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?
1. Define network architecture.

2. Explain the role and issues envisioned in the OSI Reference Model for the Presentation Layer.

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

3b. How does packet switching differ from cell switching?
4. Explain the role of the **bind** system call as it would be used by a **TCP server** within socket programming.

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. Draw one diagram for **FDM** and one diagram for **TDM** and explain how they work and how they are different.
7.a What is ADSL?

7.b What does a ADSL modem do?

7.c Explain in detail how ADSL works.

8 What environmental issues affect the quality of wireless transmissions?

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.
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.

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

11b. What is a Web **proxy server**?

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.
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.