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BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Midterm | Semester: Fall 2024
Duration: **1 Hour 10 Minutes** | Full Marks: **45**

CSE421 / EEE465 : Computer Networks

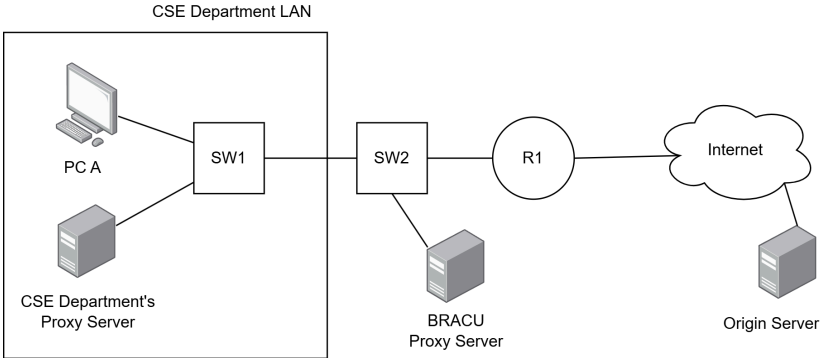
Answer **ALL** questions. (**Pages: 2**)

Figures in the right margin indicate marks.

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

Q1 **[CO1]**	**Identify** which layer of the **TCP/IP model** is responsible for the functionalities of the following scenarios: **I.** Email application is encrypting the username and password. **II.** Two devices need clock synchronization before signal transmission over medium **III.** A device drops corrupted data received from its neighbor node	**3**
Q2 **[CO2]**	When a user visits the www.news.com website using Google Chrome, the user accepts cookies. A few days later, the user goes to the same website using Internet Explorer but notices that the news website is not showing any personalized content. **Explain** why.	**5**
Q3 **[CO2]**	Bob sends an email using a secure web-based email service, and Alice reads it using an email client like Outlook. At the start, none of the devices or servers know the IP addresses of the mail servers. **Draw a diagram to show** all the transport and application layer protocols used during the whole sending and receiving process.	**5**
Q4 **[CO2]**	You have started a new startup and hosted your webpage www.gamingforall.com at server 200.10.20.8. Now, people need to know your authoritative DNS server information to get the IP address of the web page's server. **Write** the resource records that must be registered in the DNS server to reach your local authoritative DNS server and the webpage. Remember to mention the type of record.	**5**
Q5 **[CO2]**	Suppose you are watching the FIFA World Cup via **live streaming**. The server hosting the service received several requests from the Internet, which had the same source port number, **60001**. **State** the **name** of the Transport layer protocol used, the **type** of port number, and **how** the server can differentiate all of these requests.	**2** + **3**
Q6 **[CO3]** **[CO3]**	Ruha has requested a webpage using a **non-persistent HTTP** connection. The webpage has **34 objects, excluding the base HTML** file, and each object is **4 MB.** It takes **35 ms** to send **a TCP request** from her device to the server and come back. Also, the **HTTP request and response** for each object **is 30 ms**. The server has a speed of **64 Mbps**. **I.** **Calculate the total RTT** required in ms for all objects**.** **II.** **Calculate** the **total file transmission time** in ms for all webpage objects.	**3** + **3**

Q7 Each department of Brac University has dedicated proxy servers. If content is not found in the department's proxy server, it is searched into Brac University's central proxy server and then to the origin server. The department's proxy server can handle **40% of** the requests, and the remaining **60%** of the requests are **equally divided and resolved** by the BRACU Proxy and the Origin servers. Given that the CSE Department network's LAN delay is **15 ms**, the BRACU network's LAN delay is **30 ms**, the access delay for the origin server is **100 ms,** and the internet delay is **200 ms**. **4 + 2**

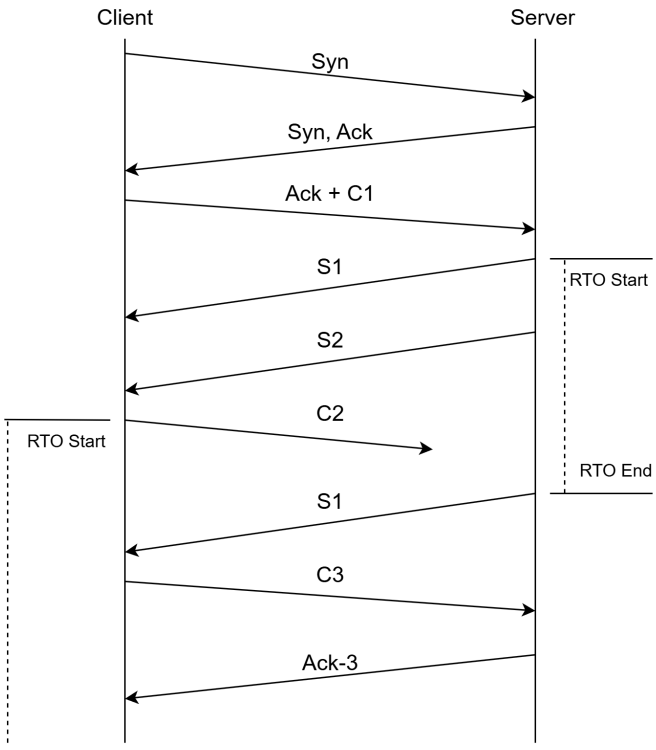


[CO3] **I.** **Calculate** the **average response time** for a webpage.

[CO3] **II.** A device from the **EEE** department of Brac University, has just visited the webpage xyz.com. **Identify** the **exact response time** for PCA if it wants to visit the webpage xyz.com.

Q8 While transferring data, the ISN of the client is **1910,** and the ISN of the server is **1532**. The data size of the segments are given as shown in bytes:
C1= 421, C2=320, C3=111, S1=260, and **S2=220.**

Initially, the rwnd of the client is **6000** bytes, the rwnd of the server is **12000** bytes, and they are using **selective repeat** protocol to send data. **4 + 4 + 2**



[CO2] **I.** **Explain** why the server is resending segment S1 and what the client will do with segment S1.

[CO3] **I.** **Calculate** the **sequence** and **acknowledgment numbers** of the **C2** segment.

[CO3] **II.** **Calculate** the **rwnd** of the server after receiving the **C3** segment from the client.

==========THE END==========