Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Fall-2023

Course Code: CSE225, Course Title: Data Communication

Level: 2 Term: 1 Batch: 62

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)***	Analyze and draw the constellation diagram for the following: a. ASK, with peak amplitude values of 0 and 2 b. BPSK, with a peak amplitude value of 3 c. QPSK, with a peak amplitude value of 2 d. 8-QAM with two different peak amplitude values, 2 and 3, and four different phases	**[4]**	**CO3**
	b)	Examine the bandwidth for the following situations if we need to modulate a 6-KHz voice. a) AM b) PM (set $\beta = 4$) c) PM (for Narrowband)	**[3]**	
	c)	Distinguish the characteristics of a digital signal that are changed in each of the following digital-to-analog conversions. a. ASK b. FSK c. PSK Besides, briefly explain any one of them with the necessary diagram.	**[3]**	
2.	***a)***	Telephone companies implement TDM through a hierarchy of digital signals, called digital signal (DS) service or digital hierarchy. Point out the digital signals with the required bit rates. Draw figure if appropriate.	**[4]**	**CO3**
	b)	Outline the strategies used to handle uneven input data rates in case of TDM.	**[3]**	
	c)	Assume that a voice channel occupies a bandwidth of 4 kHz. We need to multiplex 15 voice channels with guard bands of 100 Hz using FDM. Examine the required bandwidth. Besides, according to you, what could be the possible applications of FDM?	**[3]**	
3.	***a)***	Suppose you have the following bits to send (in decimal): 6, 13, 15, 7, and 2 Inspect the checksum.	**[4]**	**CO4**
	b)	Compare your obtained checksum (from 3. a) to prove that there is no error in the destination portion.	**[3]**	
	c)	Suppose, you want to send the data word 100100 and the generator is using 1101 as divisor. Now, calculate the code word that will be generated by the CRC Encoder	**[3]**	
4.	***a)***	Suppose you have 4 stations (A, B, C and D). A is sending 1, C and D are sending 0 and B remains silent. Examine the CDMA multiplexing values using the Walsh table.	**[4]**	**CO4**
	b)	Which of the CSMA (CSMA/CD or CSMA/CA) is used in Wireless Internet? Analyze that with the proper figure.	**[3]**	
	c)	Compare Polling and Token passing with necessary diagram.	**[3]**	