Name: Sang Hwa Lee

This exam has five (5) short answer questions with each question is worth five (5) points. The exam is worth a total of twenty-five (25) points.

Exams are **individual work**. Permitted materials include *your* notes, the lecture slides, recorded lectures, and any assigned or optional readings. Internet searches are not a permitted resource.

*Table 1: Permitted Resources*

| |  |  |  |  |  |
|---|---|---|---|---|---|
| Exams |  |  |  |  |  |

Your submission will be collected via Turnitin on our course ELMS page. For information about Turnitin, how it works, and the feedback reports you may have access to, visit Turnitin Originality Checker for Students. The Turnitin report will show the report to you after you submit. **If TurnItIn identifies part of the instructions or submission template as potential plagiarism, you do not need to worry.** Common responses based on the material I have provided will sometimes be identified. A high score is not sufficient to raise concerns. I provide this report to you because my goal is to avoid any potential issues.

Honor Pledge

The University has a nationally recognized Honor Code, administered by the Student Honor Council. The Student Honor Council proposed and the University Senate approved an Honor Pledge. The University of Maryland Honor Pledge reads:

> *I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.*

**Please type the honor pledge in the space provided below.** Students who fail to write and sign the Pledge will be asked to confer with the instructor.
(https://studentconduct.umd.edu/you/students/honor-pledge)

> *I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination. _ Sang Hwa Lee*

Questions

1. Explain where we are most likely to connect to a network that has a logical bus topology and why the behavior of this type of network is important for users to be aware of.

Answer: We are most likely to connect to a network that has a logical bus topology where there are small networks, such as homes and small businesses. The behavior of this type of network includes hosts that are connected directly, and every host receives every message. Users should be aware of this behavior because if one of the computers stops working, the functionality of the entire network can be affected. (Module 6, Week 7-1, Slide 27)

2. Imagine that you have connected to a network, but you cannot connect to any websites. You check your network settings and find that your computer has the IP address 169.254.35.177. Explain what problem this IP address is a symptom off.

Answer: This IP address is a symptom of the DHCP client unable to get a lease. This leads to the IP address of 169.254.35.177, which is a private IP address that is non-routable. (Module 7, Week 8-2, Slide 20)

3. Work-from-home and hybrid work seems to be sticking around. Explain how company could provide its employees with a secure connection to the company network when they are working outside the office.

Answer: The company could provide a VPN connection. This connection would use a public network to create a private route, or a "tunnel," between hosts. It would be transparent to the application and allow the employees to virtually access the company's network as if they were physically connected to it. (Module 9, Week 10-1, Slide 31)

4. There are two main Transport Layer protocols: TCP and UDP. Which protocol is most likely to be used for real-time voice communications? Explain why.

Answer: The UDP protocol would most likely be used for real-time voice communications because it is simple, connectionless, and has low latency. Unlike TCP, it does not have the overhead of the TCP handshake. (Module 8, Week 9-1, Slides 13-14)

5. Explain what NAT is and what problem it solves. Make sure your response clearly explains the difference between public and private addresses.

Answer: NAT stands for "Network Address Translation." The NAT relays information by having a router map a private internal IP address to the router's public IP address. The private network would normally use a "non-routable" IP address that is only used internally, but the NAT maps this internal, private IP address to a public IP address so it can relay information out. Therefore, the NAT allows devices on private networks to access the Internet using public IP addresses. This may solve the problem of the limited number of public IP addresses that are available. (Module 7, Week 8-2, Slide 16)