M. Hasyim Abdillah P. 1101190095 TT-43-11

1. $s(t) = [20 + 2\cos(3000\pi t) + 10\cos(6000\pi t)]\cos(2\pi f_c t)$

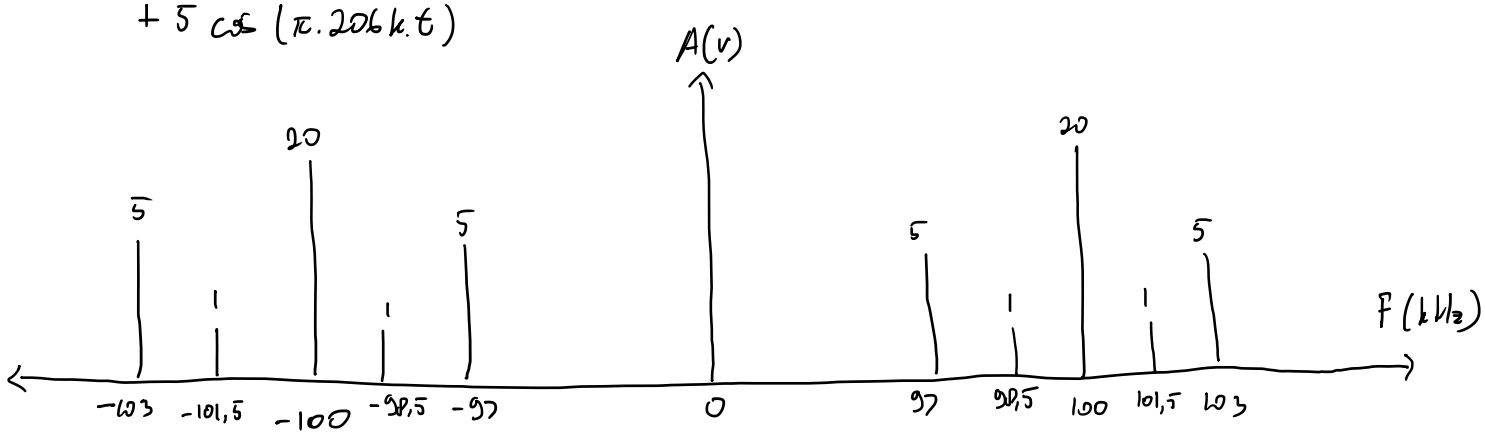
$f_c = 10^5$ Hz

a. $s(t) = [20 + 2\cos(3000\pi t) + 10\cos(6000\pi t)]\cos(2\pi 10^5 t)$

$s(t) = 20(2\pi 10^5 t) + 2\cos(3000\pi t)\cos(2\pi 10^5 t) + 10\cos(6000\pi t)\cos(2\pi 10^5 t)$

$s(t) = 20(2\pi 10^5 t) + \cos(\pi.203k\,t) + \cos(\pi.197k\,t) + 5\cos(\pi.194k.t)$

$+ 5\cos(\pi.206k.t)$



b. $s(t) = [20 + 2\cos(3000\pi t) + 10\cos(6000\pi t)]\cos(2\pi f_c t)$

$s(t) = 20[1 + 0{,}1\cos(3000\pi t) + 0{,}5(6000\pi t)]\cos(2\pi f_c t)$

$\mu_T = \sqrt{\mu_1^2 + \mu_2^2} = \sqrt{0{,}1^2 + 0{,}5^2} = 0{,}51$

c. $P_c\,(100\,kHz) = \frac{20^2}{2} = 200$ W/Ω

$P_{m_1}(100k \pm 1{,}5k) = \frac{1^2}{2} = 0{,}5$ W/Ω

$P_{m_2}(100k \pm 3k) = \frac{5^2}{2} = 12{,}5$ W/Ω

d. Daya pada sideband :

$2P_{m_1} + 2P_{m_2} = 2.\,0{,}5 + 2.\,12{,}5 = 26$ W/Ω

Daya total :

$P_c + 2P_{m_1} + 2P_{m_2} = 200 + 26 = 226$ W/Ω

Perbandingan daya total & daya sideband $= \frac{26}{226} = 0{,}115$

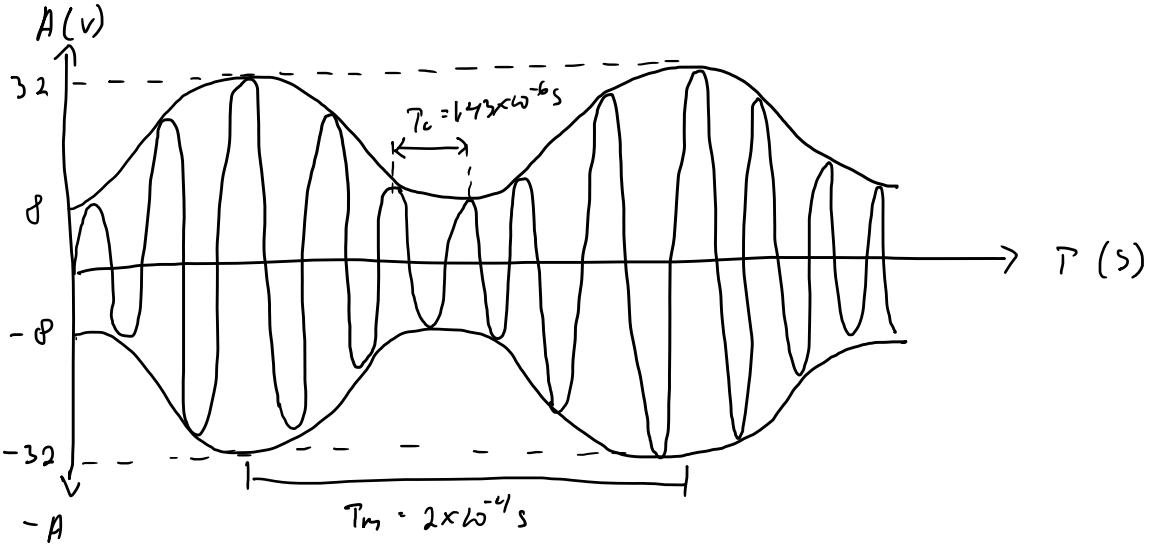
2. a. $\mu = 60\% = 0,6$ $\quad f_c = 700\ kHz$

$A_c = 20\ V$ $\quad f_m = 5\ kHz$

$H = A_c(1+\mu) = 20(1+0,6) = 32\ V$

$h = A_c(1-\mu) = 20(1-0,6) = 8\ V$

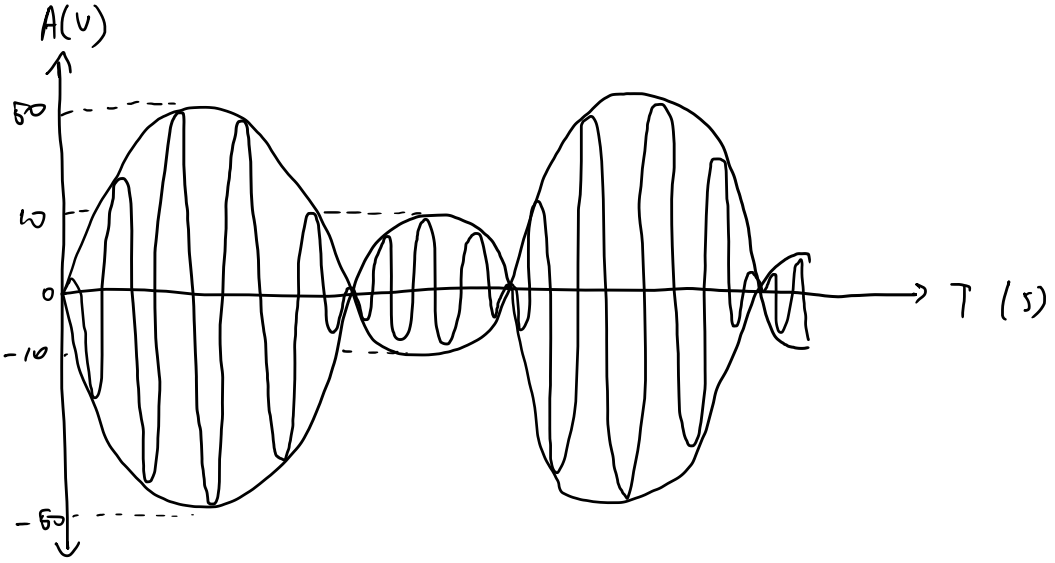
$T_c = \frac{1}{700k} = 1,43 \times 10^{-6}\ s$ $\quad T_m = 2 \times 10^{-4}\ s$



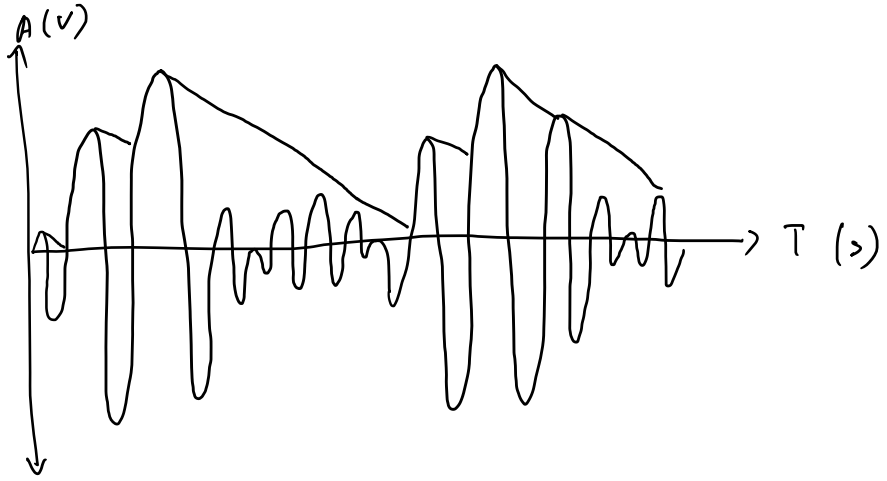
b. $\mu = 150\% = 1,5$

$H = A_c(1+\mu) = 20(1+1,5) = 50\ V$

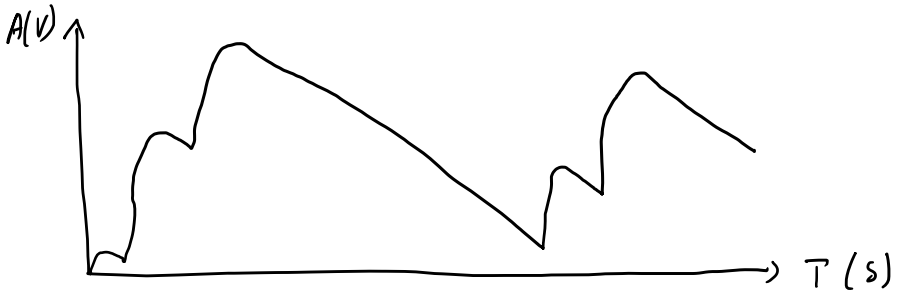
$h = A_c(1+\mu) = 20(1-1,5) = -10\ V$



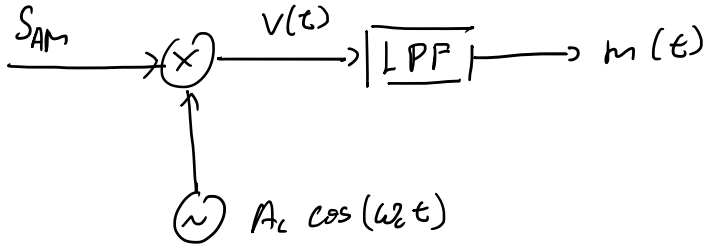
c.



output :



d.



a) $S_{AM} = A_c \cos(\omega_c t) + \frac{1}{2} \mu A_c \cos(\omega_c + \omega_m)t + \frac{1}{2} \mu A_c \cos(\omega_c - \omega_m)t$

b) $V(t) = A_c^2 \cos^2(\omega_c t) + \frac{1}{4} \mu A_c^2 \cos(2\omega_c + \omega_m)t + \frac{1}{4} \mu A_c^2 \cos(\omega_m t)$

$+ \frac{1}{4} \mu A_c^2 \cos(2\omega_c - \omega_m)t + \frac{1}{4} \mu A_c^2 \cos(-\omega_m t)$

c) $m(t) = \frac{1}{4} \mu A_c^2 \cos(\omega_m t) + \frac{1}{4} \mu A_c^2 \cos(-\omega_m t)$

$m(t) = \frac{\mu A_c^2}{2} \cos(\omega_m t)$

$m(t) = \frac{A_m . A_c}{2} \cos(\omega_m t)$