United International **University** (**UIU**)
Dept. of Computer Science and Engineering (CSE)
MidTerm Assessment Year: **2023** Semester: **Fall**
Course: **CSE 3711** Title: **Computer Networks (Section – All)**
Marks: **30** Time: **1 Hour 45 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.

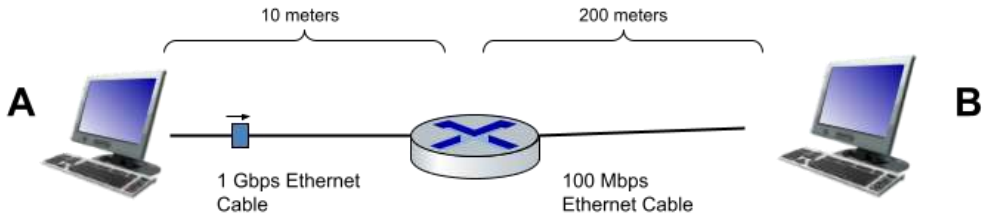
a) What is packet switching? Write down two advantages that packet switching provides over circuit switching. **[1+2 = 3]**

b) What is an access ISP? Write down the difference between access ISPs and global ISPs **[1+1 = 2]**

c) List the five protocol layers of the TCP/IP model. Write down two reasons for using protocol **layering** in TCP/IP? **[2 + 2 = 4]**

d) Consider the following diagram, where a packet of size 2 kilobytes is being sent over the network from PC A to PC B:

I. The connections are made using Ethernet cables, where the signal is transmitted at a speed of $2 \times 10^8\ m/s$. The router takes 2 milliseconds to process each packet and



there is no queueing delay in the router.

II. Now calculate the total delay for the data to reach from PC A to PC B. Also calculate the average end-to-end throughput. **[3+1 = 4]**

Q2.

a) Briefly describe the Client-Server architecture and Peer-to-Peer (P2P) architecture with necessary figures. Also, mention the difference between these architectures. **[2+1 = 3]**

b) **Scenario 1:** Suppose you are visiting a website with several images on a single webpage. Each image requires a separate HTTP request.
Scenario 2: You visit a modern website, and many resources are loaded from the same server, such as images, stylesheets, and JavaScript files using only one request.

Differentiate between the Scenarios.
Suppose that the website in scenario 1 contains **25** embedded image objects and a base HTML file. The base file size is **5kB** and the size of each image is **25kB.** The TCP segment size is **200KB.** Now, calculate how many RTTs are required to retrieve the base files and images under the following conditions:

I. Non-persistent connection without multithreading

II. Non-persistent connection with 5 threads

III. Persistent connection without pipelining

IV. Persistent connection with pipelining **[2+3 = 5]**

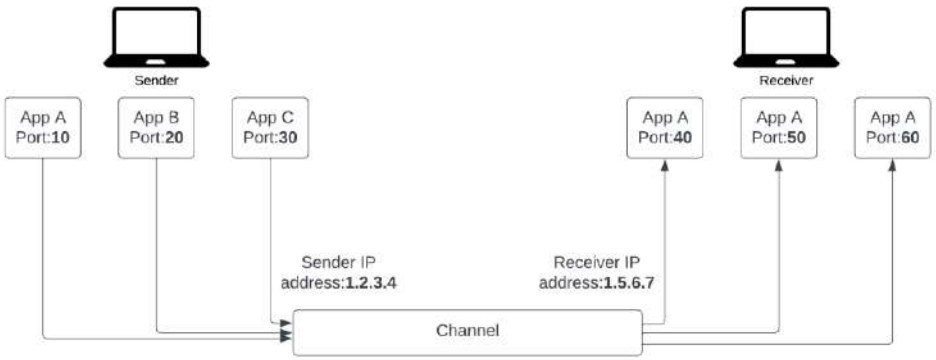
c) Shakib visits Daraz(daraz.com) on Monday to avail the 11.11 offers and searches for his favorite perfumes. After logging into Daraz two days later, he is shown perfumes of various brands on the homepage. Describe how Daraz tracks Shakib's choice with proper diagrams and explanation. **[2]**

d) How does the iterated query approach resolve the IP address of 'shop.google.com' (host IP: 172.217.4.46) when the authoritative DNS server for 'google.com' is 'ns1.google.com' (IP: 8.8.8.8)?
Will the recursive approach be better? Provide valid reasoning for your answer.
[2+1 = 3]

Q3.

a) What is the one key factor that makes UDP faster than TCP? Which protocol is more suitable for email communication, TCP or UDP? [**1]**

b) Consider the following figure of two end devices communicating through some applications:
[1+2 = 3]



I. What information is used by the **App A process** running on **sender** device to identify the **App A process** running on **receiver** device? Mention the exact values.

II. Identify and explain how **Multiplexing & Demultiplexing** have been applied in the above figure.

End of Paper – Thank You