CSE320: Data Communications

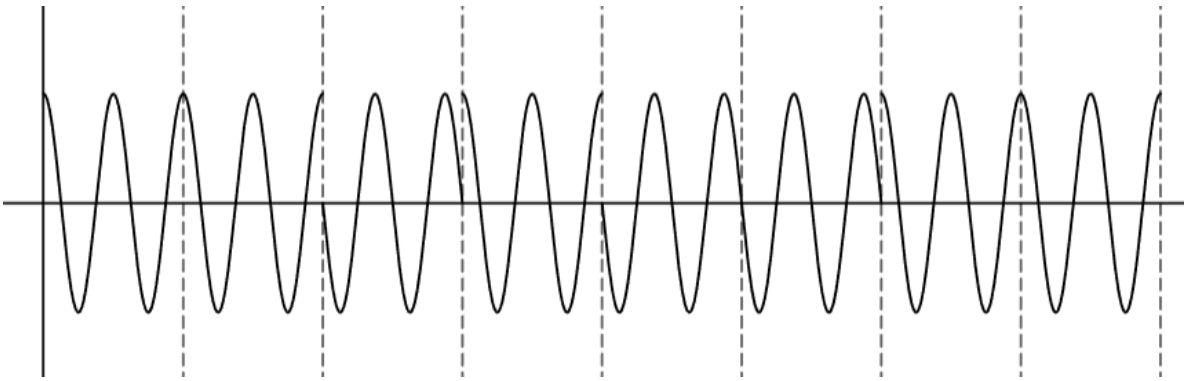
Summer 2024

Quiz-3 Section-8 Marks: 15 Duration: 20 minutes

Name: ID:

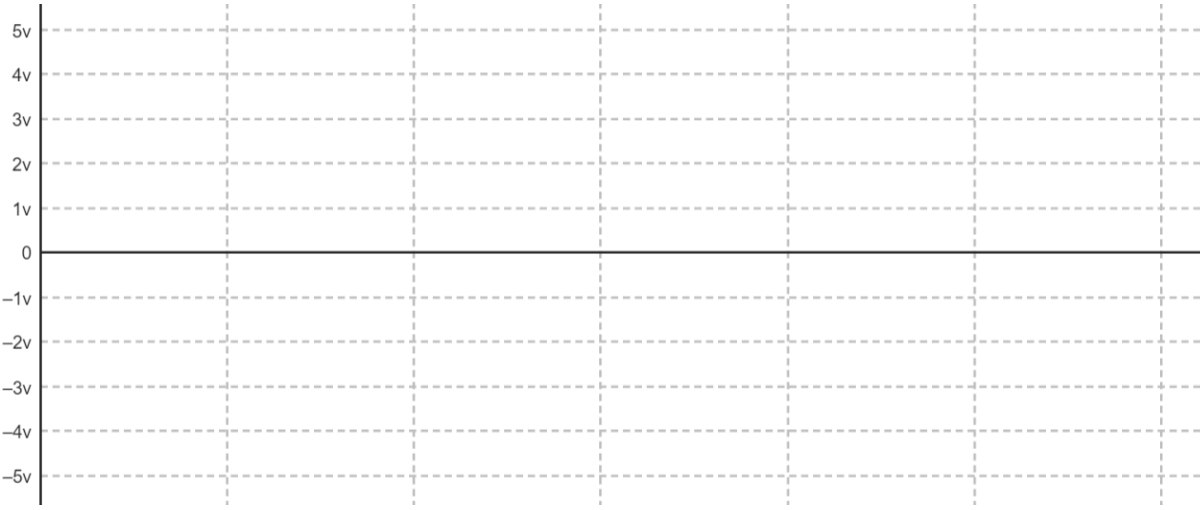
Q1. Why is Amplitude Shift Keying also known as On Off Keying? Is this method better than Phase Shift Keying? Explain. **[2 + 3 marks]**

Q2. Determine the digital bit stream from the analog signal below. The signal was modulated using Binary PSK where 0 means signal element with phase of $\pi/2$ rad and 1 means signal element with phase of π rad. **[4 marks]**



Q3. In a Multi level FSK, for each signal element, we want to send 2 bits at a time. We have used a carrier signal that has an amplitude of 4v and phase is 0 degree. If the frequency changes according to the following table, draw the modulated signal for the bit sequence 100100011110 **[6 marks]**

Bit Pattern	# cycles of the signal element
00	2
01	4
10	1
11	3



CSE320: Data Communications

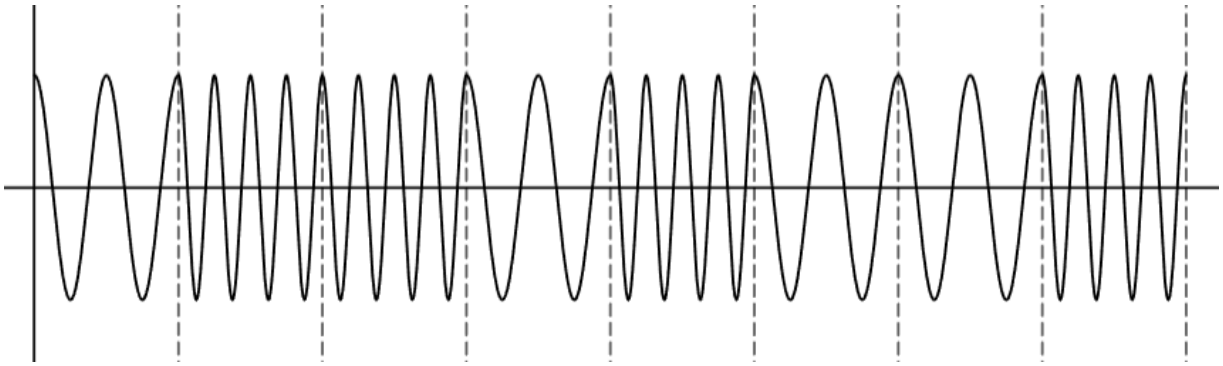
Summer 2024

Quiz-3 Section-9 Marks: 15 Duration: 20 minutes

Name: ID:

Q1. Why is a constellation diagram used? How is Coherent FSK different from Non-Coherent FSK? Explain. **[2 + 3 marks]**

Q2. Determine the digital bit stream from the analog signal below. The signal was modulated using Binary FSK where 0 means signal element with frequency of 2 Hz and 1 means signal element with frequency of 4 Hz. **[4 marks]**



Q3. In a Multi level ASK, for each signal element, we want to send 2 bits at a time. We have used a carrier signal that has an frequency of 3 Hz and phase is 180 degree. If the amplitude changes according to the following table, draw the modulated signal for the bit sequence 010010011101. **[6 marks]**

Bit Pattern	Amplitude
00	3v
01	4v
10	1v
11	2v

CSE320: Data Communications

Summer 2024

Quiz-4 Section-8 Marks: 15 Duration: 20 minutes

Name: ID:

Q1. Consider there are five channels, three with a bit rate of 100 kbits/s and two with a bit rate of 50 kbits/s, which are to be multiplexed in a way that the number of channels will decrease. One synchronization bit is added to each frame. The interleaved unit is 5 bits. Now answer the following questions: **[12 marks]**

A. What is the input slot duration (in **seconds**)? 5/100000 (slot duration is for unit size)

B. What is the duration of a frame (in **seconds**)? 5/100000 (same as inp slot duration)

C. What is the input bit duration (in **seconds**)? 1/100000 (bit duration is for 1 bit)

D. What is the frame rate? 100000/5 = 20000 FPS (inverse of frame duration)

E. What is the output data rate or transmission rate of the medium (in **bps**)?
Frame size = 5 units*4 channels + 1 sync bit = 21 bits
21*20000 = 420000 bps

F. What is the output slot duration (in **seconds**)?
input slot duration ÷ channel number
(5/100000)/4

Q2. Which issue of synchronous TDM can be solved by statistical TDM? Explain briefly. **[3 marks]**

CSE320: Data Communications

Spring 2024

Quiz-4 Section-9 Marks: 15 Duration: 20 minutes

Name: ID:

Q1. Consider, you want to use the concept of multiplexing to multiplex 10 channels. The channels send 240 pages in one second, each containing 300 characters. If 2 characters at a time are to be multiplexed using TDM with 1 synchronization bit, answer the following questions: **[12 marks]**

A. What is the input data rate for each channel (in **bps**)?
240 pages*300 chars*8 = 576000 bps

B. What is the input bit duration (in **seconds**)? 1/576000

C. What is the frame rate?
input slot duration or frame duration = 16/576000 [2 char*8 =16 bits]
frame rate = 576000/16 = 36000 fps (inverse of frame duration)

D. What is the duration of a frame (in **seconds**)? 16/576000

E. What is the output data rate (in **bps**)?
frame size = 10 channels*16 bits + 1 sync bit = 161 bits
161*36000 = 5796000 bps

F. What is the output bit duration (in **seconds**)? (1/576000)/10

Q2. What do you understand by guard band? Why is it necessary? **[3 marks]**