Spring 2008

EECS70A / CSE 70A Network Analysis I
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Homework # 2 solution

Chapter 2, Solution 1.

v = iR   i = v/R = (16/5) mA = **<u>3.2 mA</u>**

Chapter 2, Solution 3.

For silicon, $\rho = 6.4x10^2$ Ω-m. $A = \pi r^2$. Hence,

$$R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2} \longrightarrow r^2 = \frac{\rho L}{\pi R} = \frac{6.4x10^2 x 4x10^{-2}}{\pi x 240} = 0.033953$$

r = **<u>0.1843 m</u>**

Chapter 2, Solution 5.

n = 9; l = 7; **b** = n + l – 1 = **<u>15</u>**

Note: The loop should not have any internal loop and should be independent. From the figure of circuit, we need to count on only independent closed loops.

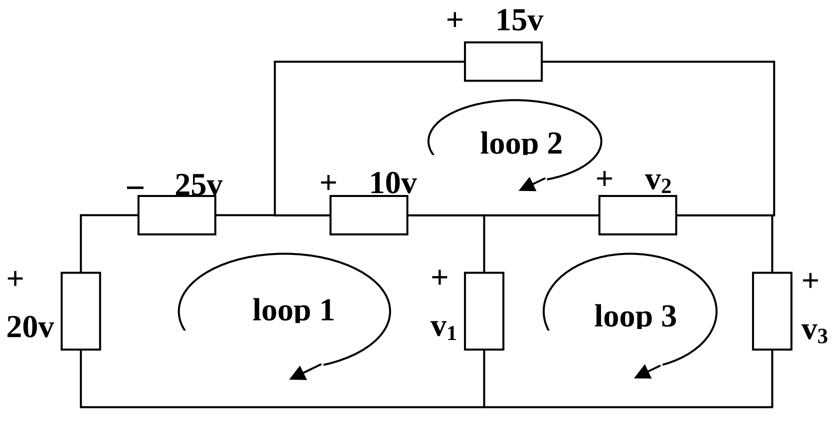
Chapter 2, Solution 9.

At A, $2 + 12 = i_1 \longrightarrow i_1 = \underline{14\ A}$

At B, $12 = i_2 + 14 \longrightarrow i_2 = \underline{-2\ A}$

At C, $14 = 4 + i_3 \longrightarrow i_3 = \underline{10\ A}$

Chapter 2, Solution 12.



For loop 1, $-20 -25 +10 + v_1 = 0 \longrightarrow$ $\underline{\mathbf{v_1 = 35v}}$
For loop 2, $-10 +15 -v_2 = 0 \longrightarrow$ $\underline{\mathbf{v_2 = 5v}}$
For loop 3, $\mathbf{-v_1 +v_2 +v_3 = 0} \longrightarrow$ $\underline{v_3 = 30v}$

Chapter 2, Solution 18.

Applying KVL,

$-30 -10 +8 + I(3+5) = 0$

$8I = 32 \longrightarrow$ $I = \underline{\mathbf{4A}}$

$-V_{ab} + 5I + 8 = 0 \longrightarrow$ $V_{ab} = \underline{\mathbf{28V}}$

Chapter 2, Solution 43.

(a) $R_{ab} = 5 \| 20 + 10 \| 40 = \frac{5x20}{25} + \frac{400}{50} = 4 + 8 =$ $\underline{\mathbf{12\ \Omega}}$

(b) $60 \| 20 \| 30 = \left(\frac{1}{60} + \frac{1}{20} + \frac{1}{30}\right)^{-1} = \frac{60}{6} = 10\Omega$

$R_{ab} = 80 \| (10 + 10) = \frac{80 + 20}{100} =$ $\underline{\mathbf{16\ \Omega}}$

Chapter 2, Solution 45.

(a) 10//40 = 8, 20//30 = 12, 8//12 = 4.8

$R_{ab} = 5 + 50 + 4.8 = \underline{59.8\Omega}$

(b) 12 and 60 ohm resistors are in parallel. Hence, 12//60 = 10 ohm. This 10 ohm
and 20 ohm are in series to give 30 ohm. This is in parallel with 30 ohm to give 30//30 = 15 ohm. And 25//(15+10) = 12.5. Thus

$R_{ab} = 5 + 12.8 + 15 = \underline{32.5\Omega}$