# B

**BRAC UNIVERSITY**
**Department of Computer Science and Engineering**

Examination : Semester Midterm                                      Semester: Spring 2022
Duration: 1 Hour 20 Minutes                                              Full Marks: 55

## CSE421 / EEE465 : Computer Networks

Answer all the following **3** questions. (**Pages: 2**)
Figures in the right margin indicate marks.

**Name:**                                        **ID:**                              **Section:**

| | |
|---|---|
| **Question 1.** **CO1** | **a)** When you write "**www.facebook.com**" in your web browser, the first request goes from your computer to your local DNS server. Draw or list the steps of queries and responses if it is an iterative DNS process. What will be the type of RR that the Local DNS server receives at the end of the process? |

**4 + 1**

**b)** Suppose there are **3 clients** downloading a file in a P2P architecture. The upload speed of the clients are **10Mbps**, **5000Kbps** and **2Mbps** respectively. There is also an origin server whose upload speed is **500Mbps**. What would be the maximum upload speed of the file if the mode is **(i)** P2P and **(ii)** Client-Server?

**3 + 2**

**c)** You want to stream the latest episode of your favorite series from Hooloo streaming service. The company is situated in the USA. Despite living in Bangladesh, you do not face any delays while streaming the whole episode. Explain how this is possible.

**5**

| | |
|---|---|
| **Question 2.** **CO2** | **a)** Bob uses Microsoft Outlook to open his email account and has sent Charlie an email. Charlie receives the email in his office PC, but did not find the time to read it. He finally read the email from his home laptop. **Choose** the correct protocol/s involved between |

   **I.**     Bob's PC and Bob's Email Server
  **II.**     Bob's Email server and Charlie's email server
 **III.**    Charlie's email server and Charlie's PC.(state in one line why this protocol was used)

**2 + 1 + 2**

**b)** How will a proxy server know if it should send the copy of a web page requested it already has or if it should fetch new information from the origin server? Does this verification create congestion in the network?

**3 + 2**

*Please turn over the page*

**c)** Given, you want to visit **"welcomebacktophysicalexams.com"**. Your network has a local DNS server and is using a recursive lookup to fetch IP addresses and RTT of **29ms**. Others in your network have already visited the above website a few hours before your visit.

**2 + 4 + 4**

After fetching the IP address, your PC sends a **non-persistent** HTTP request of size **109 bytes** to bring **13 objects** of size **31 bytes** each. In this particular connection, it requires the PC **67ms** to send the TCP request to the server.

    I.     What is the total RTT **in ms** in the DNS lookup?
    II.    What is the total RTT **in ms** required (including DNS) to bring the full object to your PC?
    III.   What is the total file transmission time **in ms** after fetching the IP address?

**Question 3.**
**CO3**

**a)** You have opened multiple tabs in your Chrome web browser. You are searching recipes for chocolate cake on different websites. What will be the type of source port number and destination port number? Will the tabs have the same port number, as they are of the same application?

**2 + 3**

**b)** How are the checksum value and acknowledgement segments used to provide reliability in TCP?

**5**

**c)** Client A and Server B are communicating over a TCP connection. Client A started the three way handshake with the initial sequence number of **3205**. Server B's initial sequence number is **220**. The window size of Client A is **496 bytes** and the window size of Server B is **280 bytes**. Client A sends the HTTP GET request of the size **120 bytes** within the third step of the TCP 3 way handshake (the ACK segment from the client). Server B answers with 2 segments containing the requested data. The first segment size is **75 bytes** and the second segment size is **45 bytes** respectively.

**6 + 4**

Client A receives only the first segment within the timer. Unfortunately, the second segment did not reach Client A. So Client A sends an acknowledgement segment. Assume that Client A uses Selective Repeat protocol.

    I.     What is the sequence number and acknowledgement number of the HTTP GET request segment from Client A?
    II.    What will be the window size of the second acknowledgement segment sent by Client A?

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**END OF QUESTION PAPER**