

M.Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2025
SEMESTER – 3: COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)
COURSE: 24P3CAIT11 : COMPUTER NETWORKS

(Regular 2024 Admission))

Time: Three Hours

Max. Weights: 30

PART - A

Answer any 8 Questions.

Weight: 1

1. Compare and contrast circuit switching and packet switching. (An, CO1)
2. Describe the layered architecture of the Internet. Elaborate on the functions and services of each layer. (U, CO1)
3. Explain the purpose of TCP Congestion Control and describe how the "slow start" algorithm helps to prevent network congestion. (U, CO2)
4. Describe the format of a User Datagram Protocol (UDP) header and explain why UDP is considered a connectionless, unreliable transport protocol. (An, CO2)
5. Distinguish between different error detection and correction methods. (U, CO3)
6. Explain the process of framing in the link layer. (U, CO3)
7. Describe the various types of multimedia networking applications with examples. (U, CO4)
8. Explain the significance of RTP, SIP, and RTCP protocols in multimedia networking applications. (An, CO4)
9. Define the term 'SMI' in network management. (R, CO5)
10. Discuss the essential properties of a cryptographic hash function and their role in ensuring message integrity. (An, CO5)

(1 x 8 = 8)

PART - B

Answer any 6 Questions.

Weights: 2

11. Explain the concept and working of a Content Delivery Network (CDN). Discuss the two main server placement philosophies used by CDNs. (An, CO1)
12. Discuss the principles of terrestrial and satellite radio transmission and their applications. (U, CO1)

13. Differentiate between IPv4 and IPv6 addressing mechanisms. (An, CO2)
14. Classify the different random-access protocols. (An, CO3)
15. Evaluate the Cyclic Redundancy Check (CRC) method for error detection in data communication using a detailed, step-by-step example. (E, CO3)
16. Explain the classes in IPv4 classful addressing scheme. Write down the Class, subnet mask and network ID for the host IP 192.58.19.221/24. (A, CO2)
17. Evaluate the different classes of services in multimedia networking. (E, CO4)
18. Analyze the concept of a Message Authentication Code (MAC). (An, CO5)

(2 x 6 = 12)

PART - C**Answer any 2 Questions****Weights: 5**

- 19 You are a network administrator for a university with four major departments: Engineering, Science, Arts, and Business. The university has been allocated the IP address block 172.25.0.0/16. You are required to design a subnetting scheme to provide a separate subnet for each of the four departments, using CIDR. Your task is to: (C, CO2)
- A) Determine the new subnet mask (in slash notation and dotted-decimal notation) that will create at least four equally-sized subnets from the given address block.
 - B) Calculate the range of IP addresses for each of the four subnets, including the network address and the broadcast address for each.
 - C) Identify the first and last usable host IP address for each subnet.

Explain your calculations and the steps you took to arrive at the solution.

- 20 Consider a scenario where a user makes a video call from their computer to another user on their mobile phone. Describe the sequence of events and the specific function of each protocol (SIP, RTP, and RTCP) at different stages of the call, from initiation to termination. (A, CO4)

- 21 Using your knowledge of network security, evaluate the security challenges and limitations of earlier SNMP versions (v1 and v2) and explain how SNMPv3 addresses these vulnerabilities. Analyze the structure of the Management Information Base (MIB) and the use of Management Information (SMI) and Explain how OID (Object Identifiers) are used to uniquely identify network objects and their attributes. (E, CO5)
- 22 Analyze the problem of multiple access in a shared communication channel and describe the three main categories of multiple access protocols. Evaluate why CSMA/CD is used in wired Ethernet networks while CSMA/CA is essential for wireless LANs. (E, CO3)

(5 x 2 = 10)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.
CO1	Build an understanding of the fundamental concepts of computer networking.	U	1,2,11,12	6
CO2	Compare and differentiate the routing and addressing mechanisms and features of IPv4 and IPv6.	An	3,4,13,16,19	11
CO3	Analyse the link layer services, including principles of error detection and correction, multiple access and point-to-point protocols, and evaluate their application in wireless and wired network environments	E	5,6,14,15,22	11
CO4	Explain the principles of audio/video compression, streaming and stored media transmission.	A	7,8,17,20	9
CO5	Describe and illustrate cryptographic concepts and various encryption/decryption methods and analyze the functionality of Network Management.	C	9,10,18,21	9

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;