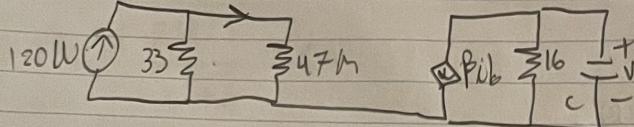


Problem 4

b)



$$ib = \frac{120 \text{ V} \cdot 33}{33 + 47} = 49.5 \text{ mA}$$

$$V_c(\infty) = -\beta ib \cdot 16 \text{ k}\Omega \Rightarrow -50 \cdot 49.5 \times 10^{-3} \cdot 16 \times 10^3$$

$$V_c(\infty) = -39.6 \text{ V} \Rightarrow V_c(0^+) = V_c(0^-)$$

$$V_c(t) = V_c(\infty) + (V_c(0^+) - V_c(\infty)) e^{-t/RC}$$

$$\gamma = RC = 0.25 \cdot 16 \times 10^3 \cdot 4 \cdot 10^{-3} \text{ sec}$$

$$V_c(t) = -39.6 + (0 + 39.6) e^{-t/4 \text{ m}} \Rightarrow -39.6 (1 - e^{-t/4 \text{ m}})$$

$$c) V_c(t) = \frac{36}{100} \cdot (-39.6)$$

$$= 0.36 \times (-39.6) \Rightarrow -39.6 (1 - e^{-t/4 \text{ m}})$$

$$e^{-t/4 \text{ m}} = 1 - 0.36 = 0.64$$

$$-t/4 \text{ m} = \ln(0.64) \Rightarrow t = 4 \text{ m} \cdot 0.4446$$

$$t = 1.785 \times 10^{-3} \text{ sec}$$

$$t = 1.785 \text{ m}$$