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BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Midterm
Duration: **1 Hour 10 Minutes**

Semester: Summer 2024
Full Marks: **45**

CSE421 / EEE465 : Computer Networks
Answer **ALL** questions. (**Pages: 2**)
Figures in the right margin indicate marks.

Name:		ID:	Section:

Q1 **[CO1]**	**State** why layers 7, 6 and 5 of the OSI model were combined into one layer in the TCP/IP model.	**3**
Q2 **[CO2]**	You visited the Batabd website on Thursday for the first time and added some items to your cart. On Friday, you revisited the site. This time, you saw that the items are kept in your cart even though you don't have a Batabd account. **Determine** how the Batabd website understood on Thursday that you had never visited the webpage before. **Explain** what had changed in Friday's request, allowing you to have the items in your cart.	**5**
Q3 **[CO2]**	Your PC's DNS resolver is trying to resolve 'www.gate.google.bd' to an IP address. Assume that the local DNS server has no cached records associated with the URL and that a recursive query mechanism is used in the resolution. **Using a diagram, show** the number of DNS query-response pairs involved in completely resolving the domain name for the local DNS server. Remember to show the sequence.	**5**
Q4 **[CO2]**	Unlike IMAP, POP3 does not allow users to synchronize their mailboxes across multiple devices. Is there any scenario where POP3 can be more useful than IMAP? **Explain** your answer.	**5**
Q5 **[CO2]**	Dipu has requested the webpage 'www.421mid.com' in two different tabs of his browser. He discovered that these two tabs' source port addresses are 49650 and 49655, respectively. **Identify** why these ports differ when the source device is the same. Also **mention** the destination port number and type.	**5**
Q6 **[CO2]**	The client and server require the FIN control bit to terminate a TCP connection. In which case does the server not send the FIN bit in response to a connection termination request from the client? **Describe** in brief.	**5**

Q7	Sabbir has requested a webpage using a non-persistent HTTP connection. The webpage has X objects in total, each 1.5 Mb. His device waits 7 ms before sending any HTTP request (Consider this a separate waiting delay). It takes 34 ms for a small packet to go to the server from his device and return. The server has a speed of 60 Mbps.	4 + 3
[CO3]	I. If it takes 1.184 seconds to load the webpage excluding total RTT, **calculate** the number of objects.	
[CO3]	II. **Calculate** the total RTT (in seconds).	

Q8	At a given moment, the server has sent the S1 segment with the sequence number 8742 and the acknowledgment number 4531. The rwnd of the client is 12000 bytes, and the rwnd of the server is 14000 bytes before the S1 segment is transmitted. The Client and the Server are using the Go-Back-N protocol to send data. The size of the segments C1, S1, S2, and S3 are 191, 532, 320 and 160 bytes respectively.	4 + 4 + 2
[CO3]	I. **Find** the sequence number and the acknowledgment number of the Fin segment	
[CO3]	II. **Calculate** the sequence number and the acknowledgment number of the Ack segment sent by the client	
[CO3]	III. **Calculate** the rwnd of the server after receiving the Ack segment from the client.	

Client   Server

S1
C1 → X
S2
X ←
C1
S3
Fin
S2
Ack