

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	Bob visits a website and inputs his username and password to log-in. He is able to successfully log in. Below is the list of steps that the server took to receive the login request from Bob. Re-arrange them in the correct order of the OSI model. <i>Writing the serial numbers in the correct order is enough for the answer.</i> <ol style="list-style-type: none"> 1. The server checks if the request came to the correct hop 2. The server receives the packet on the Ethernet port. 3. The server decompresses the credentials 4. The server identifies the application to send the credentials 5. The server creates a session with Bob 6. The server checks if the request came to the correct server 7. The server matches the credentials with its database 	5
	b) Suppose there are 3 peers in a swarm, who are exchanging a file of size 256 MB among them. The file is divided into 8 chunks. What should be the minimum requirements that must be fulfilled by the other 3 peers if a 4th client joins the swarm to download the file? Define “optimistic unchoking” in one sentence.	3 + 2
	c) Given, the access link and LAN link speeds are 123 mbps and 1023 mbps respectively . Also, the server is capable of uploading 40 objects per second of 4 bytes each. Identify the percentage utilizations of LAN and access link. Comment if adding a proxy server would help.	4
	d) What problem would it cause if we delete the “date” field in the HTTP Response/Request header? How does a proxy server reduce response time for a client despite visiting the origin server on every request it gets?	3 + 3
	Q 2. a) CO2 Explain which protocol is better suited to view emails, IMAP or POP3, when you are using a very slow internet connection with your mobile phone.	5
	b) You visit daraz.com to browse items. By the end of your initial visit, you end up adding a few items to the cart, although you did not sign up nor log in to the website. After a few days, you go back to the website, only to find that the cart items you selected previously are still there. How is this possible?	5
	c) Nonte visits www.ahare.com on his web browser on 24th January 2023 at 10:30 AM with a TTL of 5 hours . On the other hand, Phonte visited the same website on the 24th January 2023 at 3:00 PM with a TTL of 10 hours . Phonte’s PC sends the DNS request (taking 44ms to be sent) to its local DNS server.	2 +

	<p>I. Determine the RTT required for Phonte's PC to fetch the IP address. After fetching the IP address, Phonte's PC sends the request to the website server (which takes 89ms to be sent only) to open a non-persistent HTTP connection with the server and request 28 objects, including the base HTML page. Assume each object size is 24 MegaBytes. Furthermore, the server upload speed is X Mbps.</p> <p>II. Calculate the total RTT required to fetch all the objects from the point when you inserted the URL in the browser.</p> <p>II. Given, the total file transfer time / HTTP response time, including the RTT found in (II), is 19988 ms. Find X.</p>	+ 3 + 5
Q 3. a) CO2	Identify the significance and need of a half close and a full close technique of the TCP connection.	5
b)	Three repeated acknowledgements for the same segment allows some time to be saved, explain how.	5
c)	<p>In a Go-Back-N TCP connection, a HTTP request (235 bytes each) is sent for each of the data segments (889 bytes each). Like this, a total of 18 data segments are sent from the server, including the base HTML file. Furthermore, the client has an ISN of 8484 and a RWND of 10005 bytes and the server has an ISN of 9429 and a RWND of 23080 bytes.</p> <p>I. Calculate the sequence and acknowledgment number of the 4th data segment. The 9th data segment got lost on its way to the client.</p> <p>II. What's the sequence and acknowledgment number of the 11th HTTP request that's sent to the server?</p> <p>III. What's the RWND of the client when it received the 13th segment? Assume the first 5 segments were processed by the client.</p>	3 + 3 + 4