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# MANIPAL INSTITUTE OF TECHNOLOGY, MANIPAL 576104

(Constituent College of Manipal University)

**FIFTH SEMESTER B.TECH. (IT) DEGREE END SEMESTER EXAMINATION NOV/DEC – 2015**

**SUBJECT: COMPUTER NETWORKS – ICT-305**

**(REVISED CREDIT SYSTEM)**

**TIME: 3 HOURS** **30/11/2015** **MAX. MARKS: 50**

**Instructions to candidates**

Answer any **FIVE FULL** questions.

Missing data, if any, may be suitably assumed.

1A. Explain the functionalities of each layer in the OSI reference model with neat diagram.

1B. Explain the two node instability problem by considering a suitable scenario. Mention any two solutions to overcome this problem.

1C. Consider a pure ALOHA network with 100 stations. If frame transmission time is 1 microseconds, what is the number of frames each station can send to achieve maximum efficiency? [5+3+2]

2A. An organization is granted a block 130.34.12.64/26. The organization needs 4 subnets. Write the network address and mask for each group. If one of the host is identified with 130.34.12.252 identify the destination and source address for the following special addresses:

i. Network address
ii. Direct broadcast address
iii. Limited broadcast address
iv. This host on this network
v. Specific host on this network
vi. Loopback address

2B. Nine stations (S1 – S9) are connected to an extended LAN through transparent bridge (B1 and B2) as shown in Figure Q.2B. Initially the forwarding tables are empty. Suppose the following stations transmits frame : S2 transmits to S7, S3 transmits to S7, S6 transmits to S5, S6 transmits to S3, S3 transmits to S4 and S5 transmits to S3. Show the forwarding table after all the frames are transmitted.

2C. List any 4 flags used in the routing table with their significance. [5+3+2]

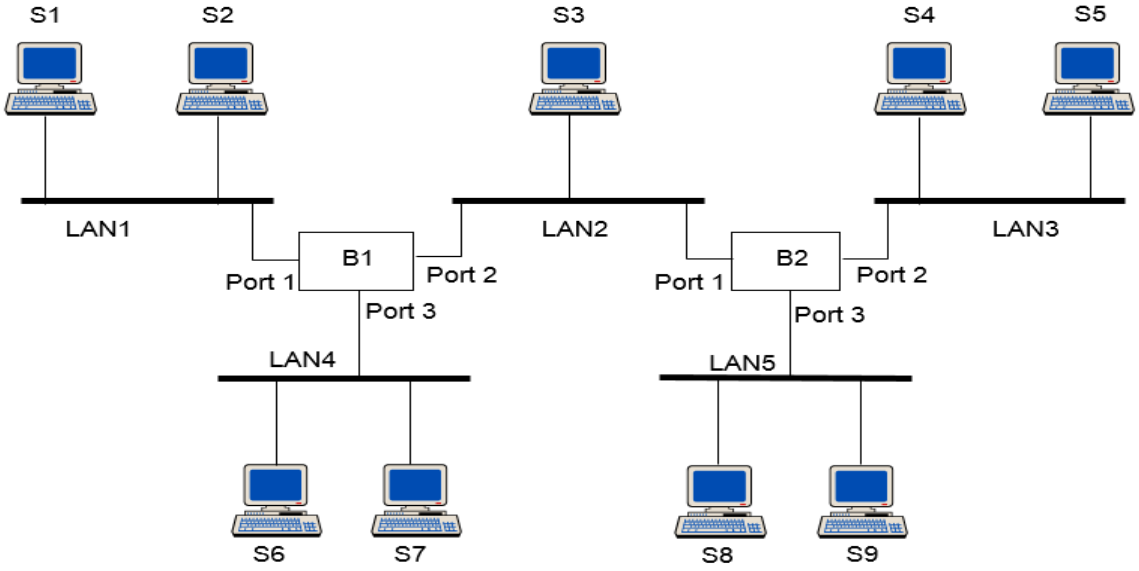


**Figure Q.2B**

3A. Explain the working of CSMA/CD with the flow diagram. How is CSMA/CD different from ALOHA protocol?

3B. What are different techniques through which congestion can be controlled in datagram subnets? Explain any three.

3C. An Ethernet MAC sublayer receives 1510 bytes of data from the upper layer. Can the data be encapsulated in one frame? If not, how many frames need to be sent? What is the size of the data in each frame? [5+3+2]

4A. Explain the role of the following with respect to TCP.

i. The timers
ii. Timestamp in the option field

4B. Explain the four cases in which the services of ARP can be used.

4C. Change the following multicast IP address to Ethernet multicast physical address.

i. 230.43.14.7
ii. 238.12.24.9 [5+3+2]

5A. How do you overcome the following problems associated with TCP

i. Slow sender and slow receiver
ii. Shrinking of window
iii. Deadlock scenario

5B. A computer sends a timestamp request to another computer. It receives the corresponding timestamp reply at 3:46:07 A.M. The values of the original timestamp, receive timestamp, and transmit timestamp are 13,560,000, 13,562,000, and 13,564,300, respectively. What is the sending trip time? What is the receiving trip time? What is the round-trip time? What is the difference between the sender clock and the receiver clock?

5C. Compare the segment identification number used in TCP with the different identification numbers used in SCTP. [5+3+2]

6A. Suppose a data of size 4000 bytes is passed to IP for delivery across two networks of the internet (i.e. from source host to a router then to the destination host). The first network uses Maximum Transfer Unit (MTU) of 1400 bytes with header length given as 5, the second network uses MTU of 800 bytes with header length as 8. Give the details of every fragment delivered to the network layer at the destination host with size, flags, identification number and offset. Assume all IP headers are 20 bytes.

6B. What is the role of pseudo header in UDP? Explain the queuing concept of UDP. Compare TCP with UDP.

6C. What are the features of OSPF? [5+3+2]

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