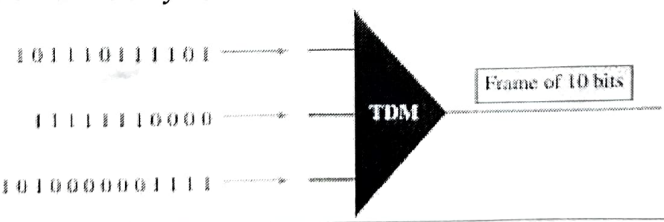
Daffodil International University

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

Time: 2 Hours **Marks: 40**

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)	Which of the modulation techniques vary its phase to determine 0 and 1? **Analyze** the possible advantages, limitations and applications of such modulation?	3	CO3
	b)	**Calculate** the number of bits per baud for the following techniques? a. ASK with four different amplitudes b. FSK with eight different frequencies c. PSK with four different phases d. QAM with a constellation of 128 points	4	
	c)	**Calculate** the narrow bandwidth for the following situations if we need to modulate a 7-KHz voice. a. AM b. FM c. PM	3	
2.	a)	Why do we need data rate management to achieve multiplexing? What kind of changes should be imposed in input data rates to achieve multiplexing? **Analyze** your understanding with appropriate figure.	3	CO3
	b)	Figure shows a multiplexer in a synchronous TDM system. Each output slot is only 10 bits long (3 bits taken from each input plus 1 framing bit). **Analyze and illustrate** the output stream. The bits arrive at the multiplexer as shown by the arrows. 	3	
	c)	We need to use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 1 bit from each digital source, but one extra bit is added to each frame for synchronization. **Investigate** the following questions:	4	

		a. What is the size of an output frame in bits? b. What is the output frame rate? c. What is the duration of an output frame? d. What is the output data rate?		
3	a)	Suppose, the dividend = 101000111 and the divisor = 1101. **Inspect** the polynomial CRC. Also **Inspect** the CRC has no error.	4	CO4
	b)	Suppose you have the following bits to send (in decimal): 6, 12, 10, 7, and 2. **Inspect** the checksum.	4	
	c)	How the single-bit error differ from a burst error? **Differentiate** with appropriate figure.	2	
4	a)	Why slotted ALOHA is better than pure ALOHA? **Identify** your logic.	3	CO4
	b)	In the reservation method, "a station needs to make a reservation before sending data". **Analyze** the statement.	3	
	c)	Suppose you have 4 stations (A, B, C and D). B, C are sending 0, D and A is sending 1. **Demonstrate your calculation and discover** the CDMA multiplexing values using Walsh table.	4	