V.03

SORU: Consider the system shown below.

m(t) ──→ ⊕ ──X(t)──→ [Square Law Device] ──y(t)──→ [Filter] ──→ g(t)
           ↑
        cos(wct)
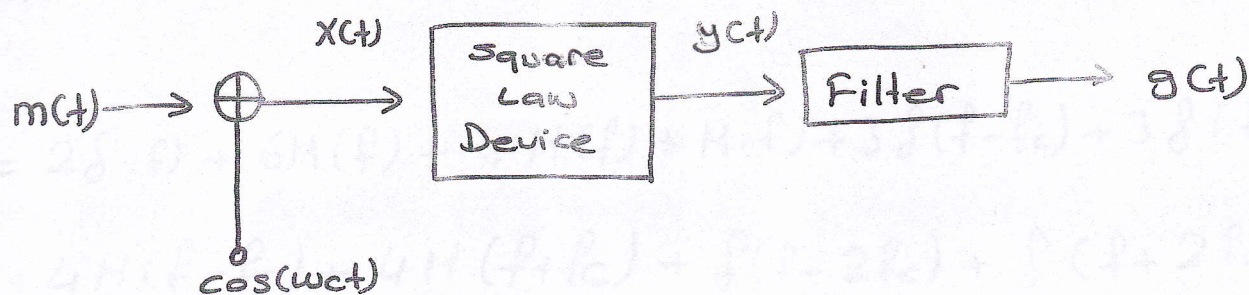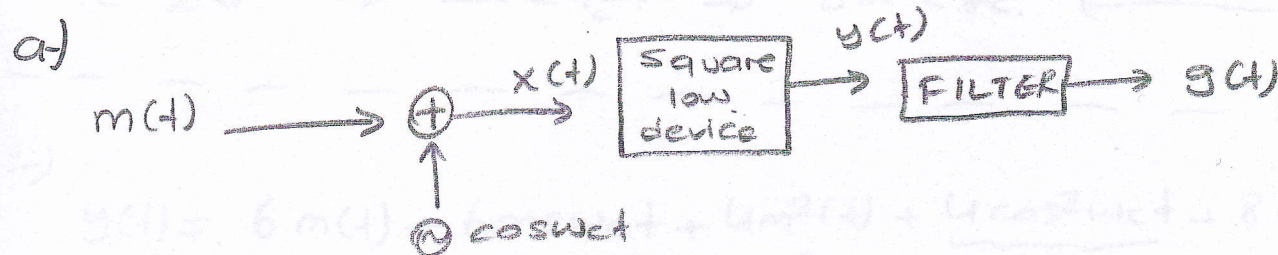
Assume that the average value of m(t) is zero and the minimum value of x(t) is M. Also assume that the square law device is defined by $y(t) = 6x(t) + 4x^2(t)$.

a-) Write the equation for y(t) and sketch its frequency spectrum.

b-) Describe the filter that yields an AM signal for g(t). Give the neccessary filter type and frequency of interest.

c-) What value of M yields a modulation index of 0,1?

Çözüm:

a-)

m(t) ──→ ⊕ ──X(t)──→ [Square low device] ──y(t)──→ [FILTER] ──→ g(t)
           ↑
      @ coswct

$$X(t) = m(t) + \cos w_c t$$

$$y(t) = 6x(t) + 4x^2(t)$$

$$= 6m(t) + 6\cos w_c t + 4m^2(t) + 4\cos^2 w_c t + 8m(t)\cos w_c t$$