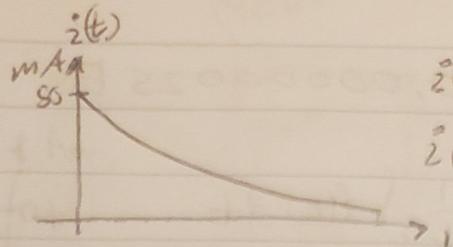
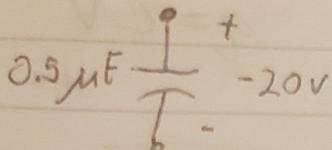


6.19



$$i(t) = 50e^{-2000t} \text{ mA}$$

$$i(t) = 0.05e^{-2000t} \text{ A}$$

$$i(t) = C V(t)$$

$$V(t) = i(t)/C$$

$$P(t) = i(t) V(t)$$

$$V(t) = \frac{1}{C} \int i(t) dt$$

$$V(t) = \frac{1}{C} \cdot \frac{-1}{40} e^{-2000t}$$

~~$$P(t) = 50e^{-2000t} \cdot \frac{1}{0.0000005} \cdot \frac{-1}{40} \cdot e^{-2000t}$$~~

~~$$= (e^{-2000t})^2 \cdot -2,500,000$$~~

~~$$= -2500000 e^{-4000t}$$~~

~~$$E = \frac{V^2 C}{2}$$~~

~~$$E = \frac{V Q}{2}$$~~

~~$$P(500) = -2800000 e^{-4000 \cdot 500} = 0 \quad E = \frac{i^2}{2C}$$~~

~~$$P(t) = 0.05e^{-4000t} \quad \checkmark$$~~

~~$$P(0.0005) = 0.05e^{-2} = 0.0068 \text{ W} = 6800 \mu\text{W}$$~~

~~$$q = CV \quad \checkmark$$~~

~~$$= C \cdot \frac{1}{C} \cdot \frac{-1}{40000} \cdot e^{-2000t}$$~~

~~$$q(t) = -\frac{e^{-2000t}}{40000}$$~~

~~$$q(0.0005) = -\frac{e^{-2}}{40000} = -0.000000$$~~

45.8

1618

b) $\lim_{t \rightarrow \infty} -\frac{e^{-2000t}}{40000} = 0$

$$6.26 \quad C = 0.00000025 F \quad q = CV \\ mA \uparrow \quad m = \frac{0.01}{0.000001} = 10000$$

$$Y(t) = \frac{1}{C} \int i(t) dt$$

400

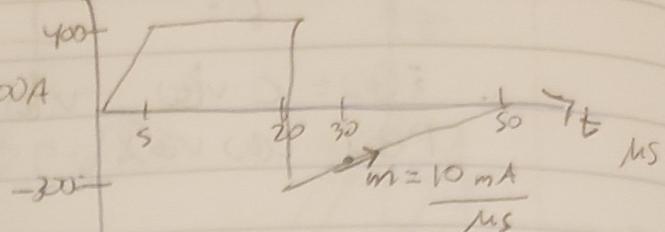
$$q(t) = \int i(t) dt$$

$$q(30\mu s) = \int i(30\mu s) dt$$

$$i(t) = 10 - 500$$

$$\int \theta dt = 5t^2 - 500t$$

$$q(30\mu s) = 50(30\mu s)^2 - 800(30\mu s)$$



$$q(t) = 5t^2 - 500t$$

$$q(t) = \frac{5000t^2}{90000} = \frac{5t^2}{90000}$$

$$V(A) = 9000000 (80\%) - 80000$$

$$V(80\text{ ns}) = 4000000 \times (10(80\text{ ns}) - 500)$$

$$V(t) = 4000000 \cancel{1000000} (5000t^2 - 800000t)$$

$$V(0.00005) = \underline{4000000} \left[5000(0.00005)^2 - 500000(0.00005) \right]$$

$$b) = \boxed{-99999950}$$

~~$g(t) = 5t^2 - 5$~~ $g(t) = 5000 t^2 - 500000 t$

$$q(0.00003) = 5000(0.00003)^2 - 500000(0.00003)$$

a) $\pm 15^\circ$

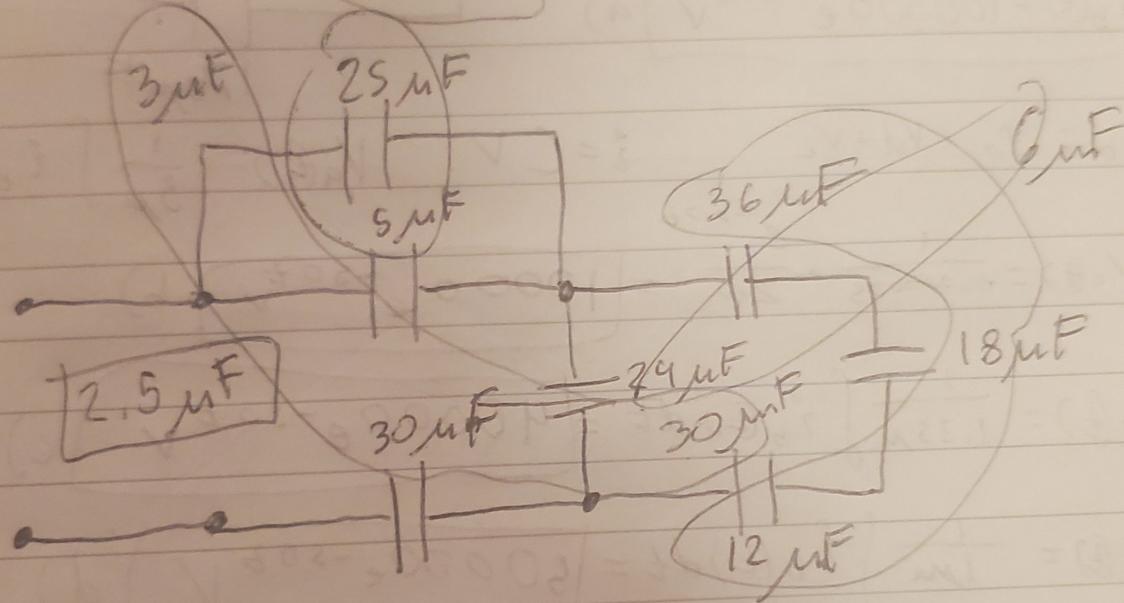
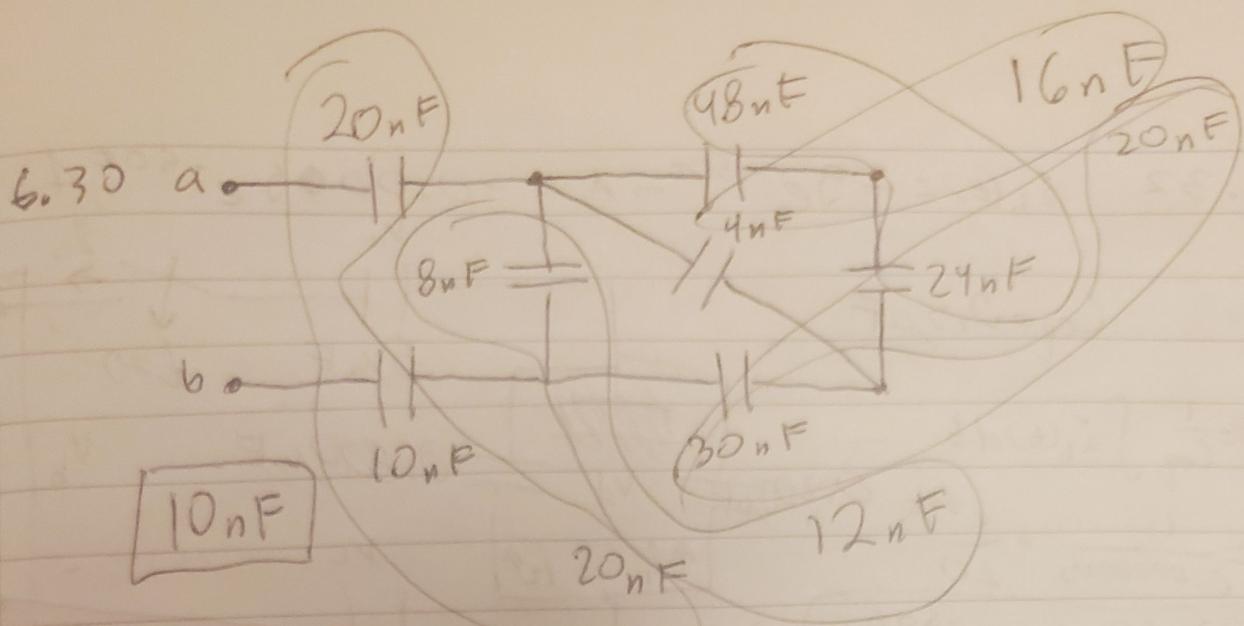
$$V(t) = 4000000 q(t)$$

$$E = \frac{VQ}{Z} = \frac{z^2}{Z}$$

$$E = \left(10000t - 500000\right)^2 / 2$$

$$\frac{100000000t^2 - 1000000000t + 25000000000}{}$$

b) $E(t) = 50000000t^2 - 5000000000t + 12500000000$



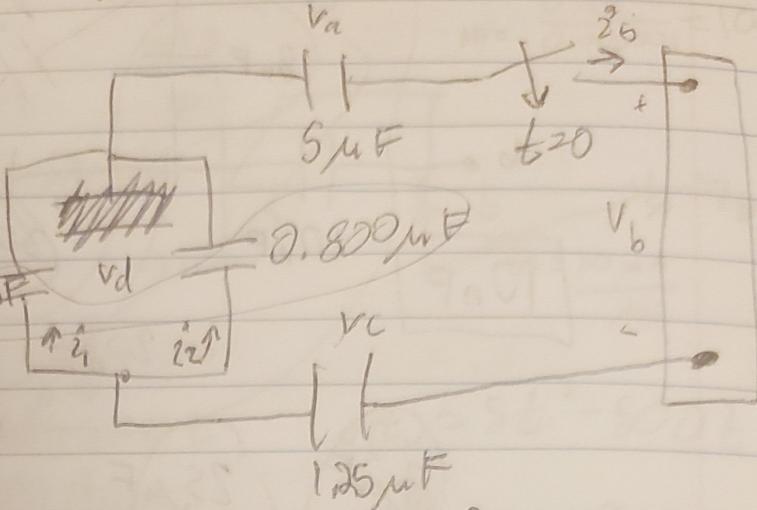
$$6.32 \quad i_b(t) = -5e^{-50t} \text{ mA} = -0.0005 e^{-50t} A$$

$$C_{eq} = 0.5 \mu F$$

$$V_B(t) = \frac{1}{C_{eq}} \int i_b(t) dt$$

$$= \frac{1}{0.00000005} \cdot \frac{e^{-50t}}{20}$$

$$V_b(t) = 100000 e^{-50t} V \quad a)$$



$$V_b = V_a + V_d + V_c$$

$$i = CV$$

$$V_a(t) = \frac{1}{L} \int i_b(t) dt$$

$$V_a(t) = \frac{1}{0.00000005} \cdot \frac{e^{-50t}}{20} = [10000 e^{-50t} V] \quad b)$$

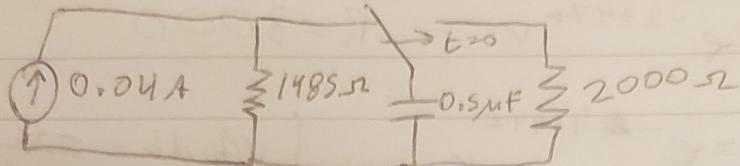
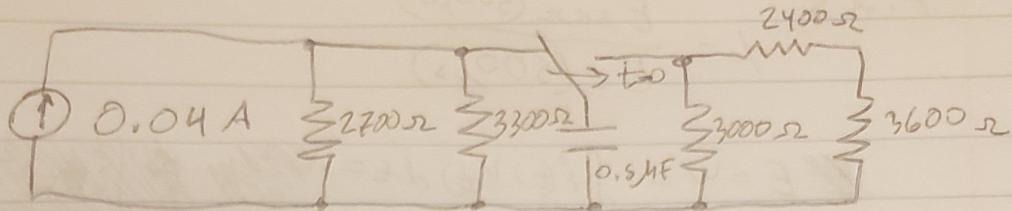
$$V_c(t) = \frac{1}{1.25 \mu} \int i_b(t) dt = [40000 e^{-50t} V] \quad c)$$

$$V_d(t) = \frac{1}{0.2 \mu} \int i_b(t) dt = [80000 e^{-50t} V] \quad d)$$

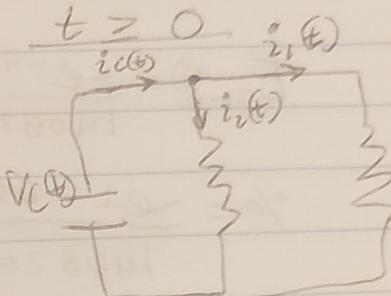
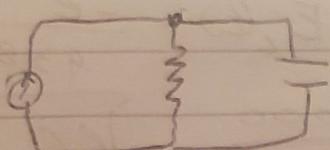
$$i_1(t) = 0.2 \mu \quad V_d'(t) = (0.0000002) \cdot (-2500000 e^{-50t}) = [-0.5 e^{-50t} A]$$

$$i_2(t) = 0.8 \mu \quad V_d'(t) = (0.0000008) \cdot (-2500000 e^{-50t}) = [-2 e^{-50t} A] \quad f)$$

7. 22



~~t = 0~~



$$V_R = V_C \quad \frac{V_R}{R} + i_R = 0.04 A$$

$$i_R = C V_R$$

$$\frac{V_R}{R} + C V_R = 0.04 A$$

$$\frac{V_R}{R} + \frac{V_R}{RC} = \frac{0.04}{C} = 80000$$

~~$$X + \frac{1}{RC} = \frac{0.04}{C} \rightarrow X + \frac{1}{2000 \cdot 0.5 \cdot 10^{-6}} = 80000 \rightarrow X = 78653 \Omega$$~~

~~$$DV_C + \frac{1}{RC} V_C = 80000$$~~

~~$$V_C(D + \frac{1}{RC}) = 80000$$~~

~~$$D + \frac{1}{RC} = 0 \quad D = -\frac{1}{RC} = -1347$$~~

~~$$y_0(t) = C e^{-1347t}$$~~

~~$$y_0(0) = 1 = C \quad y_0(t) e^{-1347t} = V_C(t)$$~~

$$V_C(t) = 0 + (e^{-1347t} - 1) e^{-t/0.001} \quad V = [e^{-2347t}] \quad a)$$

$$i_R(t) = \frac{V(t)}{R} = \frac{e^{-2347t}}{6000} A = \boxed{\frac{1}{6000} e^{-2347t} A} \quad b)$$

$$7.23 \quad \% = \frac{E_{3KR}(500\mu s)}{E_c(500\mu s)}$$

$$\cancel{E = W = \int i(t) V(t) dt} = \cancel{\int i(t) V(t) dt} \cancel{+ \int \frac{1}{R} V(t) dt}$$

$$V(t) = e^{-2347t} v \quad R = 3000$$

$$V^2(t) = e^{-4694t} v \quad \int V(t) dt = -e^{-4694t} / 4694$$

$$E_{3KR} = \frac{-e^{-4694t}}{14082000} \quad \cancel{E_c(t) = \frac{-e^{-4694t}}{9388000}}$$

$$\% = \frac{-e^{-4694t}}{14082000} \cdot \frac{9388000}{-e^{-4694t}} = 66.7\%$$