B

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

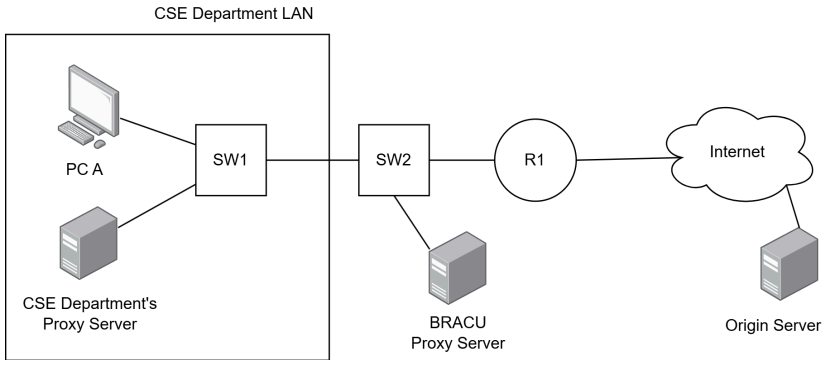
Answer **ALL** questions. (**Pages: 2**)

Figures in the right margin indicate marks.

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

Q1 **[CO1]**	**Identify** which layer of the **OSI model** is responsible for the functionalities of the following scenarios: **I.** A device is sending an image, but the image is transmitted as encoded bytes **II.** A process drops data because it is corrupted **III.** A device searches for a path to send data to a destination	**3**
Q2 **[CO2]**	You browse an online clothing store and add a few items to your cart. A few days later, while scrolling through a social media platform, you notice advertisements for the items you viewed earlier on the clothing store's website. **Explain** how the Social Media Platform knew about your choices.	**5**
Q3 **[CO2]**	Bob uses an e-mail client (a mail reader) such as Outlook to send an e-mail to Alice, who uses a secure Web-based e-mail account. The IP addresses of all mail servers are initially unknown to all the devices/servers. **Draw a diagram to show** all the transport and application layer protocols used during the sending and receiving process.	**5**
Q4 **[CO2]**	You have started a new startup and hosted your webpage www.gamingforall.com at server 200.10.20.7. Now, people may also email to your mail server. **Write** the resource records that must be registered in the DNS server to reach your mail server and webpage. Remember to mention the type of record.	**5**
Q5 **[CO2]**	Suppose you are visiting **bracu.ac.bd** from two browser tabs. These two requests reach the BRACU web server. **Explain how** the server differentiates these requests to reply and **state** the destination port of these replies.	**3** + **2**
Q6 **[CO3]** **[CO3]**	Asif has requested a webpage using a **persistent HTTP** connection. The webpage has **18 objects, including** the base HTML file, each object **12 MB** in size. Her device takes **12ms** to send a TCP request to the server. HTTP request and response time for an object is **15 ms**. The server has a speed of **42 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**

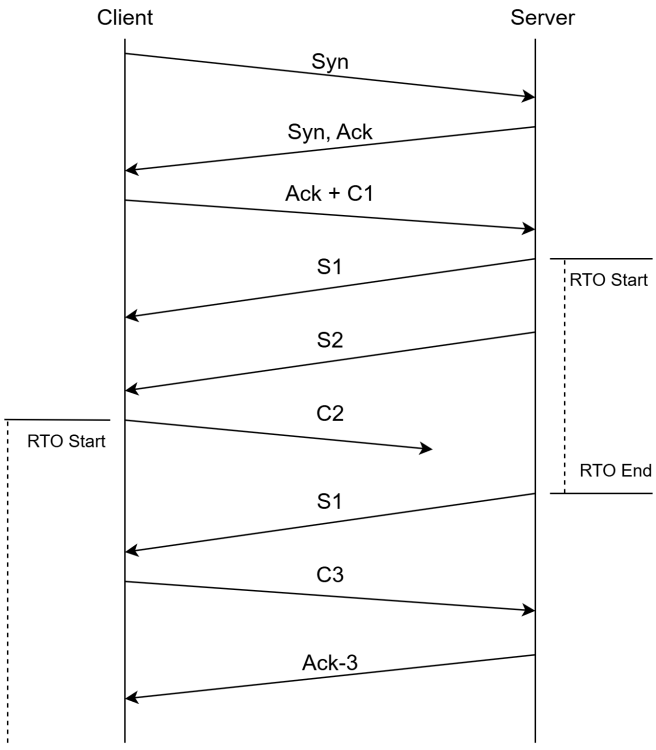
Q7 Each department of BRAC University has dedicated proxy servers. If content is not found in the department's proxy server, it is searched into Brac University's central proxy server and then to the origin server. The department's proxy server can handle **50% of all** requests. The remaining **50%** of the requests are divided **equally and resolved** by the BRACU Proxy and Origin servers. Given that the CSE Department network's LAN delay is **35 ms**, the BRACU network's LAN delay is **50 ms**, the access delay for the origin server is **200 ms,** and the internet delay is **300 ms**. **4 + 2**



[CO3] **I.** **Calculate** the **average response time** of a request from the CSE Department for a web page.

[CO3] **II.** A device from the **CSE** department has just visited the webpage xyz.com. **Identify** the **exact response time** for PC A if it wants to see the webpage xyz.com.

Q8 While transferring data, the ISN of the client is **1455,** and the ISN of the server is **2010**. Initially, the rwnd of the client is **8000** bytes, the rwnd of the server is **10000** bytes, and they are using **go-back-n** protocol to send data. The data size of the segments are given as shown in bytes:
C1= 320, C2=111, C3=260, S1=220, and **S2=421.** **4 + 4 + 2**



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

[CO3] **II.** **Calculate** the **sequence** and **acknowledgment numbers** of the **C3** segment.

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

==========**THE END**==========