MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
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I SEMESTER M.TECH. (COMPUTER NETWORKING AND ENGINEERING)
END SEMESTER EXAMINATIONS, NOVEMBER 2019
SUBJECT: COMMUNICATION NETWORK PROTOCOLS[ICT 5172]
REVISED CREDIT SYSTEM
(19/11/2019)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:
❖ Answer **ALL** the questions.
❖ Missing data if any, may be suitably assumed.

1A. Write a time line diagram depicting the Association set-up phase and data transfer phase in SCTP. In data transfer phase apply any three generic rules of acknowledgement policy. Assume packet size as 500 bytes in both direction. Window size is 2000 bytes in both client and server side. The communication link between client and server is CAT6 cable. The propagation delay is 1 microsecond and transmission delay for one segment is 500 microseconds. Compute the data rate and distance between client and server. **5**

1B. Find the number of addresses, first address and last address for the block of address assigned to an ISP. Given one of the addresses in the assigned block is 132.130.16.40/21. Also for the same block find the address range of the subnets if the block is divided into 4 subnets of equal size. **3**

1C. For the given routing table in Table Q.1C write the network topology. **2**

Table Q.1C

Mask	Network Address	Next-HopAddress	Interface
/27	202.14.17.224	----	m1
/18	145.23.192.0	----	m0
default	default	130.56.12.4	m2

2A. Discuss any one Internet application that justifies the use of UDP.
The TCP in station X sends a SYN segment with ISN = 2000 and MSS = 500 to station Y. Station Y replies with a SYN segment with ISN = 4000 and MSS = 1000. Suppose station X has 10,000 bytes to transfer to Y. Assume the link between stations X and Y is 8 Mbps and the distance between them is 300m. Ignore the header overheads for the simplification of computation. Station Y has 3000 bytes of buffer available to receive data from X. Sketch the sequence of segment exchanges, including the parameter values in the segment headers, and the state as a function of time at the two stations under the following situations:
Station X sends its first data segment at $t = 0$. Station Y has no data to send and sends an ACK segment every other frame. **5**

2B. Draw the state transition diagram of SCTP. Show the sequence of steps followed to eliminate the SYN flooding attack of TCP. **3**

2C. Explain the operation of Path vector routing. **2**

3A. Explain the concept of multiple streams in SCTP.   5
Show the contents of SACK message sent by the receiver for the state of a receiver given as below.

    i. The receiving queue has chunks 1 to 8, 11 to 14, and 16 to 2
    ii. There are 1800 bytes of space in the queue
    iii. The value of lastAck is 4
    iv. No duplicate chunk has been received
    v. The value of cumTSN is 5

3B. Describe the process of congestion control in TCP highlighting the 3 different phases.   3

3C. Discuss the need for raw sockets in application development.   2

4A. Discuss the merits and demerits of OSPF when compared to RIP.   5
Draw the network topology and its graphical representation for the following specifications.

        Number of stub networks = 3
        Number of Routers = 5
        Number of transient networks = 2
        Number of networks = 7

For one of the routers in the network topology above, write the router links.

4B. Discuss the process followed by IGMP for the host to join a multicast group and leave a multicast group.   3

4C. What is the purpose of Redirection message in ICMP?   2

5A. List the features of unique to IPv6 when compared to IPv4. Show the process of conversion of IPv4 multicast address into Ethernet multicast address for the Network interface card to receive the multicast packet. Describe the Multicast routing algorithm implemented for internet that uses source based tree approach.   5

5B.   **i.** In IP fragment, the MTUs range from 296 to 65,535. What would be the advantages of having a large MTU? What would be the advantages of having a small MTU?   3
    ii. An IP fragment has arrived with an offset value of 100. How many bytes of data were originally sent by the source before the data in this fragment?

5C. With an example explain the principle of "longest mask matching" in IP datagram forwarding.   2