B

BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination : Semester Midterm | Semester: Summer 2023
Duration: 1 Hour 30 Minutes | Full Marks: 60

CSE421 / EEE465 : Computer Networks

Answer **ALL** the following **3** questions. (**Pages: 2**)
Figures in the right margin indicate marks.

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

Q.1 a) [CO1] Protocols are technologically independent. **Discuss** briefly what it means. **4**

b) [CO2] Suppose Alice, with a web-based email account (such as Hotmail or Gmail), sends a message to Bob, who accesses his mail from his iPhone. **Describe**, briefly, how the message gets from Alice's PC to Bob's iPhone. Be sure to list the series of application-layer protocols that are used to move the email message between the two hosts. **4**

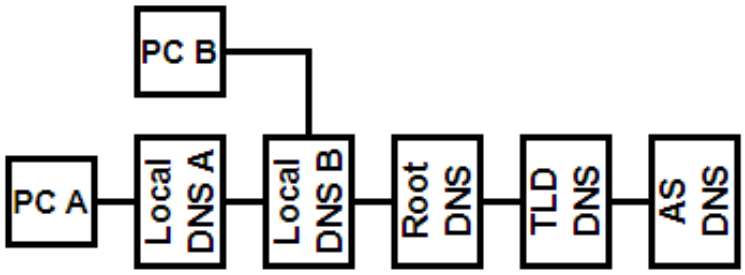
c) [CO2] You write the URL ***www.games.com*** in your web browser. **List** the first five steps that will occur in terms of DNS processing. (Do not forget the caches) **5**

d) [CO2] **Explain** how DNS helps in allocation of appropriately located resource servers to the user using CDN. **7**

Q.2 a) [CO2] You visit ***ebuy.com*** to buy some decorative papers using Chrome. You do not register, but you do choose some items and put them in the shopping cart, but due to some reason you do not buy them that day. A few days later, you visit the same site, and you find that the shopping cart still contains your items. **Recall** how it is possible. **5**

b) [CO2] **Explain** how does HTTP/2 attempt to solve the problem of HOL (Head of Line) blocking in HTTP/1.1 **5**

c) From the below figure, PC-B visits abedu.ac.bd on 13th July at 5:30 AM and gets an RR of (abedu.ac.bd, 172.69.99.13,A,12) where the TTL is given in hours. On the next day, PC-A later visits the same website. Given, each DNS lookup requires 45ms. **3 + 4 + 3**



[CO3] **I.** **Calculate** the total RTT (in ms) to fetch the IP address for PC-A.

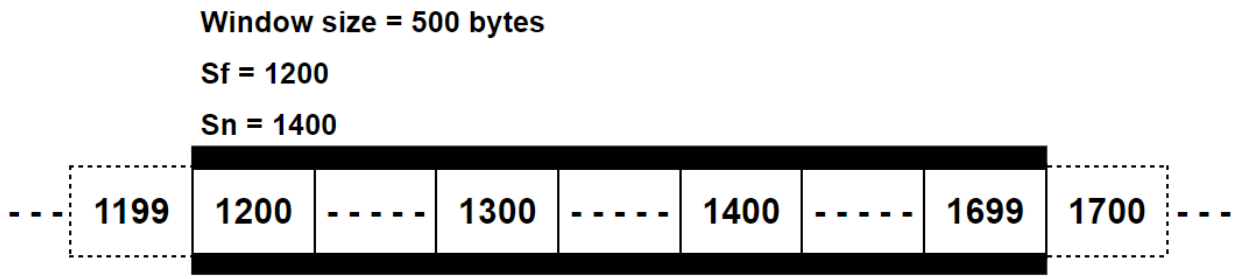
Upon receiving the IP address, PC-A with high download speed opens a non-persistent connection with the web-server. It takes PC-A 79ms to send a packet while the server requires 60ms to send the packet to PC-A. Also given, the website has a total of 23 objects including the base html file, each requiring 139ms to load.

[CO3] **II.** **Calculate** the total RTT (in ms) for the client to receive all the objects after fetching the IP address.

[CO3] **III.** **Calculate** the total time (in ms) required to view the whole page from the point of requesting the website on your browser.

Q.3. a) [CO2] UDP does not contain certain fields in its header when compared to a TCP header. **State** why those fields were omitted and for which applications. **3 +2**

b) [CO3] **3 + 2**



Refer to the above figure, which represents the window of a sender host PC-A. Few seconds later, PC-A receives an acknowledgement segment, from PC-B, with the acknowledgement number of **1300** and the **RWND** of **500 bytes**. After receiving this acknowledgement segment, **identify** the variables Sf and Sn, and start and end byte number of RWND(window) of the sender PC-A.

c) **3 + 2 + 3 + 2**

After requesting certain data segments, the Client sends the FIN segment with the sequence and acknowledgement number of **5546** and **2231** respectively with the FIN flag on.

[CO3] **I.** **Determine** the sequence and acknowledgement number of the first ACK segment that the Server sends as shown in the figure.

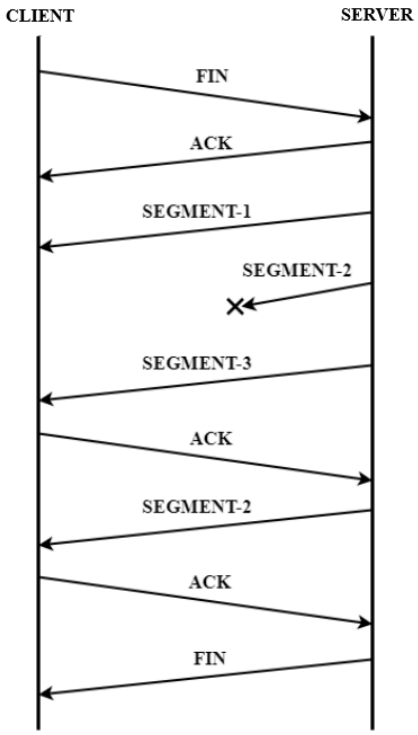
The server sends 3 data segments carrying **332**, **223** and **232** bytes respectively. The 2nd segment gets lost in transmission.

[CO3] **II.** **Determine** the acknowledgement number of the first ACK segment sent by the client, as shown in the figure.

The lost segment is retransmitted using the selective-repeat method.

[CO3] **III.** **Determine** the acknowledgement number of the 2nd ACK segment sent by the client.

[CO2] **IV.** **Name** the type of TCP connection termination being used here.



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