United International **University** (**UIU**)

Dept. of Computer Science and Engineering (CSE)

MidTerm Assessment Year: **2024** Semester: **Spring**

Course: **CSE 323** Title: **Computer Networks (Section – All)**

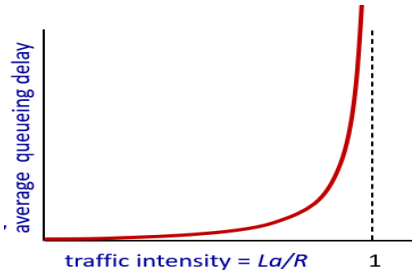
Marks: **30** Time: **1 Hour 30 minutes**

[Any examinee found adopting unfair means will be expelled from the trimester/program as per UIU disciplinary rules.]

There are **Three (03)** questions. Answer **all questions**. All questions are of values indicated on the right-hand margin.

Q1.

a) Consider the following graph and explain **Queuing delay** in terms of **Traffic Intensity.** **[2]**



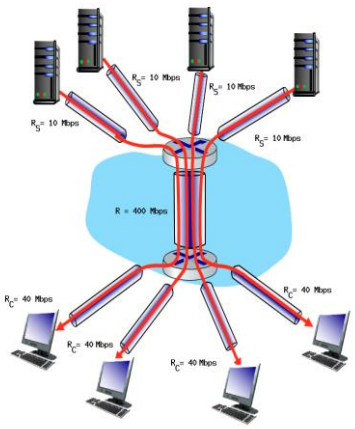
b) What are the two different **Switching technologies** used in a network? Explain the main differences among them along with their advantages & disadvantages. According to you, which one is more efficient? **[3]**

c) Consider the scenario shown below with four different servers connected to four different clients sharing a common middle link. Now answer the following questions: **[3]**

i. What is the maximum achievable end-end throughput (in Mbps) for each of four client-to-server pairs, assuming that the middle link is shared?

ii. Which link is the bottleneck link?

Assuming that the servers are sending at the maximum rate possible, what are the link utilizations for the client links (R_c)?



d) Suppose that a host wants to send 180 Bytes of data onto a twisted-pair copper wire. Find the **Transmission delay** and the **Propagation delay**, if the distance and the transmission rate are 400 km and 10Mbps, respectively. Also, calculate the total nodal delay. **[4]**

Q2.

a) What information is used by a process running on one host to identify a process running on another host? **[1]**

b) Suppose Mr. A, with a Web-based e-mail account (a10@hotmail.com), sends an email to Mr. B (b30@yahoo.com), who accesses her email using IMAP.

With a diagram explain how the email moves from A's host to B's host. Also, identify the application-layer protocols used to move the email between the two hosts. Note that you have to draw the diagram only. **[2]**

c) **Scenario 1:** The ISP requests a DNS query to the nearest available server, which in turn forwards it to its upper-level server.

Scenario 2: The ISP manually sends the queries to all the available servers.

Differentiate between the Scenarios. Which one will be better and why? **[3]**

d) Suppose a website contains 1 HTML file, 10 CSS files, and 5 Javascript files.

HTML	100 KB
CSS	30 KB
Javascript	50 KB

The RTT required for connection setup is **0.3s**. The bandwidth between the server and the client is **0.5 Gbps.** The distance between the client and the server is **5km**. Propagation speed is **200m/microsec.**

Now, calculate the **response time** required to retrieve the base files and images under the following conditions: **[3+3]**

i. Non-persistent HTTP without parallel connection

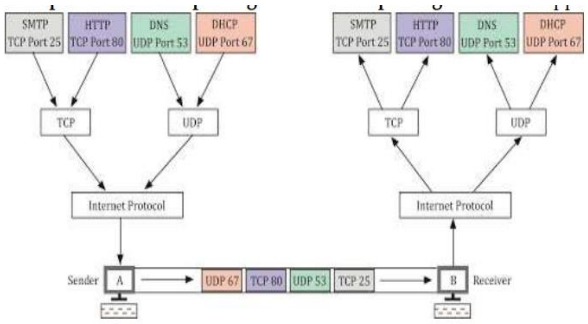
ii. Persistent HTTP without pipe-lining

Q3.

a) How does **layering architecture** simplify network operations? **[1]**

b) How do you differentiate between **TCP** and **UDP**? When would you use UDP for data communication and when would you use TCP instead? **[2]**

c) Identify and explain how **multiplexing** and **de-multiplexing** have been applied in the following scenario. **[3]**



End of Paper – Thank You