King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE370: Communications Engineering I (091)
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Quiz 6: Line Coding and Nyquist Criteria

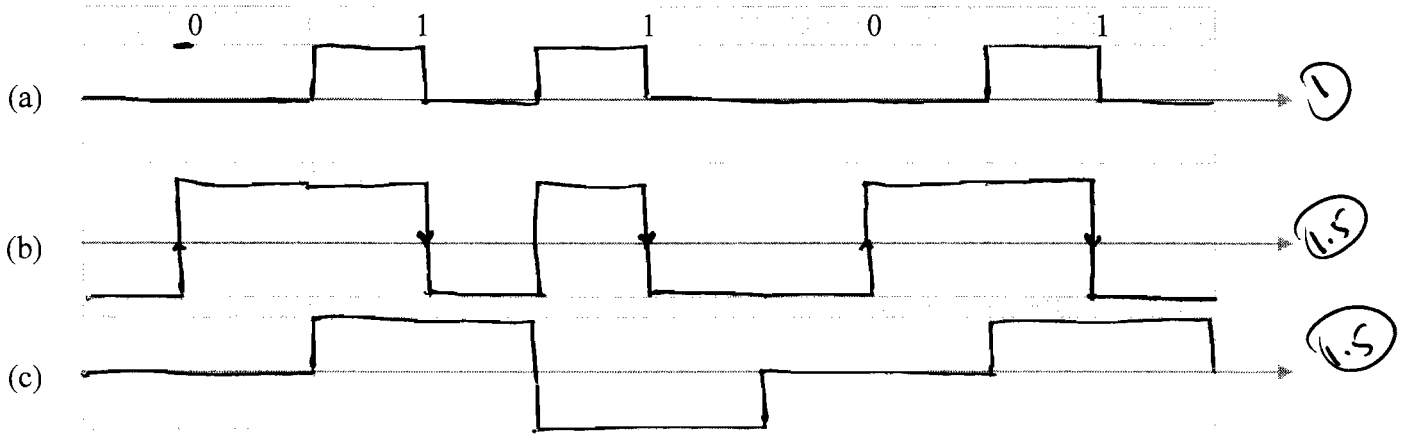
0

-1 points for not writing your serial #

Name: KEY Ver. 1

1. Consider the following sequences of 1's and 0's: **0 1 1 0 1**
Sketch the wave form using the following methods of representing symbols 1 and 0 (line coding):
(a) On-off signaling (RZ).
(b) Manchester Coding: A high to low transition represents 1 and a low to high transition represents zero.
(c) Bipolar (NRZ)

(6 points)



(1) (1.5) (1.5)

Which code/codes of the above line codes has zero DC? (b) (c) in general. (1)

Which one of the line codes required minimum bandwidth? (c) (1)

2. Binary data rate of 1 Mbit/s is to be transmitted using Nyquist criterion pulses with $P(\omega)$ as shown in the figure. The frequencies f_1 and f_2 (in hertz) of the spectrum are adjustable. The channel available for the transmission of this data has a bandwidth of 900 kHz, Determine f_1 and f_2 and the roll-off factor. **(4 points)**

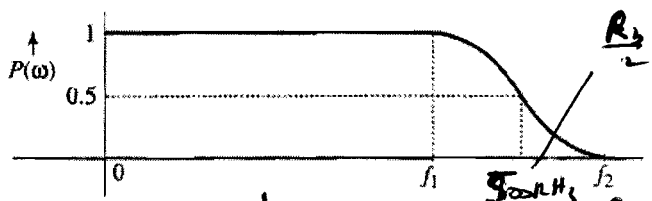
$$B_T = \frac{R_b}{2} + r\frac{R_b}{2}$$

$$B_T = \frac{(1+r)R_b}{2}$$

$$1+r = \frac{2B_T}{R_b}$$

$$\Rightarrow r = \frac{2B_T}{R_b} - 1 = \frac{2(900k)}{1M} - 1 = \frac{1.8M}{1M} - 1 = 0.8$$

(2)



$f_1 = 100\,kHz$ (1)

$f_2 = \frac{R_b}{2} + r\frac{R_b}{2} = 900\,kHz$ (1)

For ver. 2: $r = \frac{2(800k)}{1M} - 1 = 0.6$, $f_2 = 900\,kHz$, $f_1 = 200\,kHz$, $BW = 800\,kHz$

Good Luck, **Dr. Ali Muqaibel**