**Assignment for Chapter 2 on DSB-C Modulation**

**Conceptual Questions for Critical Thinking**

1. What is baseband frequency, pass band frequency and stop band frequency ?
2. Can you transmit power without wire?
3. Consider ERTA is implementing a communication project of constructing 10 radio stations in various parts of Ethiopia. You are appointed as the chief engineer for this project and given the choice of deciding between DSB-SC and DSB-C modulation. Explain with suitable diagrams (if required) which type of modulation you may choose and why?
4. A bandwidth of 100 KHz is to be considered for the transmission of AM signals .If the highest audio frequencies used to modulate the carriers is 5 KHz, how many AM broadcast stations can be accommodated in 100 KHz band simultaneously without interfering with one another?
5. In practical AM generation circuit we are adding the message signal and carrier signal instead of multiplying the two signals. So how AM is obtained ?

**Problems**

1. An audio signal given as **15 sin 2**$ π($**1500) t** amplitude modulates carrier given as

 **60 sin 2**$ π\left(100,000\right)t .$Determine the following

1. Sketch the audio signal
2. Sketch the carrier signal
3. Construct the modulated wave
4. Determine the modulation index and percentage of modulation
5. What are the frequencies of carrier and audio signal
6. What frequencies would present in a spectrum analysis of the modulated wave?

 2. A 75 MHz carrier signal having amplitude of 50 V is modulated by a 3 KHz audio signal having amplitude of 20V.

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3. Describe Amplitude Modulation with suppressed carrier and plot its frequency spectrum by deriving its equation using Fourier Transform.

4. An AM radio station radiates 10K watts of signal power .The modulation percentage is 60. Calculate how much of this is the carrier power.

5. Determine the percent modulation of an amplitude modulated wave which has power content at the carrier of 8KW and 2KW in each of its sidebands when the carrier is modulated by a simple tone.