1. For message signal $\cos(2\pi f_m t)$ and carrier frequency f_c, consider the SSB modulated signal with LSB generated by the phase shifting method. The in-phase and quadrate components of this message signal are
    a. $\sin(2\pi f_m t), \cos(2\pi f_m t)$
    b. $\cos(2\pi f_m t), \sin(2\pi f_m t)$
    c. $\cos(2\pi f_m t), -\sin(2\pi f_m t)$
    d. $-\sin(2\pi f_m t), \cos(2\pi f_m t)$

    Ans c
2. For message signal $\cos(2\pi f_m t)$ and carrier frequency f_c, consider the SSB modulated signal with LSB generated by the phase shifting method. The complex pre-envelope of this signal is
    a. $e^{j2\pi(f_c+f_m)t}$
    b. $e^{j2\pi(f_c-f_m)t}$
    c. $e^{-j2\pi f_m t}$
    d. $e^{j2\pi(f_c-f_m)t}+e^{j2\pi(f_c+f_m)t}$

    Ans b
3. For message signal $\cos(2\pi f_m t)$ and carrier frequency f_c, consider the SSB modulated signal with LSB generated by the phase shifting method. The complex envelope of this signal is
    a. $e^{j2\pi(f_c+f_m)t}$
    b. $e^{j2\pi(f_c-f_m)t}$
    c. $e^{-j2\pi f_m t}$
    d. $e^{j2\pi(f_c-f_m)t}+e^{j2\pi(f_c+f_m)t}$

    Ans c
4. Let $x(t)$ denote the SSB signal with USB corresponding to message signal $m(t)$ and carrier frequency f_c. $x(t)\cos(2\pi f_c t)-\hat{x}(t)\sin(2\pi f_c t)$ is,
    a. $m(t)\cos(4\pi f_c t)-\hat{m}(t)\sin(4\pi f_c t)$
    b. $\hat{m}(t)$
    c. $m(t)$
    d. $m(t)+\hat{m}(t)$

    Ans a
5. Let $x(t)$ denote the SSB signal with USB corresponding to message signal $m(t)$ and carrier frequency f_c. $x(t)\cos(2\pi f_c t)+\hat{x}(t)\sin(2\pi f_c t)$ is,
    a. $m(t)\cos(4\pi f_c t)-\hat{m}(t)\sin(4\pi f_c t)$
    b. $\hat{m}(t)$

c. $m(t)$

d. $m(t) + \hat{m}(t)$

Ans c

6. For distortionless recovery, VSB filter $H(f)$ must satisfy

a. $H(f-f_c) + H(f + f_c) = 1$

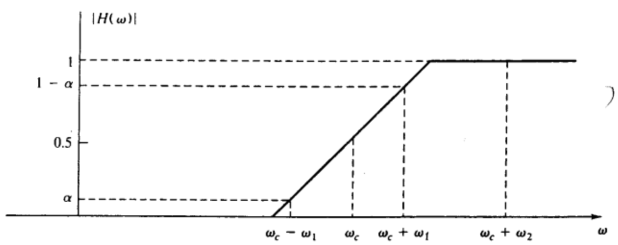
b. $H(f-f_c) - H(f + f_c) = 1$

c. $H(f+f_c) - H(f - f_c) = 1$

d. $H(f + f_c) = 0$

Ans a

7. The frequency response $H(f)$ of a VSB filter is shown below with $\omega = 2\pi f$. What is the VSB signal corresponding to $m(t) = a_1 \cos(2\pi f_1 t) + a_2 \cos(2\pi f_2 t)$



a. $\frac{a_1}{2}\alpha\cos(2\pi(f_c + f_1)t) + \frac{a_2}{2}\cos(2\pi(f_c + f_2)t)$

b. $\frac{a_1}{2}\alpha\cos(2\pi(f_c - f_1)t) + \frac{a_1}{2}(1-\alpha)\cos(2\pi(f_c + f_1)t) + \frac{a_2}{2}\cos(2\pi(f_c + f_2)t)$

c. $\frac{a_1}{2}(1-\alpha)\cos(2\pi(f_c - f_1)t) + \frac{a_1}{2}\alpha\cos(2\pi(f_c + f_1)t) + \frac{a_2}{2}\cos(2\pi(f_c + f_2)t)$

d. $\frac{a_1}{4}\alpha\cos(2\pi(f_c - f_1)t) + \frac{a_1}{4}(1-\alpha)\cos(2\pi(f_c + f_1)t) + \frac{a_2}{4}\cos(2\pi(f_c + f_2)t) + \frac{a_2}{4}\cos(2\pi(f_c - f_2)t)$

Ans b

8. Consider the angle modulated signal $10\cos(10^8\pi t + 5\sin(2\pi \times 10^3 t))$. Find the maximum phase deviation.

a. 50

b. 10

c. 5

d. 1

Ans c

9. Consider the angle modulated signal $10\cos(10^8\pi t + 5\sin(2\pi \times 10^3 t))$. Find the maximum frequency deviation.

a. 10 Hz

b. 5 Hz
c. 10 KHz
d. 5 KHz
Ans d

10. An angle-modulated signal is described as $x_c(t) = 10\cos\left(2\pi \times 10^6 t + 0.1\sin\left(10^3 \pi t\right)\right)$. Consider $x_c(t)$ as an FM signal with k_f = 5, Find the message signal $m(t)$.
a. $10\cos\left(10^3 \pi t\right)$
b. $0.1\sin\left(10^3 \pi t\right)$
c. $100\pi\sin\left(10^3 \pi t\right)$
d. $100\pi\cos\left(10^3 \pi t\right)$
Ans a