**IT 263 / NET 405**

**Homework #1**

Due Thursday, July 29th, 2021 at 11:59 PM CDT

100 points total

Type your answers to each of the following questions into a separate document and submit to the HW 1 Submission Folder on D2L. Your answer file must include your name in the file and must be in PDF format.

1. (5 points) I am installing a data cable between two office labs that are 80 meters apart. What is one advantage of installing a copper wire twisted-pair cable versus a fiber optic cable? What is one advantage of installing a fiber optic cable versus a copper wire twisted-pair cable?
2. (5 points) What is the data transmission time to send a 2 Gbyte file over a link with a 100 Mbps line rate? You can assume there is no overhead, so the throughput is equal to the line rate. Round your answer to the nearest 0.1 second and show your work.
3. (5 points) Explain what it means for a network to be scalable.
4. (5 points) Each numbered RFC document defines the rules of a network protocol. What is the title of RFC 8216 and what year was this RFC published?
5. (5 points) Each Well-Known Port number is associated with a standard network service application that can be offered on an Internet server. What is the name of the network application associated with TCP port 17?
6. (5 points) Describe two reasons that you would prefer to use a switched Ethernet compared to a shared Ethernet.
7. (5 points) What is the purpose of the ARP protocol?
8. (5 points) The IP address of my PC is 150.8.22.16 (in dotted decimal format). Write this out as a 32-bit binary value. Your answer should consist of 32 values, each of which is 0 or 1.
9. (5 points) The MAC address of my PC is 18-6B-2C-99-DD-7A (in hexadecimal format). Write this out as a 48-bit binary value. Your answer should consist of 48 values, each of which is 0 or 1.
10. (5 points) On an Ethernet switch, what is the difference between sending data packets in Store-and-Forward Mode compared with Cut-Through Mode?