

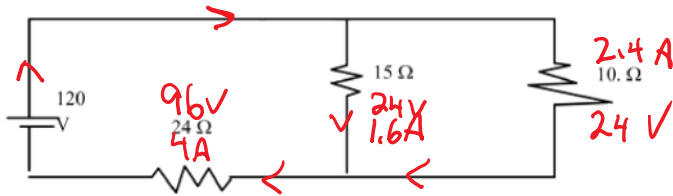
Lesson 5 Homework Solutions

May 26, 2020 8:10 PM

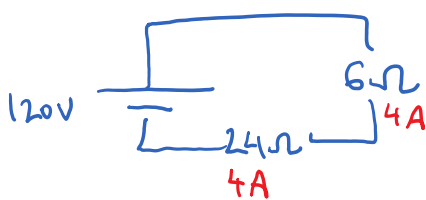
Lesson 5 Homework

1. Find R_T , I_T , then all voltages and currents

(30. Ω 4.0 A; 1.6 A, 24V; 2.4A, 24 V; 96V, 4.0A)



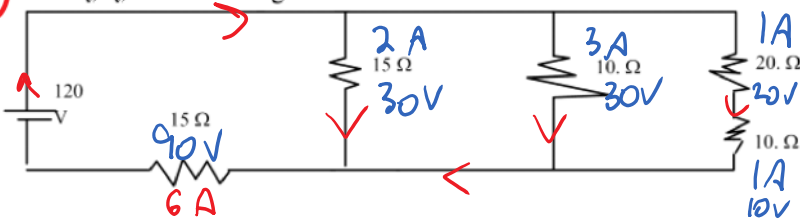
$$\frac{1}{R_{||}} = \frac{1}{15} + \frac{1}{10} \quad R_{||} = 6 \Omega$$



$$R_T = 24 + 6 = 30 \Omega$$

$$I_T = \frac{V_T}{R_T} = \frac{120}{30} = 4 \text{ A}$$

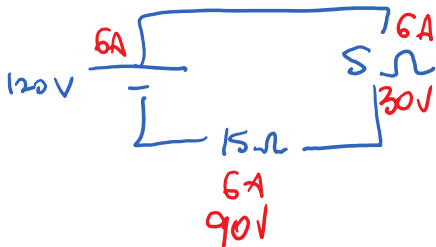
2. Find R_T , I_T , then all voltages and currents



$$\frac{1}{R_{||}} = \frac{1}{15} + \frac{1}{10} + \frac{1}{20+10}$$

$$R_{||} = 5 \Omega$$

(20. Ω , 6.0A; 90. V, 6.0A; 30. V, 2.0A; 30. V, 3.0A; 20V, 1.0A; 10. V, 1.0A)

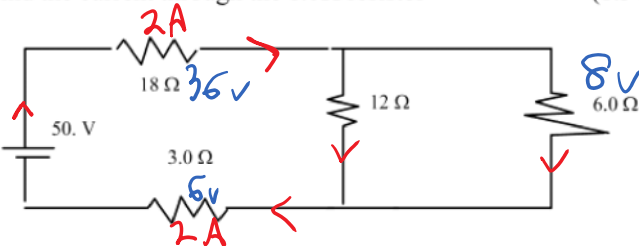


$$R_T = 20 \Omega$$

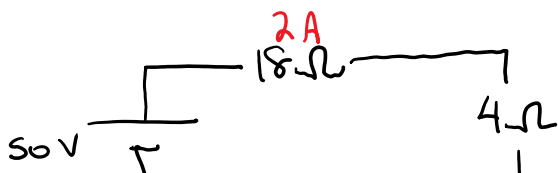
$$I_T = \frac{120}{20} = 6 \text{ A}$$

3. Find the current through the 6.0 Ω resistor

(1.3 A)



$$\frac{1}{R_{||}} = \frac{1}{12} + \frac{1}{6} \rightarrow R_{||} = 4 \Omega$$



$$R_T = 18 + 4 + 3 = 25 \Omega$$

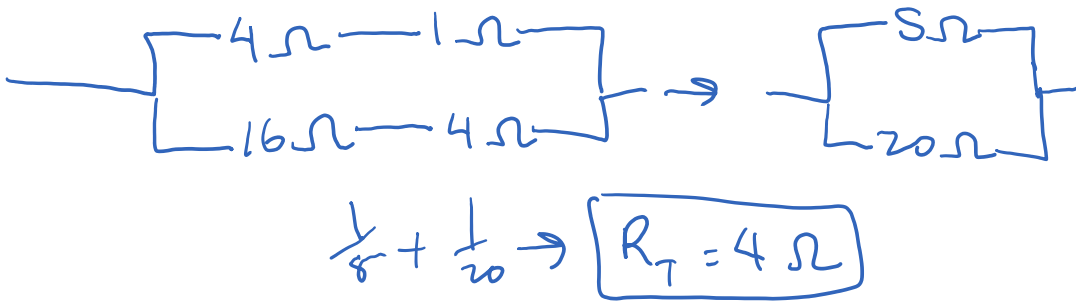
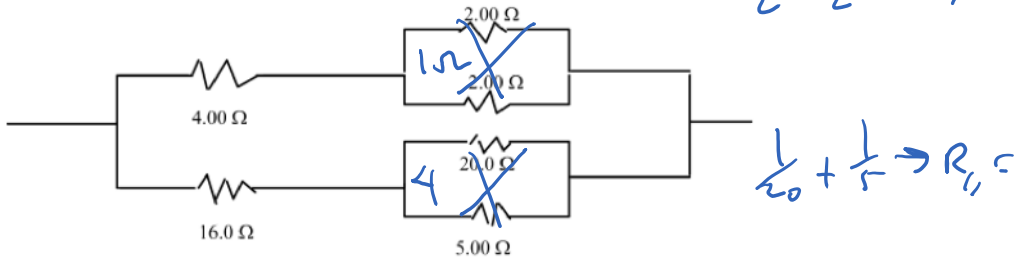
$$I = 50 - 1.3 \text{ A}$$



$$I = \frac{V}{R} = \frac{8}{6} = 1.33 A$$

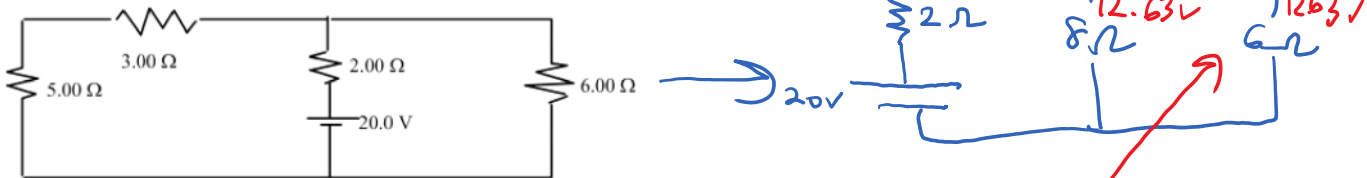
4. Find the total resistance of the circuit

(4.00Ω) $\frac{1}{2} + \frac{1}{2} \rightarrow R_{11} = 1$

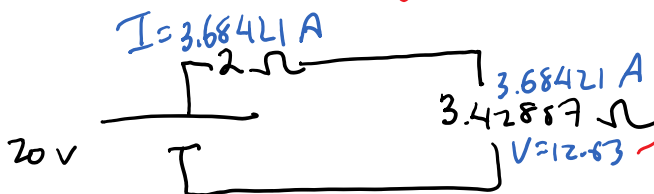


5. Find the voltage drop across the 6.00 ohm resistor

(12.6 V)

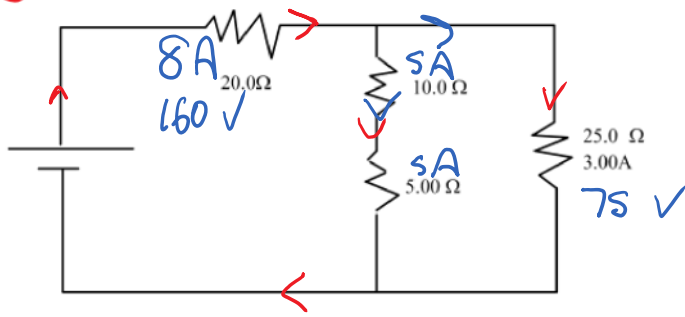


$\frac{1}{R_{11}} = \frac{1}{8} + \frac{1}{6} \rightarrow R_{11} = 3.42857 \Omega$



$R_T = 2 + 3.42857 = 5.42857$
 $I_T = \frac{20}{5.42857} = 3.68421 A$

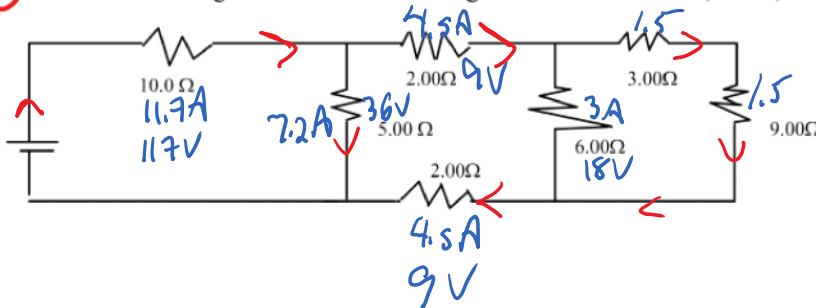
6. Find the cell voltage (235 V)



$$I = \frac{75V}{15\Omega} = 5.0A$$

$$V_T = 160 + 75 = 235V$$

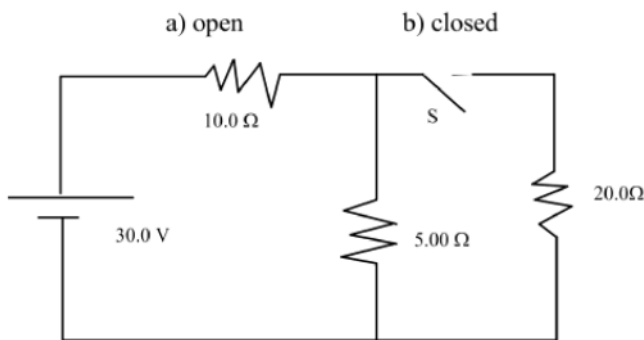
7. Find the cell voltage if 3.00A flows through the 6.00Ω resistor. (153 V)



$$I = \frac{18}{12} = 1.5A$$

$$V_T = 117 + 36 = 153V$$

8. find the total current in this circuit when the switch(S) is



a) $R_T = 10 + 5 = 15\Omega$

$$I_T = \frac{30}{15} = 2A$$

b) $\frac{1}{R_{eq}} = \frac{1}{5} + \frac{1}{20} \Rightarrow R_{eq} = 4\Omega$

$$R_T = 10 + 4 = 14$$

(2.00A; 2.14 A)

$$I_T = \frac{30}{14} \approx 2.14A$$

9. A 2.00 kg object is dropped from the top of a tree. Air resistance is negligible

a) What is the acceleration of the falling object? (9.80 m/s²)

b) what is the acceleration of the Earth? (3.28 × 10⁻²⁴ m/s²)

$$a) g = \frac{GM}{r^2} = 9.8 \text{ N/kg} = 9.80 \text{ m/s}^2$$

$$b) F_{\text{E on object}} = F_{\text{object on Earth}}$$

$$mg = M_{\text{earth}} a \rightarrow a = \frac{2(9.8)}{5.98 \times 10^{24}} = 3.28 \times 10^{-24} \text{ m/s}^2$$