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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Final term Examination, Fall-2024

Course Code: CSE225, Course Title: Data Communication

Level: 2 Term: 2 Batch: 64

Time: 2:00 Hrs **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 frequency to determine 0 and 1? **Analyze** the possible advantages, limitations and applications of such modulation?	[4]	CO3
	b)	**Examine and Draw** the constellation diagram for the following: a. ASK, with peak amplitude values of 3 and 5 b. BPSK, with a peak amplitude value of 5 c. QPSK, with a peak amplitude value of 5 d. 8-QAM with two amplitude values, 2 and 4, and four different phases.	[4]	
	c)	**Calculate** the bandwidth for the following situations if we need to modulate a 20-KHz voice. a. AM b. PM (set β =3)	[2]	
2.	a)	The practice of multiplexing signals from lower-bandwidth lines to higher-bandwidth lines has long been used by telephone companies to increase the efficiency of their infrastructure. Many switched or leased lines can be joined in this fashion into fewer but larger channels. Therefore, **analyze** the analog hierarchy of a telephone company with proper flow diagram. Besides, find out the bandwidth and guard band for each level.	[4]	CO3
	b)	Five sources, two with a bit rate of 30 kbps and three with a bit rate of 40 kbps are to be combined using multiple slot TDM with no synchronizing bits. **Examine** the final stage of the multiplexing: a. What is the size of a frame in bits? b. What is the frame rate? c. What is the duration of a frame? d. What is the data rate?	[4]	
	c)	Assume that a voice channel occupies a bandwidth of 4 kHz. We need to combine four voice channels into a link with a bandwidth of 16 kHz, from 20 to 36 kHz. **Analyze and draw** the configuration, assume there are no guard bands.	[2]	
3.	a)	Suppose, sender has sent the following bits (in decimal) to the receiver: 6, 13, 15, 7, and 2. **Inspect** the checksum. On the other hand, receiver has received the checksum value along with 6, 11, 15, 7, and 2. **Examine** the new checksum value from the destination end? Based on this final (destination-end) checksum, will the receiver accept the data as valid? Justify your answer.	[4]	CO4
	b)	Suppose the divisor = x^4+x^3+x; and dividend = $x^6+x^4+x^2+1$. **Calculate** the CRC.	[4]	
	c)	**Calculate** the hamming and error distance for each of the following code words. i) d (111111, 001000) ii) d (010101, 100101) iii) d (000000, 111111) iv) d (011000, 111100)	[2]	
4.	a)	Suppose you have 4 stations (A, B, C, and D). A is sending 1, C, D are sending 0 and B remains silent. Demonstrate your **calculation and discover** the CDMA multiplexing values using Walsh table.	[4]	CO4
	b)	Which of the CSMA (CSMA/CD or CSMA/CA) is used in traditional Ethernet? **Analyze and Explain** that with proper figure.	[4]	
	c)	Make a **contrast** between Polling and Select with necessary diagram.	[2]	