## King Fahd University of Petroleum & Minerals

**Electrical Engineering Department** 

EE370: Communications Engineering I (071)

## Quiz 6: Principles of Digital Date Transmission Dr. Ali Muqaibel

Serial # 0 -2 points for not writing your serial #

Name:

KEY

Sec. 1

1) Data at a rate of 5 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.

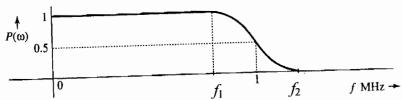
$$B = \frac{R}{2} + r \frac{R}{2}$$

$$8 = 5 + 5r$$

$$3 = 5r$$

$$r = \frac{3}{5} = 0.6$$

- 2) A pulse p(t) whose spectrum  $P(\omega)$  is shown in the figure satisfies the Nyquist criterion. If  $f_1$ =0.9 MHz and  $f_2$ =1.1 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.



$$\Gamma = \frac{\omega_x}{\beta_{min}} = \frac{1.1 - 1}{1} = 0.1$$

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

$$R = \frac{2(1M)}{1.1} = \frac{2M}{1.1} = 1.818 \text{ M} \frac{bit}{sec}$$