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Roll No. 25420MCA020

M.Sc. /M.C.A. Semester I Examination 2025-26

Computer Science/Computer Application

CS-206 : Computer Networks

Time : Three hours **Max. Marks : 70**

(Write your Roll No. at the top immediately on the receipt of this question paper)

Note: Answer any five questions, including question no. 1, which is compulsory.

1. (2x7=14)

   a. What is the purpose of TTL field in IP datagram?

   b. What is the relation (if any) between receiver's advertised window, congestion window and sending window in TCP?

   c. How is a router different from a gateway?

   d. In case where Reliability is not of primary importance, UDP would be good transport protocol. Give examples of specific cases.

   e. What is the role of ICMP redirection message?

   f. What do you mean by message nonrepudiation?

   g. Differentiate between secret key and private key used in cryptography.

2.

   a. What is hexadecimal notation in IPv6 addressing? What are the advantages of IPv6 over IPv4? (4)

   b. In an IPv4 datagram, the M bit is 0, the value of HLEN is 5, the value of total length is 200, and the offset value is 200. What is the number of the first byte and number of the last byte in this datagram? Is this the last fragment, the first fragment, or a middle fragment? (4)

   c. Give two situations in which physical to logical address mapping is needed. Explain any one protocol used for physical to logical address mapping. (6)

3.

   a. What is the 'count to infinity' problem? Why does it happen in the Distance Vector Routing? How this problem is resolved? (6)

   b. What is 3-way handshake mechanism? Also, explain how the mechanism is used for establishing a TCP connection. (5)

   c. How is the flow control at the transport layer different from flow control at the data link layer? (3)

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4.

a. What is the role of IGMP protocol? Explain the method to change the multicast IP address to an Ethernet multicast physical address with suitable example. (6)

b. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence. (4)

c. In a TCP connection, the initial sequence number at the client site is 2,171. The client opens the connection, sends only one segment carrying 1,000 bytes of data, and closes the connection. What is the value of the sequence number in each of the following segments sent by the client? (4)

   i. The SYN segment?
   ii. The data segment?
   iii. The FIN segment?

5.

a. What do you mean by traffic shaping? Explain the Token Bucket approach used for traffic shaping. (4)

b. Draw the flow diagram of three-phase Congestion Management approach of TCP. (4)

c. Differentiate between IPv4 and IPv6 header formats with suitable diagram. (6)

6.

a. Explain the security protocol at transport layer in TCP/IP model. What are different services supported by this protocol? (5)

b. Differentiate between the two security services: message authentication and entity authentication. (3)

c. What do you mean by message integrity? Explain the technique for maintaining message integrity using hash function with appropriate diagram. (6)

7.

a. What is the difference between local and remote log-in in TELNET? (4)

b. What is the role of FTP in data communication? Define the three transmission modes of FTP. (4)

c. What is the role of SMI in SNMP architecture? (3)

d. Differentiate between the two techniques of address resolution used by DNS. (3)