COMP211 Class Test: Canvas Quiz

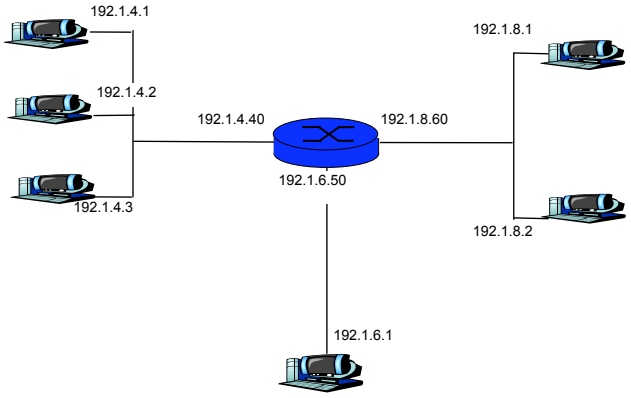
The class test consists of 10 questions and you have 40 minutes to complete the quiz. The quiz covers material from the network and link layers. Here is a set of review questions that should allow you to prepare for the test. Actual class test questions will be similar in spirit.

1. What is the name of a packet in each of the following layers?
   (a) Transport Layer
   (b) Network Layer
   (c) Link Layer
2. What is the difference between routing and forwarding?
3. Draw a diagram illustrating the architecture of a router.
4. We discussed 3 types of switching fabrics. Briefly describe each of them.
5. Describe how packet loss can occur at input ports of routers.
6. Describe how packet loss can occur at output ports of routers.
7. What is HOL blocking? Does it occur in input ports or output ports?
8. Consider sending a 3100 byte datagram into a link that has an MTU of 320 bytes. How many fragments are generated?
9. What is the 32-bit binary equivalent to the IP address 225.1.3.51?
10. You have captured an IPv4 datagram and the first 160 bits are as follows:

```
01000101 00000000 00000000 11111010
00001010 01111110 01000000 00000000
10000000 00000110 10110101 10100010
10101000 00100100 00000100 00010100
11001000 00101001 00000100 00011000
```

    What is the *destination IP address* of this datagram in the standard a.b.c.d notation? Source IP address? Length in bytes of the datagram?
11. Consider a router that interconnects three subnets: A, B, and C. Suppose all of the interfaces in each of these subnets are required to have the prefix 223.200.0.0/20. Suppose subnet A is required to support 2000 interfaces, and subnet B and C are each required to support 1000 interfaces. Provide network addresses for A,B and C (in the form a.b.c.d/x) that satisfy these constraints.
12. Do routers have IP addresses? If so, how many?
13. Suppose there are 5 routers between a source host and a destination host. Over how many interfaces will an IP datagram travel if it is sent from the source host to the destination host? How many forwarding tables will be looked up in the process?
14. Suppose an application generates chunks of 20 byte of data every 20msec and each chunk gets encapsulated in a TCP segment and then an IPv4 datagram. What percentage of each datagram will be application data?
15. How big is the IPv4 address space? The IPv6 address space? The MAC address space?

16. Given the following network, complete the forwarding tables:



Router:

Destination Subnet	Next Router	Number of Hops	Interface
192.1.4.0/24			
192.1.6.0/24			
192.1.8.0/24			

Host 192.1.8.1:

Destination Subnet	Next Router	Number of Hops
192.1.4.0/24		
192.1.6.0/24		
192.1.8.0/24		

17. Consider a router with the following information in the forwarding table:

Destination Subnet	**Interface**
62.17.192.0/19	0
62.17.192.0/20	1
62.17.192.0/21	2
62.17.192.0/22	3
62.17.192.0/23	4
62.17.208.0/21	5
otherwise	6

Suppose a datagram arrives with destination IP address 62.17.193.1. Which interface will the router use for forwarding this datagram?

18. Is it necessary that every AS uses the same Intra-AS routing protocol? Why or why not?
19. Why are there different protocols for Inter-AS and Intra-AS routing?
20. Compute the CRC bits defined by the generator 1011 and the data bit string 110101.
21. An Ideal Multiple Access Protocol should have 4 characteristics. List them.
22. Sketch the operation of Slotted ALOHA.
23. Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with specific destination MAC address?
24. At which layer do routers operate? Switches?
25. What is a CSMA protocol?
26. Consider CSMA/CD with exponential backoff. After the 5'th collision, what is the probability that a node chooses K=4?
27. Is it true that at high load channel partitioning multiple access protocols are more efficient than random access multiple access protocols? Why or why not?
28. Which multiple access protocol is used in 802.11 wireless LANs? Briefly explain its functionality.