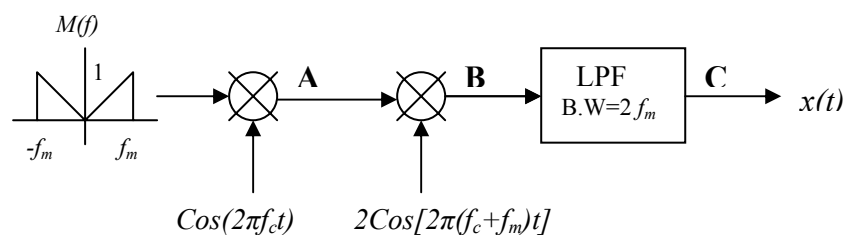


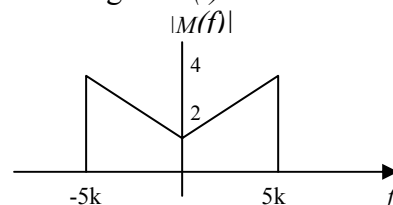
Q1) The signal $s(t) = m(t)\cos(2\pi f_c t)$ is demodulated using a square-law demodulator having the characteristic $v_o(t) = s(t)^2$. If $M(f)$ is a pulse of width $-f_m < f < f_m$ and with amplitude A , sketch the Fourier transform of $v_o(t)$ in the frequency range of $-2f_m < f < 2f_m$.

Q2) The message $M(f)$ is given below, this signal is applied to the system shown here.



- Sketch the spectrum at point A, B, and C.
- Suppose $x(t)$ is entered to another system, design this system such that the original message $m(t)$ will be recovered.

Q3) The spectrum $|M(f)|$ of the signal $m(t)$ is shown below:



If the carrier frequency $f_c = 30 \text{ kHz}$, sketch carefully the spectrum of:

- AM signal.
- DSB-SC signal.
- USB signal.