Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL

IV SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

END SEMESTER EXAMINATIONS, APR/MAY 2017

SUBJECT: COMPUTER NETWORKS [ICT 2201]

REVISED CREDIT SYSTEM
(21/04/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. What are the different types of network topologies? List their advantages and disadvantages? **5**

1B. A network with one primary and four secondary stations uses polling. The size of a data frame is 1000 bytes. The size of the poll, ACK, and NAK frames are 32 bytes each. Each station has 5 frames to send. How many total bytes are exchanged if a station can send only one frame in response to a poll? **3**

1C. When routers generate ICMP messages, to where do they send them? What additional contextual information do routers include in the messages along with the ICMP header at the beginning? **2**

2A. Five LANs are connected using source routing bridges as shown in Figure Q.2A. Assume that the bridges 3 and 4 are not part of the initial spanning tree. **5**

a) Show the single route broadcast frames when S1 wants to learn the route to S2
b) Show the path to all routes broadcast frames returned by S2
c) List all possible routes from S1 to S2 from part (2)
d) How many LAN frames are required to learn the possible routes

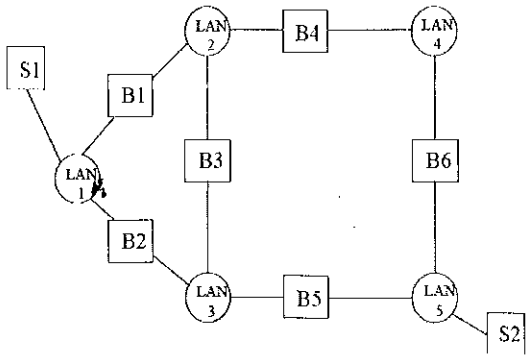

Figure Q.2A

2B. Consider the network shown in Figure Q.2B. Distance vector routing is used for building the routing tables for each node of the network. Show initial and final tables of all the nodes. **3**

2C. List two protocols that use exponential backoff. Describe the problems would occur if each of the listed protocol did not use backoff. **2**

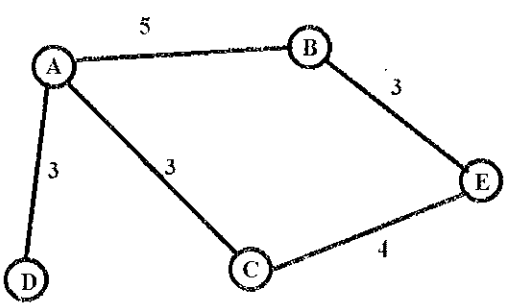

Figure Q.2B

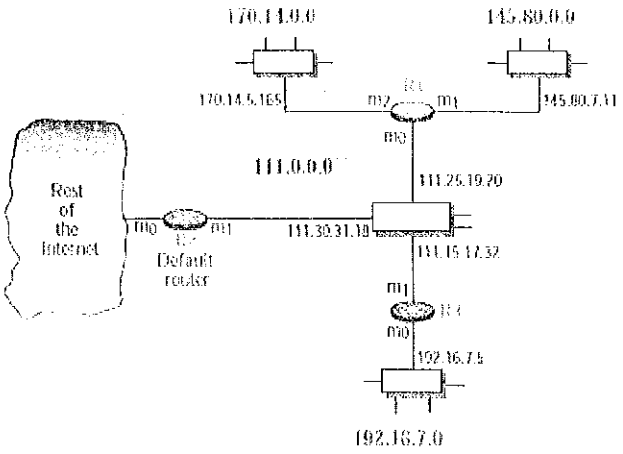

Figure Q.3B

3A. Considering the following scenario show all the IP Packets generated by router R1 and R2 for the network shown in Figure Q.3A. Assume an MTU of 1500 Bytes for network A and 535 bytes for network B respectively. R1 receives an IP packet P directed at H and containing a 2000 bytes TCP segment. IP header is of 20 bytes. Describe the M bit and the Offset field for IP fragments of packet P sent from R1 on network A and R2 over network B. **5**

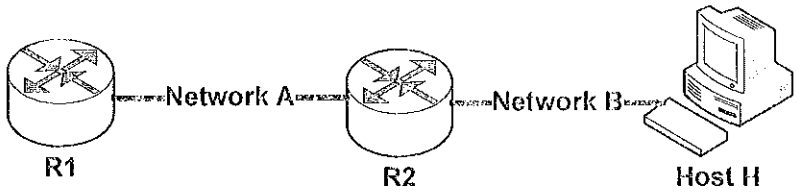

Figure Q.3A

3B. Calculate checksum for the following UDP datagram at the sender. The sender with IP address 153.18.8.105 and port number 1087 is communicating a message "TESTING" to the Day-time server having 171.2.14.10 as its IP addresses. **3**

3C. What are the processes involved in leaving a multicast group? **2**

4A. An organization is granted a block of addresses with the beginning address 180.202. 0.0/16 **5**

a) Three subnets with 2000 addresses each
b) Two subnets with 4000 addresses each
c) Five subnets with 1000 addresses each
d) Two subnets with 250 addresses each

Explain how the addresses are allotted for each show the first and last address of all the subnets. Also specify the range of unused addresses.

4B. TCP opens a connection using an initial sequence number (ISN) of 14,534.The other party opens the connection with an ISN of 21,732. Show the three (32 bytes) TCP segments during the connection establishment. Please include values provided in this question at their respective fields in the segment. **3**

4C. What are interior and exterior routing protocols? Give examples of each. **2**

5A. Figure Q.3B shows an imaginary part of the Internet. Assume that the addresses shown are classfull addresses. Draw the Routing tables for Routers R1and R3. **5**

5B. What are the design issues for layers in networking? How do u solve them? **3**

5C. In a send window, Sf = 41 and Sn = 51. If window size is 6 bytes, show the send window before and after the station receives an ACK segment with ack No = 46 and rwnd = 5. Ignore congestion control. Does this situation mean shrinking the window? **2**