Name _____

CS3516 B10
Computer Networks
Mid Term Exam
November 16, 2010

Question	Points	Score
0	1	
1	2	
2	3	
3	7	
4	3	
5	5	
6	6	
7	7	
8	3	
9	6	
10	8	
11	10	
12	20	
Total	80	

Trivia Question (1 extra credit point)

0. (a) Which actor played Superman in the 1978 Movie “Superman, the Movie”?

-OR-

(b) What city will host the 2016 summer Olympic Games?

(2 pts.) 1. Define **network architecture**.

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

(5 pts.) 3a. Explain the advantages and disadvantages between **store-and-forward** and **cut-through packet-switched routers** inside a sub-network.

(2pts.) 3b. How does **packet switching** differ from **cell switching**?

(3 pts.) 4. Explain the role of the **bind** system call as it would be used by a **TCP server** within socket programming.

(5 pts.) 5. Discuss the differences between **TCP** and **UDP.** Name one higher-level protocol that uses **TCP** and one higher-level protocol that uses **UDP**.

(6 pts.) 6. Draw one diagram for **FDM** and one diagram for **TDM** and explain how they work and how they are different.

(1 pts.) 7.a What is **ADSL**?

(2 pts.) 7.b What does a **ADSL modem** do?

(4 pts.) 7.c Explain in detail how **ADSL** works.

(3 pts). 8 What environmental issues affect the quality of **wireless** transmissions?

(6 pts.) 9. Given six objects on a server's **base HTML page**, explain the differences between a browser using a **non-persistent TCP connection** versus using a **persistent TCP connection** to download the server page and the six objects.

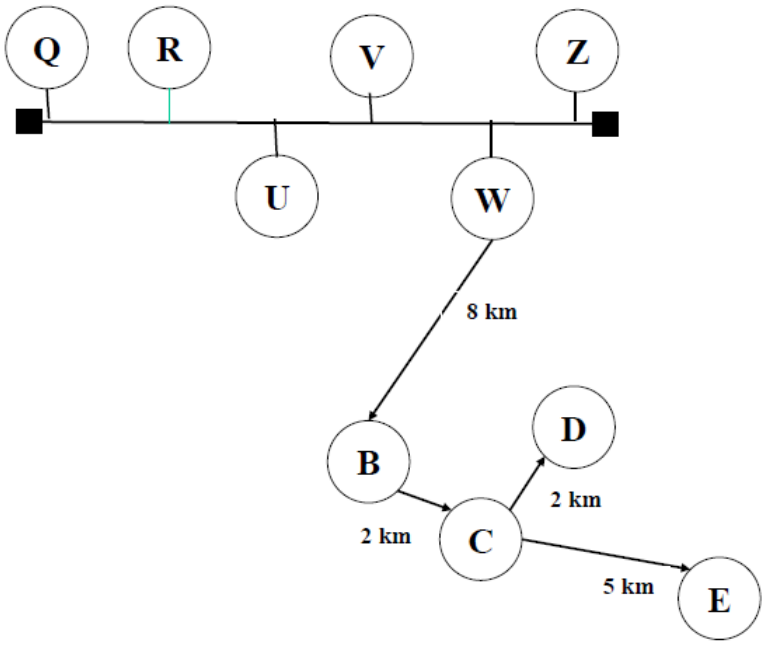
(8 pts.) 10. What is a **cookie**? Draw a diagram and use it to explain the **four components** of using cookies between browsers and Web server sites.

(3 pts.) 11a. Draw a diagram to show and explain the components of an **HTTP response message**.

(2 pts.) 11b. What is a Web **proxy server**?

(5 pts.) 11c. Explain the actions the **proxy server** and **origin server** perform to address whether an object requested by a Web browser is **stale** or not.

12.



Given the internet pictured above with a propagation speed of **200 m/microsec**. on the **100BASE5** LAN and a propagation speed of **150 m/microsecond** on the store-forward packet-switched WAN where nodes **Q, R, U, V, W** and **Z** are equally spaced on the Ethernet with nodes **Q** and **Z** at the opposite extreme ends.

Nodes **W, B-E** are spaced on the WAN as shown with **2 Gbps** links between nodes. Assume it takes each WAN node **5 millisec.** to look up a packet's route in its routing table and there is a **1 microsec.** delay for a Ethernet frame to pass through a node on the ether.

Assume an IP packet has **1300 bytes** and the frame header = **100 bytes** and the frame trailer = **100 bytes** on both the Ethernet LAN and the point-to-point WAN.

(18 pts.) a. How long will it take to send a frame from node **Q** to node **E** in the situation that when the frame arrives at node **C** there are four frames waiting to go to node **E** and two frames waiting to go to node **D**? Assume all frames are the same size and that there is no other traffic on the internet when the frame is sent.
{To receive full or partial credit, you MUST show all your work}

(2 pts.) b. Assuming all arriving packets to node **W** come ONLY from the Ethernet, what the maximum possible **utilization** of the outgoing link from node **W** to node **B**.

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