

Student ID: \_\_\_\_\_

**Networking Comprehensive Exam  
Fall 2004**

**Work any 3 of the following problems. Give complete explanations for each answer.  
Circle the 3 questions that you wish to be graded.**

**1      2      3      4      5**

1. (a) Why is a minimum frame size necessary on an Ethernet?  
(b) What is the minimum frame size? How was this frame size determined?

2. (a) Explain the difference between a network that is connection-oriented and a network that is connectionless. Concentrate your technical description on differences in network-layer function. What are the technical differences and what are the relative advantages of each approach to designing a network?

(b) Give an example of a connectionless network and an example of a connection-oriented network.

3. Explain Distance Vector routing and Link State Routing. Be sure that you clearly distinguish between the two and give some advantages for each.

4. Use the following parameters to obtain a formula for end-to-end delay,  $E$ , of a message across an IP network:

$N$  = number of hops between two given end systems

$L$  = message length in bits

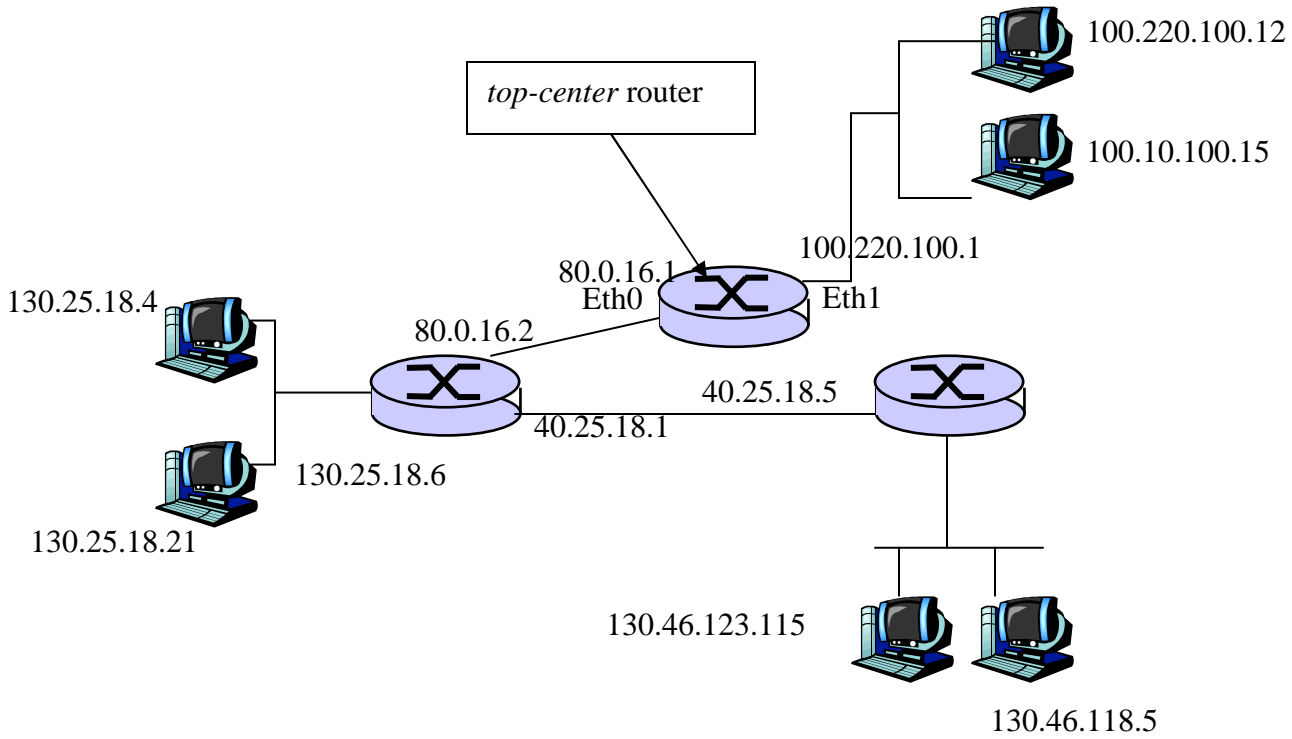
$B$  = data rate, in bits per second (bps) on all links

$P$  = fixed packet size in bits

$H$  = overhead (header) bits per packet.  $H$  is NOT included in  $P$ .

$D$  = propagation delay per hop in seconds.

5. Complete the routing table for the *top-center* router shown below. The table should contain **exactly 4 rows** that include **destination network**, **subnet mask**, and **next**. Do not use any “default” entry. The table 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 appropriately defined).



*top-center* routing table

Destination Network	Subnet Mask	Next