Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Fall 2022

Course Code: CSE-225, Course Title: Data Communication

Level: 2 Term: 2

Time: 120 Minutes **Marks: 40**

Answer ALL Questions

(All portions of each question must be answered sequentially)

[numbers in the right-hand margin indicate full marks of each question and corresponding course outcomes].

1.	a)	Show the contents of the five output frames for a synchronous TDM multiplexer that combines four sources sending the following characters. Note that the characters are sent in the same order that they are typed. The third source is silent. Source 1 message: HELLO Source 2 message: HI Source 3 message: Source 4 message: BYE	5	CO3
	b)	Sketch the flow diagram digital hierarchy used by telephone companies and list different levels of hierarchy. Also, find the overhead (extra bandwidth for guard band or control) in each hierarchy level.	5	
2.	a)	Cristiano Ronaldo wants to send a message to his friend Lionel Messi via a public channel. To make his message secured he added a CRC (using both binary and polynomial equation) at the end of his message. Lionel Messi received the message sent by Cristiano Ronaldo and found error in the data and discard the message. Now consider the following parameters for necessary calculations. a) Last four digits of your student ID (e.g. 5678) is the message sent by Cristiano Ronaldo. Generate binary and Polynomial equations from your ID. b) Use x^3+x^2+1 as divisor [in both cases] c) For Polynomial Equations, your reverse ID (e.g. 8765) is the message received by Lionel Messi along with the generated CRC of Cristiano Ronaldo. For Binary Calculations, follow the regular procedure to generate CRC and send it to Lionel Messi. **Now answer the following questions.** i. What is the CRC [both binary and polynomial] generated by Cristiano Ronaldo? ii. What CRC/Reminder [both binary and polynomial] Lionel Messi is generated? iii. If you found any error, justify why you think this is an error. iv. What type of error (if any) occurred during the data transmission? You may consider other error detection methods to calculate the error in this case.	10	CO4

	b)	Calculate the hamming distance for each of the following codewords. Also, identify the minimum hamming distance. d (100110, 001010) d (010101, 101001) d (001000, 111101) d (011010, 100100) d (011011, 101011) d (111101, 010010)	5	
3.	a)	Explain the flow diagram of CSMA/CA.	5	
	b)	Explain the Select and Pool Functions of Pooling with necessary diagrams.	4	
	c)	Explain the encoding process of CDMA and generate a combined signal by considering the following parameters. Number of stations: 05 Data bit for station 1 i s 0 Data bit for station 2 is 1 Data bit for station 3 is 0 Data bit for station 4 is silent Data bit for station 5 is 1 Use Walsh table to generate the chip sequence for the five stations.	6	