

Problem 5

HW # 9-5

b) by KVL we have

$$2 - \nu_L(t) \cdot 200 - V_L(t) = 0$$

$$\Rightarrow 2 - i_L(t) \cdot 200 - 50 \text{ mH} \cdot \frac{di_L(t)}{dt} = 0$$

$$\boxed{\Rightarrow 2 - 200 \cdot i_L(t) - 0.05 \cdot \frac{di_L(t)}{dt} = 0}$$

c) in s-domain

$$2 - 200 I_L(s) - 0.05 (s I_L(s) - I_L(0)) = 0$$

$$\Rightarrow 2 - 200 I_L(s) - 0.05 s I_L(s) + 0.05 \cdot 0 = 0$$

$$\Rightarrow 2 = 200 I_L(s) + 0.05 s I_L(s)$$

$$\boxed{\Rightarrow I_L(s) = \frac{2}{200 + 0.05s}}$$

Problem 6

$$a) F(s) = \frac{4}{(s+1)(s+3)} \Rightarrow \frac{A}{s+1} + \frac{B}{s+3} \Rightarrow 4 = A(s+3) + B(s+1)$$

$$\text{put } s = -1$$

$$4 = A(-1+3) + B(0)$$

$$4 = 2A \Rightarrow \boxed{A = 2}$$

$$s = -3$$

$$4 = A(0) + B(-2+1)$$

$$4 = -2B \Rightarrow \boxed{B = -2}$$

$$F(s) = \frac{2}{s+1} - \frac{2}{s+3} \Rightarrow L^{-1}[F(s)] = 2 L^{-1}\left[\frac{1}{s+1}\right] + (-2) L^{-1}\left[\frac{1}{s+3}\right]$$

$$f(t) = 2e^{-t} - 2e^{-3t} \Rightarrow$$

$$\boxed{f(t) = 2(e^{-t} - e^{-3t})}$$