Daffodil International University
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Midterm Examination, Spring-2023
Course Code: CSE225, Course Title: Data Communication
Level: L2   Term: T2   Batch: 60

Time: 1 Hour and 30 Minutes   Marks: 25

Answer ALL Questions
[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a)	Rakib and his three friends share a room at DIU Male Hostel and each have their own laptop/PC. They want to create a network that allows them to connect and communicate. To achieve this, they connect each laptop/PC in a circular chain, creating a network where each device only has two neighbors for communication and acts as a repeater to regenerate and pass on the signal. In this setup, the signal travels in a single direction around the chain, providing efficient and reliable data transmission. Hence, apply your knowledge to analyze the performance of that topology in terms of the type of connectivity, advantages, disadvantages, and applications. Besides, what will happen if one connection or link gets disconnected? Use the figure if appropriate.	[5]	CO1
2.	a)	Explain your basic understanding about physical, logical and port addresses.	[3]	CO2
	b)	Identify the layers that provide the below mechanism in OSI model: i) Flow Control ii) Error detection iii) Port addressing iv) Encryption	[2]	
3.	a)	Calculate the total delay (latency) for a frame of size 10 million bits that is being sent on a link with 20 routers each having a queuing time of 4 µs and a processing time of 2 µs. The length of the link is 4000 Km. The speed of light inside the link is 3×10^8 m/s. The link has a bandwidth of 10 Mbps. Select the component of the total delay that is dominant. Select the one that is negligible.	[3]	CO3
	b)	We have a channel with 8 KHz bandwidth. If we want to send data at 200 Kbps, estimate the minimum SNR_{dB} and SNR.	[2]	
4.	a)	Explain the operating procedure of Delta Modulation.	[2]	CO3
	b)	We know that line coding is the process of converting digital data to digital signals. Suppose, we have the following data $(BC)_{16}$ to send. Evaluate this digital data into the following line coding schemes. i. Manchester ii. Differential Manchester iii. Bipolar AMI	[3]	
5.	a)	Evaluate the constellation diagram for the following cases based on the type of modulation (ASK, FSK, PSK, or QAM). The numbers in parentheses define the values of I and Q respectively. i. Two points at (3, 0) and (-3, 0). ii. Four points at (2, 2), (-2, 2), (-2, -2), and (2, -2). iii. Two points at (0, 2) and (0, -2).	[3]	CO3
	b)	We need to send data 3 bits at a time at a bit rate of 3 Mbps. The carrier frequency is 10 MHz. Calculate the baud rate and the bandwidth.	[2]	