

## Comprehensive Examination in Computer Networks

Fall 2011

Work each of the following problems. If a mathematical approach is required, show all of your work and make sure that the presentation is complete and logical.

1. Consider an error-free 64kbps satellite channel used to send 512-byte data frames in one direction between two stations on earth. Short acknowledgements come back the other way. (Ignore ACK transmission time but NOT propagation delay). You may assume that the total one-way propagation time between the two earth stations is 500 ms (earth-satellite-earth).

- a. What is the maximum throughput for a sending window size of 1 frame?

- b. What is the maximum throughput for a sending window size of 15 frames?

2. Name four functions that an ATM network performs but the IP network layer does not. I'm giving you one as an example. You may NOT repeat it.

a. Connection-setup\_\_\_\_\_

b. \_\_\_\_\_

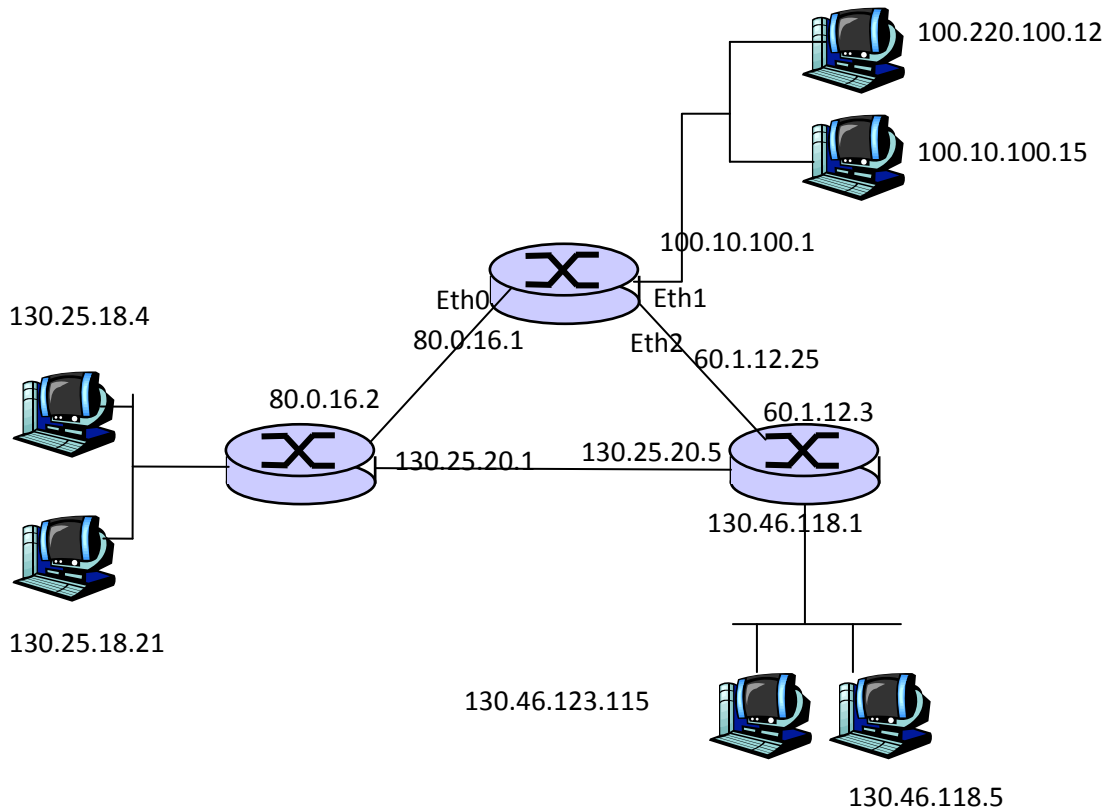
c. \_\_\_\_\_

d. \_\_\_\_\_

e. \_\_\_\_\_

3. Two stations on an Ethernet LAN send frames that collide. Given that this one collision has occurred and that no other station transmits, what is the probability that exactly 4 collisions (3 additional collisions) will occur?

4. Create a routing table for the top-center router shown below. The table should contain exactly 5 rows as indicated. Do not use any default entry. Entries should be sufficient so that each IP address shown can communicate with all the other IP addresses shown (assuming that other routing tables are all properly defined.) NOTE: choose routes corresponding to fewest hops possible.



NETWORK ADDRESS	SUBNET MASK	NEXT

