Lab – 5

Subject Code: EC303 P

Due Date:25/9/20

Instructions:

1. Please mention legends, axis labels, titles etc in your plot/subplot for better understanding & clarity.
2. The report to be submitted must include matlab code & all observations pertaining to each plot below the same.
3. Kindly number your answers correctly.
4. **NO PLAGIARISM.**
5. Ask any questions in class or via LMS so that it will be beneficial to all (us and you).

Questions:

1. Design an AM broadcast system with at least 3 independent broadcast station each with bandwidth of 4 kHz. Each must transmit an audio signal amplitude modulated using carrier frequencies of 10, 16 and 22 kHz.
    a) Design a receiver that can tune to one of these stations. Comment on quality of the received signal.
    b) Introduce an AWGN channel between the transmitter and receiver. Analyze the effect of SNR varying from 10 dB to 20 dB (with step size of 5) on the demodulated signal. Write your observation based on the quality of the resultant demodulated signal (both music and voice signal).

    Note: Consider audio signal (.Wav file) for duration of 5 seconds.

2. Convert the designed AM broadcast system into DSB-SC system. The receiver will need to be redesigned (you will need to multiply by the carrier, followed by LPF).
    a) Introduce a frequency offset of 1 Hz, 5 Hz and 10 Hz at the receiver and demodulate the received signal (Do not introduce noise).
    b) Write your observation.