

Sheet (02)

Q1: Multiple Choice Question:

1. What is Amplitude Modulation?
 - a) Change in amplitude of carrier according to modulating signal amplitude
 - b) Change in frequency of carrier according to modulating signal amplitude
 - c) Change in amplitude of carrier according to modulating signal frequency
 - d) Change in amplitude of modulating signal according to carrier signal amplitude

2. Frequency components of an AM wave are?
 - a) Carrier frequency (ω_c) with amplitude A
 - b) Lower side band ($\omega_c + \omega_m$) having amplitude $mA/2$
 - c) Upper side band ($\omega_c - \omega_m$) having amplitude $mA/2$
 - d) Carrier frequency ($\omega_c/2$) with amplitude A

3. In amplitude modulation frequency and phase of carrier _____
 - a) varies simultaneously
 - b) varies alternately
 - c) initially varies but become same after sometime
 - d) remains constant

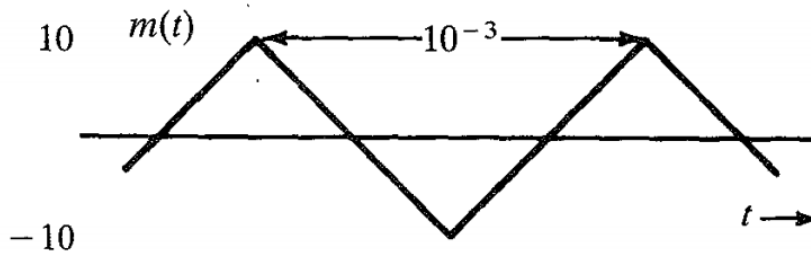
4. Envelope of AM wave has the same shape as the message of baseband signal.
 - a) True
 - b) False

5. What do you understand by low level AM?
 - a) Output power is low
 - b) Modulation is done at high power of carrier and modulating signal
 - c) Collector Modulation Method is low level AM
 - d) Output power is high

Q2: Sketch with mentioning the equations the block diagram of DSBFC.

Problems:

1. Carrier wave of frequency $f = 1\text{MHz}$ with voltage of 20V used to modulated a signal of frequency 1kHz with voltage of 10v . Find out the following: (a) μ , (b) Frequencies of modulated wave, (c) Bandwidth
2. Sketch the AM signal $[A + m(t)] \cos\omega_c t$ for the periodic triangle signal $m(t)$ shown in figure corresponding to the modulation index : (a) $\mu = 0.5$, (b) $\mu = 1$, (c) $\mu = 2$, (d) $\mu = \infty$



3. For the AM signal in prob 1 , with $\mu = 0.8$: (a) Find the amplitude and power of the carrier. (b) Find the sideband power and the power efficiency.
4. A given AM (DSB-LC) transmitter develops an unmodulated power output of one KW across a 50-ohm resistive load. When a sinusoidal test tone with a peak amplitude of 5.0 V is applied to the input of the modulator and the modulation index is 0.8 , Determine the following quantities in the output signal:
 - a) The peak amplitude of the lower sideband.
 - c) The ratio of total sideband power to carrier power.
 - d) The total power output.