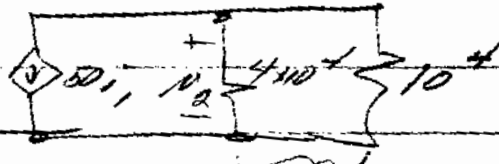
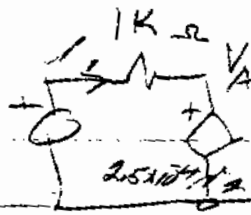


ES 332

Homework 5

2.11

a)



$$\frac{4}{5} \times 10^{-3} = 8 \times 10^{-3} = \beta i_1$$

$$V_A = 2.5 \times 10^{-4} N_2$$

$$i_1 = \frac{N_1 - V_A}{10^3} = \frac{N_1 - 2.5 \times 10^{-4} N_2}{10^3}$$

$$50 i_1 + \frac{N_2}{8 \times 10^3} = 0 = 50 (10^{-3} N_1 - 2.5 \times 10^{-7} N_2) + 0.125 \times 10^{-3} N_2$$

$$\therefore 50 \times 10^3 N_1 = 50 \times 2.5 \times 10^7 N_2 - 0.125 \times 10^{-3} N_2$$

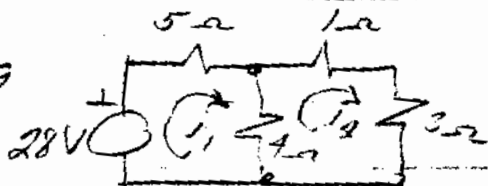
$$N_1 = \left(2.5 \times 10^{-4} - 2.5 \times 10^{-3} \right) N_2 = -2.25 \times 10^{-3} N_2$$

$$\frac{N_2}{N_1} = -\frac{1}{2.25 \times 10^{-3}} = \boxed{-444.44} \leftarrow$$

$$b) i_1 = \frac{N_1 - V_A}{10^3} = \frac{N_1 - 2.5 \times 10^{-4} N_2}{10^3} = \frac{N_1 - 2.5 \times 10^{-4} (-444.44) N_1}{10^3}$$

$$\text{so } \frac{N_1}{N_2} = \frac{10^3}{1 + 0.1111} = \boxed{900 \Omega} \leftarrow$$

2.19



$$28 = 5i_1 + 4(i_1 - i_2)$$

$$0 = 4(i_2 - i_1) + 4i_2$$

$$\text{or } \begin{cases} 9i_1 - 4i_2 = 28 \\ -4i_1 + 8i_2 = 0 \end{cases}$$

$$i_1 = \frac{\begin{vmatrix} 28 & -4 \\ 0 & 8 \end{vmatrix}}{\begin{vmatrix} 9 & -4 \\ -4 & 8 \end{vmatrix}} = \frac{224}{72 - 16} = \frac{224}{56} = \boxed{4A} \leftarrow$$

$$\begin{vmatrix} 9 & 28 \\ -4 & 0 \end{vmatrix}$$

$$\frac{4 \times 28}{56} = \boxed{2A} \leftarrow$$