Printed Page:-04 **Subject Code**:- **ACSCY0401**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2023 - 2024)

Subject: Computer Networks and Network Programming

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **20**

1. Attempt all parts:-

1-a. What category of network is typically used within a single building or campus? (CO1) 1

(a) LAN

(b) MAN

(c) WAN

(d) PAN

1-b. Which network device operates at the Data Link Layer of the OSI model? (CO1) 1

(a) Hub

(b) Switch

(c) Router

(d) Repeater

1-c. Which routing algorithm uses information about the distance to a destination to make routing decisions? (CO2) 1

(a) Dijkstra's algorithm

(b) Bellman-Ford algorithm

(c) OSPF

(d) RIP

1-d. What is the function of ARP in networking? (CO2) 1

(a) Allocating IP addresses

(b) Resolving MAC addresses from IP addresses

(c) Assigning domain names

(d) Determining network topology

1-e. What are the two main transport layer protocols? (CO3) 1

(a) TCP and FTP

(b) UDP and IP

(c) TCP and UDP

(d) HTTP and SMTP

1-f. In TCP, what is the purpose of window management? (CO3) 1

(a) Error detection

(b) Flow control

(c) Congestion control

(d) Address resolution

1-g. Which protocol is commonly used for downloading files from a remote server? (CO4) 1

(a) HDLC

(b) CSMA/CD

(c) TCP

(d) UDP

1-h. What is the primary advantage of using UDP (User Datagram Protocol) over TCP (Transmission Control Protocol)? (CO4) 1

(a) Address Resolution

(b) Error Reporting

(c) IP Address Allocation

(d) Data Encryption

1-i. What is the main purpose of a firewall in network management? (CO5) 1

(a) To block all network traffic

(b) To monitor network performance

(c) To prevent unauthorized access to or from a private network

(d) To enhance network speed

1-j. What is the primary benefit of data compression in data transmission? (CO5) 1

(a) Increased security

(b) Faster transmission speed

(c) Improved data integrity

(d) Reduced bandwidth usage

2. Attempt all parts:-

2.a. Name one category of network based on geographical coverage. (CO1) 2

2.b. Define Medium Access Control. (CO2) 2

2.c. How does TCP establish a connection? (CO3) 2

2.d. Describe one key feature of the Twisted framework in Python for network programming. (CO4) 2

2.e. How does the Domain Name System (DNS) facilitate the translation of human-readable domain names into machine-readable IP addresses? (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. Identify three network devices commonly used in networking setups. (CO1) 6

3-b. Describe the mode of communication in simplex, half-duplex, and full-duplex modes. (CO1) 6

3-c. Describe the basic operation of ARP (Address Resolution Protocol). (CO2) 6

3-d. Explain the difference between IPv4 and IPv6. (CO2) 6

3.e. Describe the client-server model in networking. (CO3) 6

3.f. Compare and contrast the features and capabilities of two popular network programming libraries or frameworks, such as Socket.io and Netty. (CO4) 6

3.g. Describe the FTP protocol and its role in facilitating file transfers between clients and servers. (CO5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. Discuss the TCP/IP protocol suite and its significance in modern networking. (CO1) 10

4-b. Describe the function of common network devices such as routers, switches, and modems, and explain how they contribute to network connectivity. (CO1) 10

5. Answer any <u>one</u> of the following:-

5-a. Discuss the basic operation of ARP (Address Resolution Protocol) in network communication, including its role in mapping IP addresses to MAC addresses. (CO2) 10

5-b. Explain the difference between static and dynamic routing algorithms, providing examples of each and their respective advantages and disadvantages. (CO2) 10

6. Answer any <u>one</u> of the following:-

6-a. Describe the process-to-process delivery mechanism in networking and its significance. (CO3) 10

6-b. Describe the concept of window management in TCP and its impact on performance. (CO3) 10

7. Answer any <u>one</u> of the following:-

7-a. Discuss the challenges and considerations involved in handling network protocols with different byte order requirements, such as TCP/IP and UDP. (CO4) 10

7-b. Evaluate the performance impact of byte ordering operations in network programming. (CO4) 10

8. Answer any <u>one</u> of the following:-

8-a. Describe the challenges associated with data compression in multimedia applications, such as image and video compression. (CO5) 10

8-b. Analyze the impact of data compression on network performance and bandwidth utilization. Discuss how compression algorithms can help improve the speed and efficiency of data transmission over networks. (CO5) 10