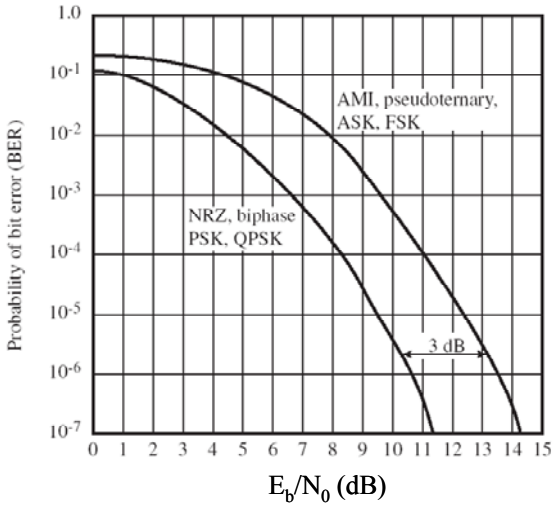
KFUPM - COMPUTER ENGINEERING DEPARTMENT

COE-341 – Data and Computer Communication

Student Name:
Student Number:

Consider the figure shown in the side



a) (5 points) What does the y-axis represent and what is its range and units?

b) (5 points) What does the x-axis represent and what is its range and units?

c) (5 points) Given the figure, which modulation schemes perform best?

d) (4 points) At the value of Eb/N0 = 8 dB, what is the BER value for PSK and that for ASK?

e) (6 points) If you transmit 1000 bits using ASK at Eb/N0 equal to 8 dB, what is the minimum number of bits in error? maximum number of bits in error? AVERAGE number of bits in error?

f) (10 points) If the scheme QPSK is operated at BER of 10^{-7} with a channel SNR of 12 dB, what would be the spectral efficiency for this link?

g) (10 points) If the link in part (f) has a bit rate of 5 kb/s, what would be the transmission bandwidth in Hz if the raised cosine filter parameter *r* is equal to 1.

h) (10 points) Draw the signal constellation of QPSK signal. Indicate the bits to symbol assignment on your drawing.

i) (5 points) Draw the signal constellation of 16-QAM.

j) (5 points) How many bits does every symbol in 64-QAM carry?