS d) FTP	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 strengths and weaknesses of different network topologies by analyzing their impact on cost, performance, and reliability.	K2	CO1
		(OR)		
	11.b.	Compare and contrast NRZ, NRZI, and Manchester encoding techniques. Explain how each technique represents binary data using electrical signals and discuss the advantages and disadvantages of each method.		
2	12.a.	Develop a system that utilizes Parity Check, Checksum, and CRC error detection techniques. For each technique, describe the type of data transmission and network environment where this system would be most effective.	K3	CO2
		(OR)		
	12.b.	Design a scenario where the use of spread spectrum technology and specific Wi-Fi frequency bands would be most advantageous.		
3	13.a.	Propose a LAN architecture for a small office environment. Justify the selection of components, such as workstations, servers, switches, and routers, based on the specific needs and constraints of the office, such as budget, performance requirements, and security concerns.	K3	CO3
		(OR)		
	13.b.	Implement a solution for a company experiencing IP address depletion. Explain how implementing NAT would address this issue and enhance the company's network security.		
4	14.a.	Analyze the three-way handshake and four-way handshake processes used by TCP for connection establishment and termination. Evaluate the significance of each step in ensuring reliable and efficient communication.	K4	CO4
		(OR)		
	14.b.	Justify the design choices behind UDP, considering its focus on low latency and minimal overhead. Analyze how these design choices impact its suitability for real-time applications like streaming media and online games, while also evaluating the potential consequences of its connectionless nature.		
5	15.a.	Critically examine the interdependencies between DNS, SMTP, and HTTP in enabling web browsing, email, and file transfer.	K4	CO5
		(OR)		
	15.b.	Decompose the concept of cryptography into its core elements: encryption, decryption, and cryptographic keys and explain how they contribute to the overall security of a cryptographic system.		

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	Decompose the factors that contribute to the performance and reliability of different network topologies (bus, star, ring, mesh). Analyze how these factors, such as data transmission, fault tolerance, and scalability, interact to determine the overall suitability of each topology for various networking applications.	K4	CO1
2	17	Critically analyze the trade-offs between Stop-and-Wait and Sliding Window protocols in terms of their efficiency, reliability, and bandwidth utilization.	K4	CO2
3	18	Infer the key design principles that guided the development of IPv6. Analyze how these principles address the limitations of IPv4 and contribute to the long-term sustainability of internet addressing.	K4	CO3
4	19	Evaluate the effectiveness of the socket abstraction in enabling inter-process communication across diverse network environments. Analyze the strengths and weaknesses of TCP and UDP sockets.	K5	CO4
5	20	Justify the use of PGP as a secure email communication solution. Critically evaluate its strengths and weaknesses compared to other email encryption methods, considering factors such as ease of use, interoperability, and security features.	K5	CO5

Z-Z-Z

END