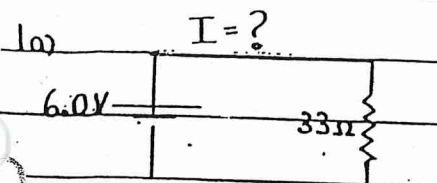


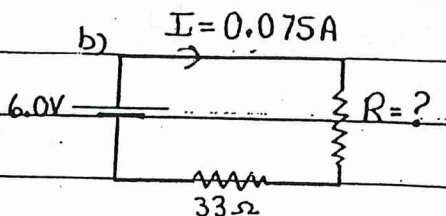
# KIRCHHOFF'S LAWS

NAME: Key



$$I = \frac{V}{R} = \frac{6V}{33\Omega}$$

$$= 0.18 \text{ A } \checkmark$$

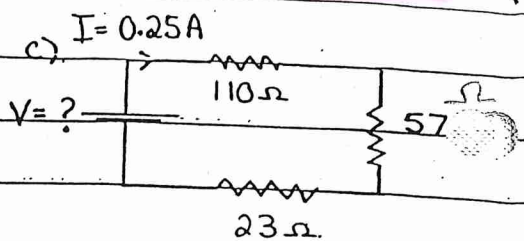


$$R_T = \frac{V_{AB}}{I_0} = \frac{6V}{0.075 \text{ A}}$$

$$= 33 \Omega$$

$$R = R_T - 33 \Omega$$

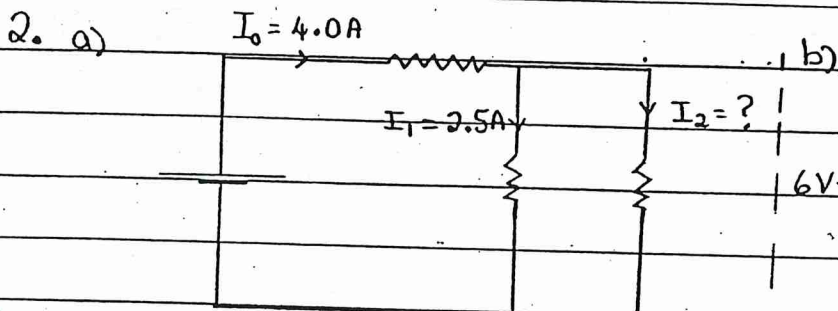
$$= 47 \Omega \checkmark$$



$$V_{AB} = I_0 R_T$$

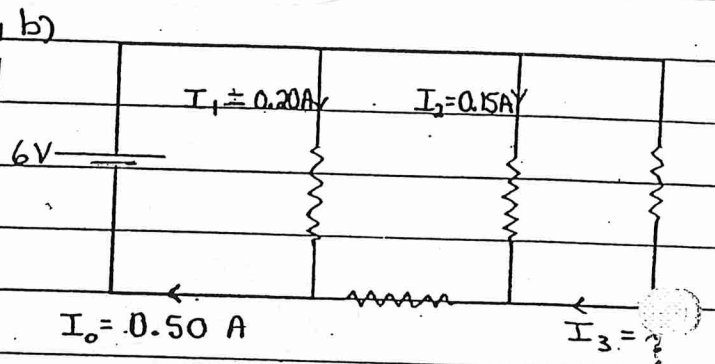
$$= 0.25(110 + 23 + 57)$$

$$= 47.5 \text{ V } \checkmark$$



$$I_2 = I_0 - I_1 = 4 - 2.5$$

$$= 1.5 \text{ A } \checkmark$$

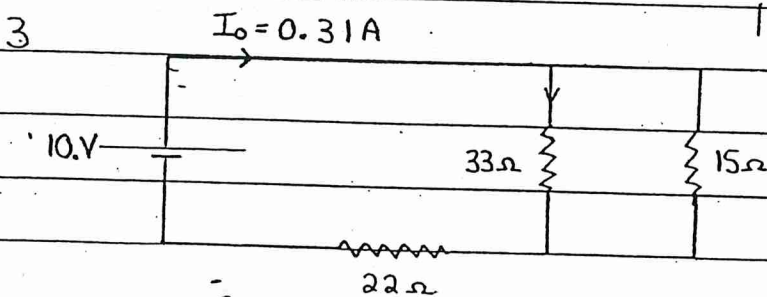


$$I_0 = 0.50 \text{ A}$$

$$I_3 = I_0 - I_1 - I_2$$

$$= 0.5 - 0.2 - 0.15$$

$$= 0.15 \text{ A } \checkmark$$



Find  $V_{22} = \frac{0.31 \text{ A}}{22 \Omega} = 6.82 \text{ V}$   $I_{22} = I_0 = 0.31 \text{ A}$   $\checkmark$

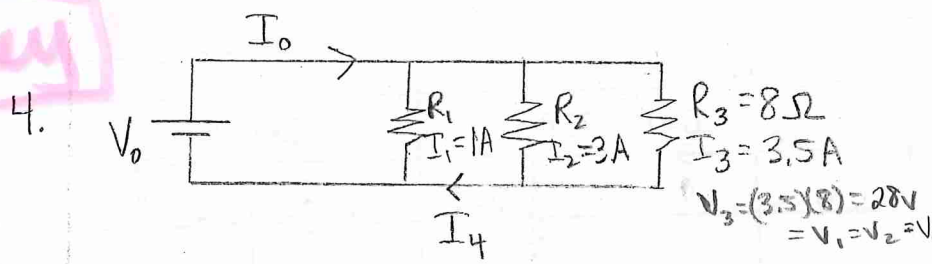
$V_{33} = 10 - 6.82 = 3.18 \text{ V}$   $I_{33} = \frac{3.18 \text{ V}}{33 \Omega} = 0.096 \text{ A}$   $\checkmark$

$V_{15} = 10 - 6.82 = 3.18 \text{ V}$   $I_{15} = \frac{3.18 \text{ V}}{15 \Omega} = 0.21 \text{ A}$   $\checkmark$

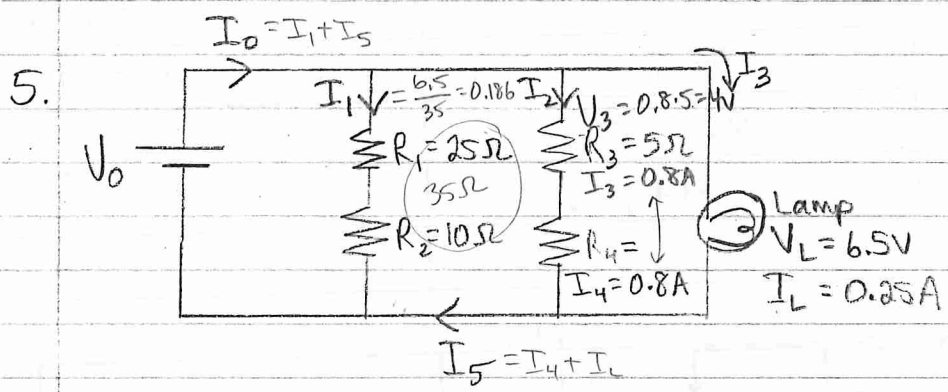
Answers:

- 1a) 0.18 A    b) 47Ω    c) 47.5 V    2. a) 1.5 A    b) 0.15 A
3. 6.8 V, 0.31 A, 3.2 V, 0.096 A, 3.2 V, 0.21 A

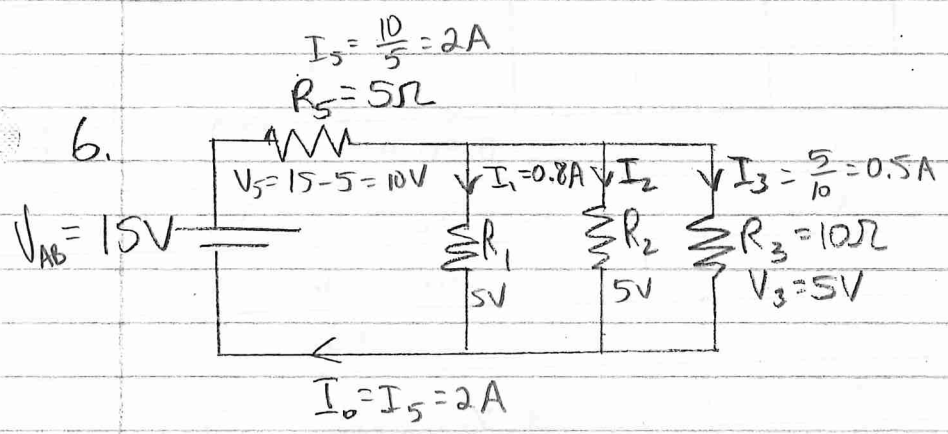
**Key**



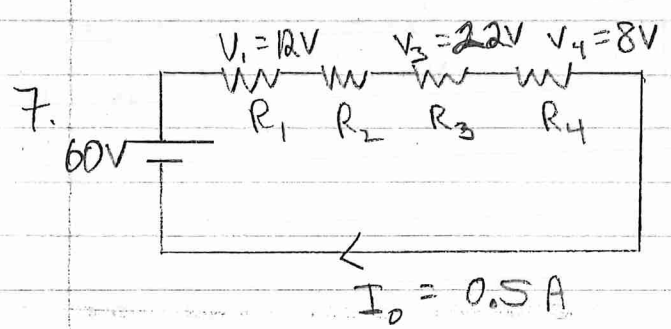
$V_0 = 28V \checkmark$   
 $I_0 = I_1 + I_2 + I_3 = 7.5A \checkmark$   
 $I_4 = 3 + 3.5 = 6.5A \checkmark$   
 $R_2 = \frac{28V}{3A} = 9.3\Omega \checkmark$   
 $P_{R_3} = IV = (3.5)(28) = 98W \checkmark$   
 $R_T = \frac{V_0}{I_0} = \frac{28V}{7.5A}$



$R_L = \frac{V_L}{I_L} = \frac{6.5}{0.25} = 26\Omega \checkmark$   
 $V_0 = V_L = V_2 = V_1 = 6.5V \checkmark$   
 $I_1 = \frac{V}{R} = \frac{6.5}{25+10} = 0.186A \checkmark$   
 $I_5 = I_4 + I_L = 1.05A \checkmark$   
 $R_4 = \frac{6.5 - 4V}{0.8A} = 3.125\Omega \checkmark$   
 $R_T = \frac{V_0}{I_0} = \frac{6.5V}{0.186 + 1.05} = 5.26\Omega \checkmark$   
 $P_{R_3} = I_3^2 R_3 = (0.8)^2 (5) = 3.2W \checkmark$   
 $P_L = I_L V_L = 1.625W \checkmark$



$V_5 = 15 - 5 = 10V \checkmark$   
 $I_0 = I_5 = \frac{10}{5} = 2A \checkmark$   
 $I_3 = \frac{V_3}{R_3} = \frac{5}{10} = 0.5A \checkmark$   
 $I_2 = 2A - 0.8 - 0.5 = 0.7A \checkmark$   
 $R_T = \frac{V_{AB}}{I_0} = \frac{15}{2} = 7.5\Omega \checkmark$



$V_2 = 60 - 12 - 22 - 8 = 18V \checkmark$   
 $R_3 = \frac{V_3}{I_0} = \frac{22}{0.5} = 44\Omega \checkmark$   
 $R_T = \frac{V_{AB}}{I_0} = \frac{60V}{0.5A} = 120\Omega \checkmark$   
 $P_{R_4} = IV = (0.5)(8) = 4W \checkmark$   
 $P_T = I_0 V_{AB} = (0.5)(60) = 30W \checkmark$

Answers:

4. 28V, 7.5A, 6.5A, 9.3Ω, 98W, 3.73Ω  
 5. 26Ω, 6.5V, 0.186A, 1.05A, 3.125Ω, 5.26Ω, 3.2W, 1.625W  
 6. 10V, 2.0A, 0.5A, 0.7A, 7.5Ω  
 7. 18V, 44Ω, 120Ω, 4W, 30W