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Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Midterm Examination, Spring 2025
Course Code: CSE 225, Course Title: Data Communication
Level:2 Term:2 Batch: 65

Time: 1.5 Hours **Marks: 25**

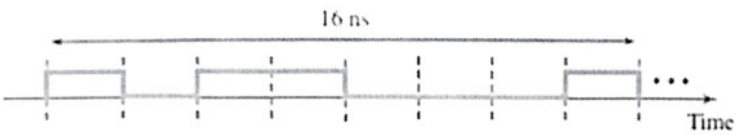
Answer ALL Questions

[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	You have been hired as a network engineer to design a network for a new medium-sized company. The company is divided into three departments: Sales, HR, and IT. The company's office has a single floor with three sections dedicated to each department. Each department has 25 employees, and each employee needs a computer with internet access. The company also plans to expand and add more employees in the future. Which network topology will you choose for the company? And **apply** your knowledge to describe possible benefits and limitations of that topology and provide appropriate diagram if necessary.	3	CO1
	b	A manufacturing plant has multiple machines that need to communicate with a central monitoring system to report operational status and receive commands. Now **examine** a) Which connection type (point-to-point or multipoint) would be more effective for communication between each machine and the central system? Justify your choice b) If the central system needs to send commands to multiple machines, which connection type would be preferable?	2	
2	a	**Relate** the following functions to the appropriate OSI model a) Interface to transmission media b) Ensures reliable transmission of data c) Format and code conversion services d) Creating user datagrams. e) Communication between two processes either half-duplex or full-duplex mode f) Compression is important in transmitting multimedia such as audio, video and text.	3	CO2
	b	In data Communication the two addresses physical and logical are needed for transferring data between sender and receiver. **Compare and contrast** these addresses.	2	

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3	a	**What** is the total delay (latency) for a frame of size 5 million bits that is being sent on a link with 10 routers each having a queuing time of 2 μs and a processing time of 1 μs. The length of the link is 2000 Km. The speed of light inside the link is 2×10^8 m/s. The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible?	3	CO3
	b	**What** is the bit rate for the signal in Figure: 	2	
4	a	Suppose you need to send $(65)_{10}$. **Analyze** and draw the signal using the following line coding schemes: i. Differential Manchester ii. NRZ (I) iii. MLT-3	3	CO3
	b	**Analyze** between synchronous & asynchronous serial transmission.	2	
5	a	Briefly **explain** the causes of transmission impairment with proper diagram.	3	CO3
	b	A signal has passed through three cascaded amplifiers, each with a 4 dB gain. **What** is the total gain? How much is the signal amplified?	2	