Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

MAKEUP EXAMINATIONS, DECEMBER 2016

SUBJECT: COMPUTER NETWORKS [ICT 305]

REVISED CREDIT SYSTEM
(31/12/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE** full questions.
- Missing data, if any, may be suitably assumed.

1A. An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 1000 customers as follows:
a. The first group has 200 medium size businesses; each needs 128 addresses.
b. The second group has 400 small businesses; each needs 16 addresses.
c. The third group has 2000 households; each needs 4 addresses.
Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations. **5**

1B. Write a note on Congestion control in Datagram subnets. **3**

1C. Prove that hierarchical routing technique reduces path length and saves space in routing table. Give an example. **2**

2A. With a neat diagram explain the functionalities of each layer in the OSI reference model. **5**

2B. Explain CSMA and CSMA/CD. **3**

2C. List all flags used in the routing table with their significance. **2**

3A. With a neat diagram explain all the different fields present in the header of an IP datagram. **5**

3B. Explain the four basic topologies used to form a network. List one advantage and disadvantage of each topology. **3**

3C. With neat diagram explain the multiplexing/ demultiplexing concept in UDP. **2**

4A. With a neat state transition diagram explain the different events during connection establishment, connection termination, and data transfer from a client to server using Transmission Control Protocol. **5**

4B. Five LANs are inter-connected using source routing bridges as shown in Figure Q.4B. Assume that the bridges 3 and 4 are not part of the initial spanning tree.
i. Show the single route broadcast frames when S1 wants to learn the route to S2
ii. Show the path of all routes broadcast frames returned by S2.
iii. List all possible routes from S1 to S2. **3**

iv. How many LAN frames are required to learn the possible routes?

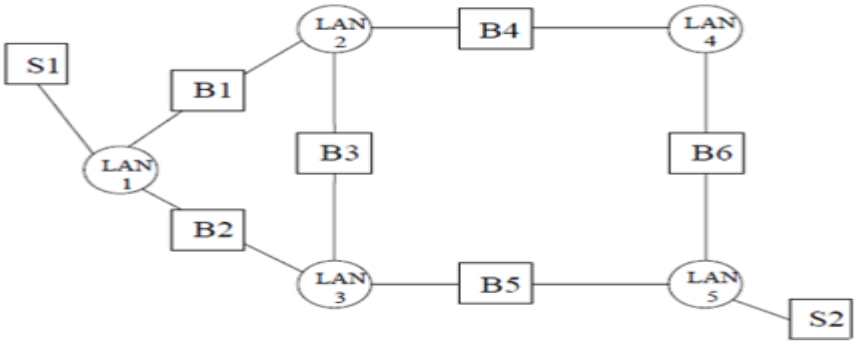

Figure Q.4B

4C. A computer receives a time-stamp request from another computer at 2:34:20 PM. The value of the original timestamp is 52,453,000ms. If the sender clock is 7ms slow, What is the one-way time? **2**

5A. A router R1 has following entries in its routing table. Draw the network topology.

Mask	Network Address	Next hop address	Interface
/26	140.24.7.192	240.100.1.2	m1
/24	120.24.7.0	200.1.1.1	m0
/16	240.100.0.0	—	m1
/16	100.100.0.0	200.1.1.1	m0
/8	200.0.0.0	—	m1
/0	Default router	200.1.1.2	m1

5

5B. Explain the two node instability problem by considering a suitable scenario. State any two solutions to overcome this problem. **3**

5C. A client uses UDP to send 16 bytes of data to the server. Calculate the efficiency of this transmission at UDP level. **2**

6A. Briefly explain all types of message available in IGMP. Also show the sequence of message sent in the scenario as shown in the figure Q. 6A.

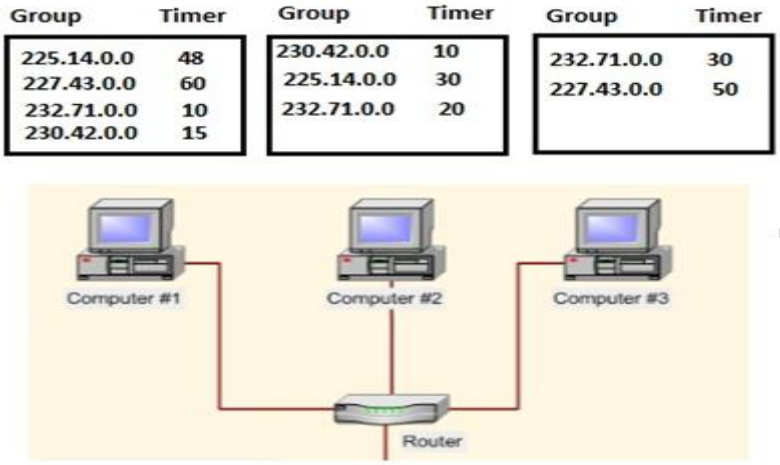

Figure Q.6A

5

6B. Calculate the checksum at the sender side and receiver side for the following ICMP packet: Type: Echo Request, Identifier: 123, Sequence Number: 25, Message: Hello **3**

6C. In a datagram, the M bit is zero, 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? **2**