B

BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Midterm

Semester: Summer 2024

Duration: **1 Hour 10 Minutes**

Full Marks: **45**

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

Name:	ID:	Section:

Q1 [CO1]	**State** why should all manufacturers of networking products follow standards.	**3**
Q2 [CO2]	You are simultaneously going to two websites for research purposes. Comparing the two websites, you find that the loading times vary a lot. Upon further inspection, you will see that the first website, which loads slowly, uses HTTP/1.1, and the second website, which is faster, uses HTTP/2.0. **Determine** the cause/s of this difference.	**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 a resource record cached for the TLD server and that an iterated 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]	IMAP allows the email to be partially downloaded. In which scenario/s is this helpful? **Justify** your answer.	**5**
Q5 [CO2]	Dipu is designing an application that needs to send real-time sensor data from IoT devices to a central server, where correct data transmission is the main priority. **Identify** which transport layer protocol will be suitable for him and why.	**5**
Q6 [CO2]	In which scenario does a sender retransmit a previous data segment before the RTO timer runs out? **Explain** in short.	**5**

Q7	Sabbir has requested a webpage using a persistent HTTP connection. The webpage has 24 objects in total. His device waits 5 ms after getting an HTTP response to send the next HTTP request (Consider this a separate waiting delay). It takes 27 ms for a small packet to go to the server from his device. The server has a speed of 25 Mbps.	3 + 4
[CO3] [CO3]	I. **Calculate** the total RTT (in seconds).	
	II. If it takes 4.345 seconds for the entire webpage to load on his device, **calculate** the size of each object.	

Q8	At a given moment, the server has sent the S1 segment with the sequence number 1910 and the acknowledgment number 1532. The rwnd of the client is 7000 bytes, and the rwnd of the server is 9000 bytes before the S1 segment is transmitted. The Client and the Server are using selective repeat protocol to send data. The size of the segments C1, S1, S2 and S3 are 144, 232, 365, 421 bytes respectively.	4 + 4 + 4 + 2
[CO3]	I. **Find** the sequence number and the acknowledgment number of the S3 segment	
[CO3]	II. **Calculate** the sequence number and the acknowledgment number of the Fin segment sent by the client	
[CO3]	III. **Calculate** the rwnd of the client while sending the Fin segment. Note that, the client was able to process the S1 segment and sent it to the application.	

Client ... Server

S1
C1 → X
S2
X ←
C1
S3
Fin
S2
Ack