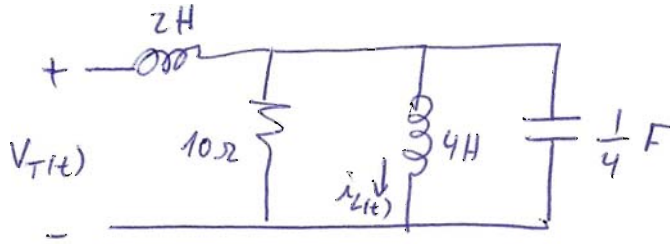


1)



Datos: $i_L(t) = 5 \sin(2t)$

$$V_L = L \frac{di_L(t)}{dt}$$

$$V_{L4} = 4 \cdot 5 \cdot 2 \cos(2t) = 40 \cos 2t$$

$$i_C = C \frac{dV_C(t)}{dt} = \frac{1}{4} \cdot 40 \cdot 2 (-\sin 2t) = -20 \sin 2t$$

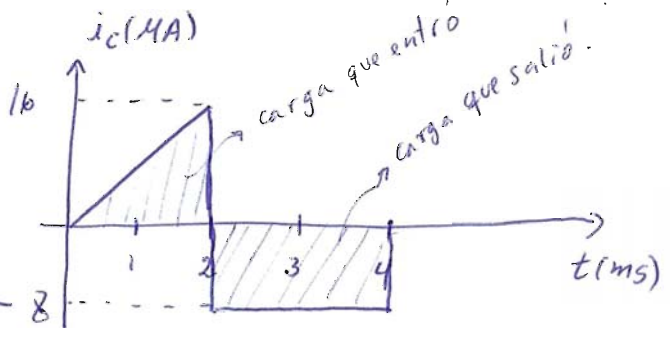
$$i_R = 4 \cos 2t$$

$$V_{L2} = 2 \frac{d}{dt} (5 \sin 2t - 20 \sin 2t + 4 \cos 2t)$$

$$V_{L2} = 2 (-30 \cos 2t - 8 \sin 2t) = -60 \cos 2t - 16 \sin 2t$$

$$V_T(t) = 40 \cos 2t - 60 \cos 2t - 16 \sin 2t$$

$$V_T(t) = -20 \cos 2t - 16 \sin 2t$$



$$i_C = C \frac{dV_C}{dt}, \quad V_C(t) = V_C(t_0) + \frac{1}{C} \int_{t_0}^t i_C(x) dx$$

2) Datos: $V_C(0) = 0V$, $C = 4\mu F$
 graficar V, P, W

$W = E(t=2ms) = ?$
 $q(1ms) = ?$, $q(3ms) = ?$

$t: 0 < t < 2ms$

$$V_C(t) = 0 + \frac{1}{4\mu} \int_0^t 8x dx = \frac{1m \cdot 8x^2}{4\mu \cdot 2} \Big|_0^t = 10^3 t^2$$

$$P(t) = V_C(t) i_C(t) = 10^3 t^2 \cdot 8 \cdot 10^{-3} t = 8t^3$$

$$E(t) = \frac{1}{2} C V_C^2(t) = 2\mu \cdot 10^6 t^4 = 2t^4$$

$t: 2ms < t < 4ms$

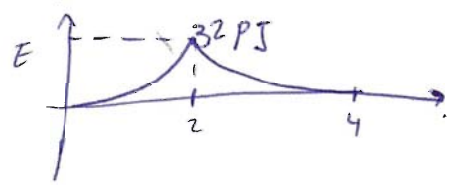
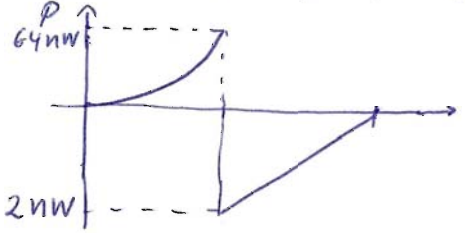
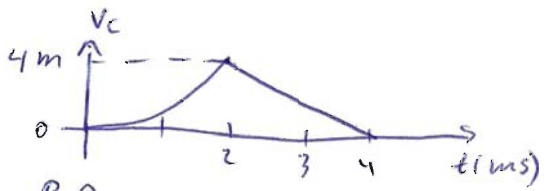
$$V_C(t) = V_C(2ms) + \frac{1}{4\mu} \int_{2ms}^t -8\mu dx = 4 \cdot 10^3 + \frac{1(-8\mu)x}{4\mu} \Big|_{2ms}^t$$

$$= 4 \cdot 10^3 + (-2t - (-2 \cdot 2m)) = 4 \cdot 10^3 - 2t + 4 \cdot 10^{-3}$$

$$= 8 \cdot 10^{-3} - 2t$$

$$P(t) = V_C(t) i_C(t) = (8 \cdot 10^{-3} - 2t)(-8\mu) = -64\eta + 16\mu t$$

$$E(t) = \frac{1}{2} C V_C^2(t) = 2\mu (8m - 2t)^2 = 2\mu (64\mu - 32mt + 4t^2)$$



$$C = \frac{1}{V} \Rightarrow q = CV \Rightarrow q(1ms) = 4\mu V_C(1ms) = 4\eta C$$

$$q(3ms) = 4\mu V_C(3ms) = 4\mu (8m - 6m) = 8\eta C$$