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

Dept. of Computer Science and Engineering (CSE)

MidTerm Assessment Year: **2021** Semester: **Fall**

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

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? Specify **3 distinct advantages**. **[3]**

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

9

i. What are the functions of Network Layer?
ii. What are the differences between TCP and UDP?
iii. What are the functions of Data Link Layer?
iv. What are the port numbers of HTTP and SMTP?
v. At which Layer does CRC work?
vi. Every entity in a TCP/IP system requires two level of addressing. What are they?

c) What are the **two technologies** used in the **Network Core**? Describe each one with proper **example, advantages** and **disadvantages**. **[3]**

d) **How long** does it take a packet of length **1,000 bytes** to **propagate** over a link of distance **2,500 km**, propagation speed **2.5 x 10^8 m/s**, and transmission rate **2 Mbps**? Does this delay depend on **packet length**? Does this delay depend on **transmission rate**? **[2+0.5+0.5 = 3]**

e) Suppose a host wants to send 2 Kb packet onto an optical fiber link of distance **1,000 km** with transmission rate **1 Mbps.** Calculate the total nodal delay. **[3]**

Q.2

a) What are the two predominant architectural paradigms that are used in modern network applications? Describe them briefly with proper example. **[2]**

b) How can you classify the transport-layer protocol that can be offered to applications? **[1]**

c) A browser contains a file "**abcd.html**" in its cache memory and sends a "**conditional get**" request to the server. Suppose, If-modified-since: header is exactly equal to Last-Modified: header line. What code the web server sends as a response message to the cache? Should the server explicitly return the contents of the file? **How** can you tell? **[2]**

d) How do you differentiate between persistent and non-persistent connections? Suppose a web page **http://uiu.ac.bd/cse/home.index** consists of a base HTML file and 5 JPEG images reside on the same UIU server. Answer to the following questions: **[3+0.5+0.5+1 = 5]**

i. Show the steps of transferring the web page to client for the non-persistent connection.
ii. How many non- persistent TCP connections are to be generated?
iii. How many persistent TCP connections require for the same website?
iv. For a back-of-the-envelope calculation, what is the estimated amount of time needed to request and receive the HTML file?

Q.3 Suppose the following messages are exchanged between an SMTP client and an SMTP server. **[5]**

```
220 uiu.edu
HELO mit.edu
250 Hello mit.edu, pleased to meet you
MAIL FROM: <alice@mit.edu >
250 alice@mit.edu ... Sender ok
RCPT TO: <bob@uiu.edu>
250 bob@uiu.edu ... Recipient ok
DATA
354 Enter mail, end with "." on a line by itself
Do you like to attend ICBBDB 2021 Int'l Conference on December 30, 2021?
How about joining Inauguration Ceremony via Zoom?
.
250 Message accepted for delivery
QUIT
221 uiu.edu closing connection
```

Answer questions from i to v:

i. How many commands are issued by the client and what are they?
ii. How many replies are made by the server?
iii. What type of connection is made by SMTP, persistent or non-persistent?
iv. Which protocol and port number are recommended to carry out a direct dialogue with an SMTP server?
v. After simply establishing a TCP connection between your local host and the mail server what reply one should receive from the server?

←End of Paper – Thank You→