3C. Is address aggregation necessary in Internet addressing? Justify your answer. **2**

4A. An SCTP association is established between client and server with the following: Client sends an initial tag of 500, an initial TSN of 1450, and a window size of 2000. The server replies with an initial tag of 6000, an initial TSN of 670, and a window size of 4000. The client sends 15 chunks of 200 bytes each and receives an acknowledgement for 7th chunk. The last two chunks are in Transit(14TH AND 15TH).

i. Show the contents of all four packets exchanged during association establishment. Ignore the value of the cookie.

ii. Show the contents of the sending queue and other variables as per TSNs assigned during Association establishment. **5**

4B. A client uses TCP to send data to a server. The data consists of 16 bytes. Calculate the efficiency of this transmission at the TCP level (ratio of useful bytes to total bytes). Calculate the efficiency of transmission at the IP level and also at the data link layer. Ignore options for the IP and TCP header. Assume Ethernet at the data link layer. **3**

4C. The Ping application generally uses raw sockets. Why? Justify your answer. **2**

5A. Write programs to exchange 100 bytes of text using unix/windows network system calls. Assume an UDP socket. Also write the system calls used to enable/disable Nagle algorithm and IPheader inclusion/deletion. **5**

5B. Given a network with 4 routers as shown in Figure Q.5Band Table Q.5B, write the RIP configuration file for router R3(2811). **3**

5C. In a block of addresses, we know the IP address of one host as 182.44.82.16/26. What is the first address (network address) and the last address (limited broadcast address) in this block? **2**

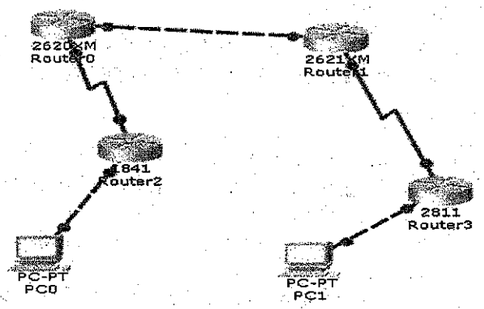

Figure Q.5B

Table Q.5B

1841 Series Router0 (R1)		
	FastEthernet0/0	Serial0/0/0
IP address	10.0.0.1	20.0.0.1
Connected With	Pc0	R2 on Serial 0/0

2811 Series Router0 (R4)		
	FastEthernet0/0	Serial0/0/0
IP address	50.0.0.1	40.0.0.2
Connected With	Pc1	R3 on Serial 0/0

2621XM Series Router0 (R3)		
	FastEthernet0/0	Serial0/0/0
IP address	30.0.0.2	40.0.0.1
Connected With	FastEthernet0/0	R4 on Serial 0/0/0

2620XM Series Router1 (R2)		
	FastEthernet0/0	Serial0/0
IP address	30.0.0.1	20.0.0.2
Connected With	R3 on FastEthernet0/0	R1 on Serial 0/0/0

PC-PT PC0		
	FastEthernet0	Default Gateway
IP address	10.0.0.2	10.0.0.1
Connected With	R1 on FastEthernet0/0	

PC-PT PC1		
	FastEthernet0	Default Gateway
IP address	50.0.0.2	50.0.0.1
Connected With	R4 on FastEthernet0/0	

Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY

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A Constituent Institution of Manipal University

I SEMESTER M.TECH. (COMPUTER NETWORKING AND ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: COMMUNICATION NETWORK PROTOCOLS [ICT 5101]

REVISED CREDIT SYSTEM
(24/11/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data if any, may be suitably assumed.

1A. Write the sequence of steps followed in the implementation of congestion control mechanism in internet (with a diagram). Apply the congestion control algorithm for the following scenario assuming a maximum window size of 64 segments.
i. Three duplicate ACKs are received after the fourth RTT.
ii. A time-out occurs after the sixth RTT. 5

1B. Write the state transition diagram for the SCTP Server.
Show the contents of a SACK to be sent if a host has received bytes 2001 to 3000 in order. Bytes 4001 to 6000 are out of order, and bytes 3501 to 4000 are duplicate. Assume cumulative TSN suitably. 3

1C. Assume that TCP is sending data at 1 megabyte per second. If the sequence number starts with 7,000, how long does it take before the sequence number goes back to zero? 2

2A. How does IGMP support/complement multicast routing? Show with an example that the Distance vector multicast routing algorithm generates only one multicast packet to a network using shortest path tree approach. 5

2B. Write an algorithm for the implementation of trace route application highlighting the logic used in its implementation. What is the role of ICMP? 3

2C. Given B:A:CC::1234:A, show the complete unabbreviated IPv6 address. What are the benefits of Path MTU in IPv6 ? 2

3A. Consider a Network with 7 routers and 9 links(types of links: point-point, transient and stub links; Assume suitable names for routers and assign weights for each link). Construct a shortest path tree and then generate a routing table for one node using Link state. Also show the OSPF implementation steps for the same network. 5

3B. Create a scenario in which the sender sends three packets to the receiver. The first and second packets arrived and acknowledged. The third packet is delayed and resent. The duplicate packet is received after the acknowledgment for the original to be sent. Assume generic TCP implementation and generic acknowledgment policy. Explicitly specify the acknowledgement rules applied. 3