

HW#5

#1: For a 4-bit PCM system, it consists of a sampler, a linear quantizer, and an encoder. Suppose the input signal is $x(t) = 8\cos(2000\pi t)$

- (a) Determine the minimum sampling frequency.
- (b) Determine the step size of the 4-bit linear quantizer.
- (c) Find the bit rate of the system
- (d) Find the signal to quantization noise ratio in dB. ($\log_{10}2 = 0.301$,
 $\log_{10}3 = 0.477$)

#2: A message signal with bandwidth equal to 4.7 KHz and amplitude in the range of (-10, 10) volts is transmitted via a PCM system. The maximum acceptable quantization error is less than 0.5 volts and sampling rate R. What is the minimum required bandwidth (in bps) for the transmission?