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

Dept. of Computer Science and Engineering (CSE)

Mid Term Assessment Year: **2022** Semester: **Fall**

Course: **CSE 323** 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 **3 (Three)** questions. Answer **all 03 questions**. All questions are of values indicated on the right-hand margin.

Q1.

a) How **layering architecture** simplifies network operations? With the aid of diagrams, compare the **OSI** and **TCP/IP** layered models. Diagrams should show all the layers' functions and an example of TCP/IP protocol suite for each layer. **[3]**

b) For the **TCP/IP layered architecture**, answer the following questions: **[0.5x6=3]**

i. What are the two key network core functions?
ii. What are the differences between TCP and UDP?
iii. What is the difference between circuit-switching and packet-switching technologies?
iv. Every entity in a TCP/IP system requires two level of addressing. What are they?
v. Write two differences between **IPv4** and **IPv6**.
vi. What is **FTTH**? In which access network it is used and how?

c) Suppose a host wants to send a packet of length **2 Kb** onto an optical fiber link of distance **2,000 km**, propagation speed **2.5 x 10^8 m/s**, and transmission rate **2 Mbps**. Calculate the propagation delay, transmission delay and the total nodal delay. **[4]**

d) How do you describe **throughput**? Suppose that a server sends bits into two pipes at different rates (in bits/sec). What would be the average end-end throughputs? Also, find the transmission rate of the bottleneck link (Note: Make assumptions, where applicable). **[2]**

Q.2

a) Suppose you are looking up the Website of Whiting School of Computing at John's Hopkins University. Their URL is https://cs.jhu.edu/. Describe the **Iterative process** of **Domain Name Lookup**. Assume that you have looked up https://cc.gatech.edu/ before. **[4]**

b) How do you differentiate between **Application's architecture** and **the Network architecture?** What are the two predominant **architectural paradigms** that are used in modern network applications? Describe them briefly with proper example. **[2]**

c) Suppose a webpage has a **base HTML file**, **2 CSS files**, and **5 images**. The **bandwidth** between the client and server is 0.5 GBps. The size of each type of file is given below.

Type	**Size**
HTML	100 KB
CSS	150 KB
Image	2 MB

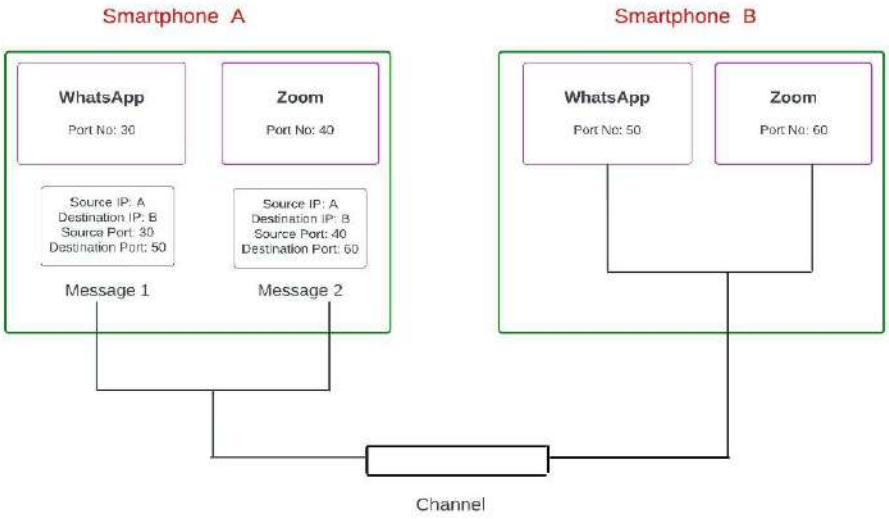
The **RTT** for connection setup is 0.1ms. Find the total time required for this webpage to load if we use

i. HTTP 1.0
ii. HTTP 1.1.
iii. Are any further improvements possible in the case of HTTP 1.1? **[2+2+2=6]**

Q.3

a) Suppose you are making a new **Network Application** that will be used for "Live Streaming Games". According to you, which **Transport layer protocol** will be a better choice and why? **[2]**

b) Consider the following figure of one smartphone communicating with another through some applications.



Answer the following questions: **[1+2+1 = 4]**

i. What **information's** will be used by the WhatsApp process running in Smartphone A to identify the WhatsApp process running in Smartphone B for sending packets?
ii. Identify & Explain how **Multiplexing** & **Demultiplexing** have been applied in the above figure.
iii. Show the **TCP/UDP segment format** of Message-1 by only using the above given information.

←End of Paper – Thank You→