Perform BPSK modulation and demodulation using following information:

(i). Input data sequence=[1 0 0 1 0 1 0 1 0];

(ii). Channel noise is Additive White Gaussian Noise (AWGN), SNR will vary from 5 to 25 dB

The plot results should be self-explanatory. Proper label corresponding x and y axis must be provided.

Task:

a. Plot the input sequence.

b. Plot sinusoidal carrier signal (Take A_c=2 and suitable f_c).

c. Perform BPSK modulation, plot the resultant signal.

d. Pass the signal through channel with different extent of AWGN (as referred in info (iii)). Plot the noisy signal for each case (5, 10, 15 20, 25dBs).

e. Perform demodulation for each case. Plot the demodulated signals.

f. Calculate bit error rate for 1000 random input data sequence.

g. Design appropriate filter to reduce the noise, and again perform (step e and f). Comment on the efficiency of the designed filter for noise reduction.