National University
Of Computer and Emerging Sciences

CS-3001 Computer Networks	
Assignment 1	**Marks 80**

Assignment Cover Sheet	
Student name:	
Student ID	
Instructor's Name:	Salma Kulsoom
Deadline:	September 22, 2022
Student declaration:	I declare that: • This evaluation is my very own work and wherein other's works or thoughts were used, I even have accurately referenced or stated them • I recognize that plagiarism is a critical offense that could cause disciplinary action.
Student signature:	

Submission Instructions

- Submit the handwritten assignment in hard copy.
- You do not need to type or print out the assignment.
- Do not write questions, just mention the question number and answer it.
- Your assignment must be written in a neat and understandable format with a proper cover page. Print this first page and attach it as the first page of your assignment. Cover pages other than this one will not be accepted.
- Show complete steps of calculations.
- DO NOT copy anything from anyone else as it will result in the cancellation of the assignment

Q1. Two terms are frequently used in networking, flow control, and congestion control. Do you think that they are equivalent? How do they differ in the context of connection-oriented and connection-less services? Justify your answer.

Instructions: Avoid copying and pasting long theories. Just get understanding from different resources and explain it upon your own level of understanding. There are actually three parts to this question:

- What are flow-control and congestion control. How do they differ from each other? (100-200 words)

- How do flow-control and congestion-control work for connection-oriented and connection-less services? (300-500 words)
- Conclusion: are they really equal or not? (100-200 words)

Q2. suppose there is only one router(also known as packet switch) between a client and a server. The transmission rate from the client to the router is R_1 and the transmission rate from router to host is R_2. The router works on a store-and-forward mechanism. Calculate the end-to-end delay required to send a packet of length L from the client to the server. Queueing and propagation delays are negligible here.

Instruction: Carefully read the question. It is not too technical. The transmission rate is different between the nodes. Take that into consideration**.**

Q3. There are five links on the path from host A to host B. Transmission rate of the paths is R1= 1200 Kbs, R2= 2 Mbps, R3= 5 Mpbs, R4= 20 Mbps, and R5= 5Mbps. What is the throughput for a file of size 2 million bits?

Instructions: You just have to find out how throughput is calculated when each path has a different transmission rate.

Q5. The bandwidth of a network is 300 Mbps but due to congestion in the network, only 10,000 frames can be transmitted per minute where each frame carries 5000 bits. Calculate throughput for this network.?

Instructions: Take care of units.

Q6: Series of packets are being transmitted from source to destination. How end-to-end delay is calculated for this network? What are the possible delays?

Instructions: Explain with proper formula.

Q7: Suppose you are going to develop a network standard. Will you use VC (Virtual Circuit) or datagram? Justify your selection.

Instructions: Explain with a scenario.

Q8. Assume the following network scenario in which data travels with the speed of light (299 792 458 m / s).

What is the transmission delay if

a) A sends a 2000 byte packet to B

b) B sends a 2500 byte packet to D

What is propagation delay from

a) B to D

b) A to C

A wants to send a 3000-byte packet to C. B here works on a store-and-forward mechanism. What will be the end-to-end delay for the packet that is traveling from A to C through B?