King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE370: Communications Engineering I (071)
Quiz 6: Principles of Digital Date Transmission
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Serial # 0

-2 points for not writing your serial #

Name: KEY "Corrected" Sec. 4

1) Data at a rate of 7 kbits/s is to be transmitted over a leased line of bandwidth 4 kHz using Nyquist criterion pulses. Determine the maximum value of roll-off factor r that can be used.

$$B = \frac{R}{2} + r\frac{R}{2}$$

$$4K = \frac{7K}{2} + r\frac{7K}{2}$$

$$8 = 7 + 7r$$

$$1 = 7r$$

$$\Rightarrow \boxed{r = \frac{1}{7}} = 0.1428$$

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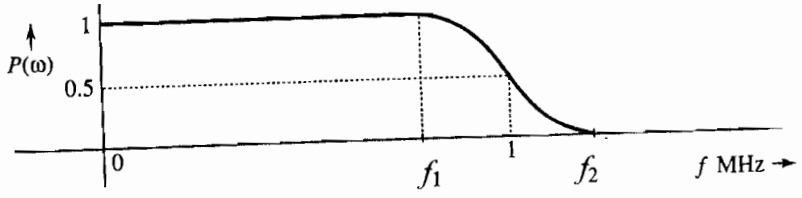
2) A pulse $p(t)$ whose spectrum $P(\omega)$ is shown in the figure satisfies the Nyquist criterion. If f_1=0.7 MHz and f_2=1.3 MHz, determine :

a. the roll-off factor.

b. the maximum rate at which binary data can be transmitted by this pulse using the Nyquist criterion.



$$r = \frac{\omega_x}{B_{min}} = \frac{1.3-1}{1} = \boxed{0.3 = r}$$

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$$B = \frac{R}{2} + r\frac{R}{2} \Rightarrow R = 2B/(1+r)$$

$$R = \frac{2(1M)}{1.3} = \frac{2M}{1.3} = 1.538\ M\ \frac{bit}{sec}$$

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