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BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Midterm | Semester: Summer 2025
Duration: **1 Hour 10 Minutes** | Full Marks: **45**

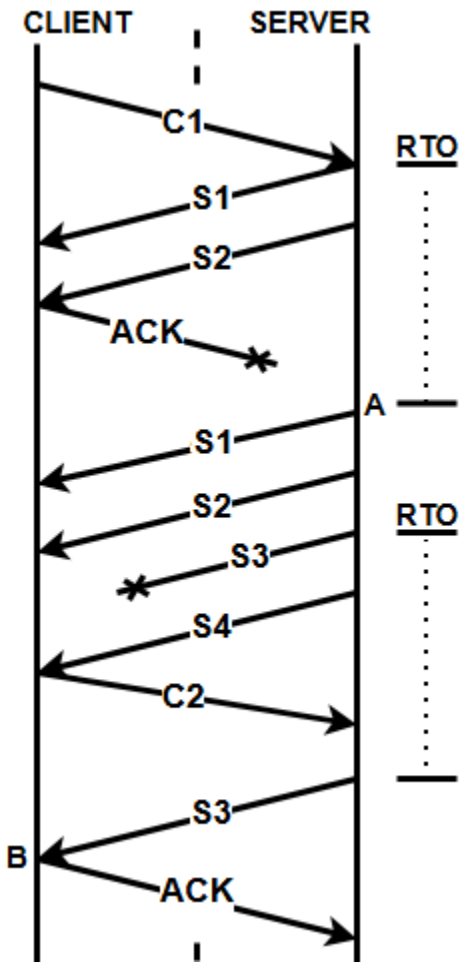
CSE421 / EEE465 : Computer Networks

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

Figures in the right margin indicate marks.

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

Q1 [CO1]	**Identify** the OSI model layers involved when: **I.** The data stream is split into smaller pieces (segments), and each piece is given a number for correct ordering. **II.** A user opens a browser and types a website address to request a page. **III.** The message is changed into a common format so different systems can understand it. **IV.** The frame is converted into electrical or radio signals and sent over the wire or air.	**4**
Q2 [CO2]	A developer wants to check if a webpage is available and working, but does not want to download the full page every time. **I.** **Mention** which HTTP method the developer should use for this purpose. **II.** **Specify** how the server can let the browser know that the page does not exist.	**2 + 2**
Q3 [CO2]	Sloth Bank wants to make online banking easy for its lazy customers. After a customer signs up and logs in with their password, the system ensures that future visits don't require the customer to re-enter their password. Instead, the website automatically recognizes and logs them in. **I.** **Identify** how this might be implemented. **II.** Do you think this approach is secure? **Explain** why or why not?	**3 + 3**
Q4 [CO2]	Your company's website, www.mycompany.com, is hosted on a server with IP address 192.0.2.50. You updated the DNS record on your authoritative DNS server to point to a new IP address: 203.0.113.75. The record's TTL (Time to Live) is set to 3600 seconds. **I.** **Mention** the type of DNS record you updated for www.mycompany.com. **II.** **Explain** why some users might still reach the old IP address even after the update, even though your authoritative DNS server has the correct new IP.	**3 + 3**
Q5 [CO2]	The university web server and a custom research server operate on ports 80 and 30500, respectively. Student computers use ports in the range 49152–65535 for outgoing internet access. **Explain** in brief the following: **I.** Is it appropriate for student devices to use ports in the 49152–65535 range for outgoing connections? **II.** Is using port 30500 for a long-running research service that will be accessed by many students appropriate?	**3 + 3**

Q6 [CO3]	A browser needs to load an HTML page that includes references to the following resources using a **persistent HTTP** connection *(The network link has a bandwidth of T)*: • Base HTML file, taking **123 ms** to download • 3 embedded images, each taking **520 ms** to download • 5 Java applets, each taking **333 ms** to download Each of the three control packets, such as **SYN packet, SYN-ACK packet, ACK-HTTP request packet,** incurs a one-way delay of **48 ms**. In contrast, an HTTP Response experiences a one-way delay of **64 ms**. All transfers occur at a constant rate, with no use of parallel TCP connections or HTTP pipelining. **I.** Calculate the **total round-trip time** for loading the HTML Page. **II.** Compute the **total time required** to fetch the HTML page. **III.** State, mathematically, how the total time in **(II)** changes if the **link bandwidth T is doubled.**	**3 + 3 + 3**
Q7 [CO3]	In a **selective repeat** TCP connection, the client and server have the following values and flow: ISN of Client = **6729**, RWND of Client = **3200**; ISN of Server = **6214**, RWND of Server = **8000** The data size of the segments is given as shown in bytes: C1=**1421**, C2=**1320**, S1=**?**, S2=**443**, S3=**122** and S4=**220** **I.** If the **sequence** number of the **second S2** segment is **7000**, calculate the data size of **S1**. **II.** Calculate the **sequence** and the **acknowledgement** number of segment **C2**. **III.** Calculate the rwnd of the client at **point B**. 	**3 + 4 + 3**

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