CS3516 B14
Computer Networks
Mid Term Exam
November 20, 2014

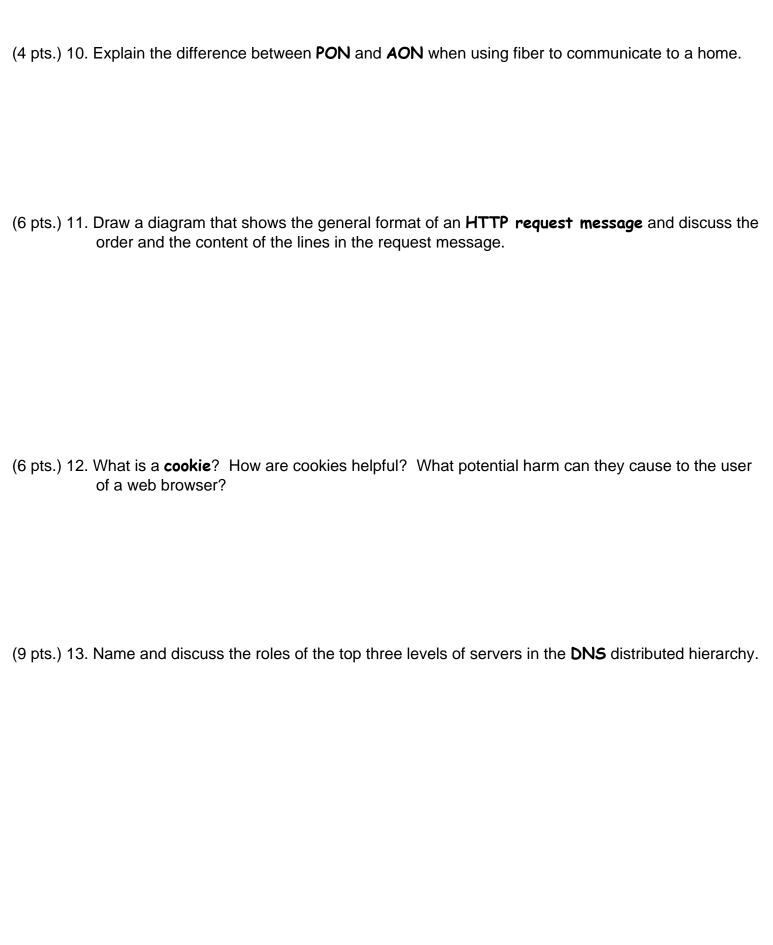| Question	Points	Score
0	1	
1	5	
2	3	
3	4	
4	5	
5	3	
6	4	
7	5	
8	2	
9	6	
10	4	
11	6	
12	6	
13	9	
14	18	
Total	**80**	

Trivia Question (1 extra credit point)

0. (a) What is the capital of **Sierra Leone**?

-OR-

   (b) What city will host the **Republican National Convention** in **2016**?

(5 pts.) 1. What is a **network protocol** and what does a **network protocol** define?

(3 pts.) 2. Explain the role and issues envisioned in the **OSI Reference Model** for the **Session Layer**.

(4 pts.) 3. Explain the relationship between the **listen** system call and the **accept** system call on a server using TCP sockets on a UNIX/Linux system.

(5 pts.) 4. Explain the difference between **datagram** and **virtual circuit routing**.

(3 pts.) 5. Name the three standard approaches used to conduct **network performance evaluation**.

(4 pts.) 6. Explain how the **modulation rate** and **channel capacity** can be different for a signal traveling over a wired medium.

(5 pts.) 7. Draw a diagram and explain the role of **statistical multiplexing** in a **concentrator**.

(2 pts.) 8. What is the **minimal acceptable** wiring grade for **twisted pair** today?

(6 pts.) 9. Discuss the differences between **ADSL** and **VDSL**.

(4 pts.) 10. Explain the difference between **PON** and **AON** when using fiber to communicate to a home.

(6 pts.) 11. Draw a diagram that shows the general format of an **HTTP request message** and discuss the order and the content of the lines in the request message.

(6 pts.) 12. What is a **cookie**? How are cookies helpful? What potential harm can they cause to the user of a web browser?

(9 pts.) 13. Name and discuss the roles of the top three levels of servers in the **DNS** distributed hierarchy.

(18 pts.) 14. Given the **internet** pictured below with a propagation speed of **200m/microsec** on the packet-switched WAN and **150 m/microsec** on the **counter-clockwise 10 Mbps** ring LAN where the five nodes (A, B, C, D, E) are equidistantly spaced **300 meters** apart. Assume that every frame on the token ring incurs a **one-bit delay** when it passes through each node repeater.

Nodes 1-4, 7, 8 and E are equidistantly spaced **6 km** apart on the WAN with **1 Gbps** links between nodes. Node E is the only WAN node with a processing time of **100 milliseconds**.

Assuming one packet fits exactly into one frame payload and given the following frame specifications:

Frame payload = **1170 bytes**
Frame header = **40 bytes** Frame trailer = **40 bytes**

a. How long will it take to send a packet from **node D** to **node 1** in the situation that when the packet arrives at **node 2** there are three packets waiting to go to **node 1** and two packets waiting to go to **node 7**? Assume no other queuing on the WAN and that the transmitting node has the token.

{List any assumptions made and show ALL work to receive full and/or partial credit.}