

CSE250: Circuits and Electronics

Spring 2023

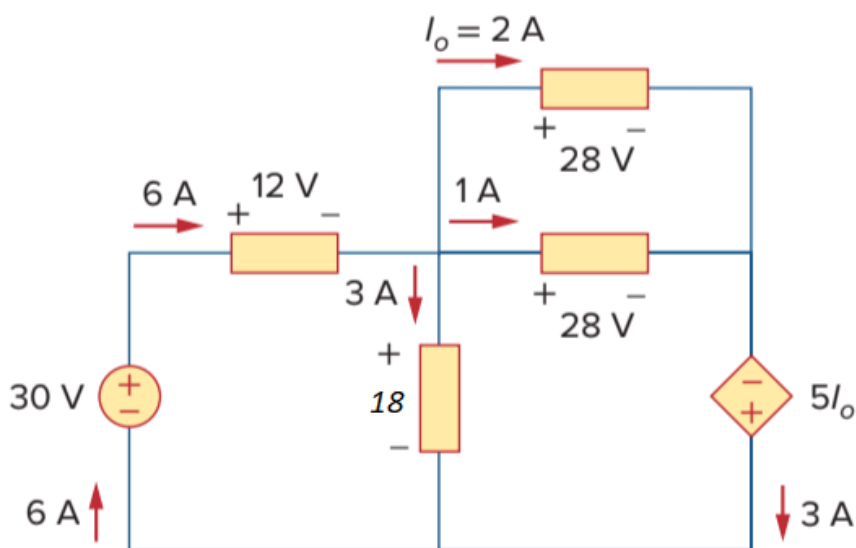
Practice Problems Set 1

1.	Calculate the amount of charge represented by 6.667 billion protons.	Answer: 1.0681×10^{-9}
2.	If the potential difference between two points is 60 V, how much energy is expended to bring 8 mC from one point to the other?	Answer: $\pm 0.48 J$
3.	How much charge passes through a radio battery of 9 V if the energy expended is 72 J?	Answer: $\pm 8 C$
4.	To move charge q from point b to point a requires 25 J. Find the voltage drop v_{ab} if: (a) $q = 5 C$, (b) $q = -10 C$.	Answer: (a) 5V, (b) - 2.5 V
5.	If 10 J work is done on a - 2C charge in moving it from point A to point B, where $V_B = 20 V$, what is the potential of point A?	Answer: 25 V
6.	The total charge entering a terminal is given by $q = (10 - 10e - 2t) mC$. Calculate the current at $t = 0.5 s$.	Answer: 2.707 mA
7.	A home electric heater draws 10 A when connected to a 115 V outlet. How much energy is consumed by the heater over a period of 6 hours?	Answer: 6.9 kWh

8. Find the power supplied/absorbed by each of the elements shown in the circuit below.

Answer:

$-180\text{ W}, 72\text{ W}, 54\text{ W},$
 $28\text{ W}, 56\text{ W}, -30\text{ W}$

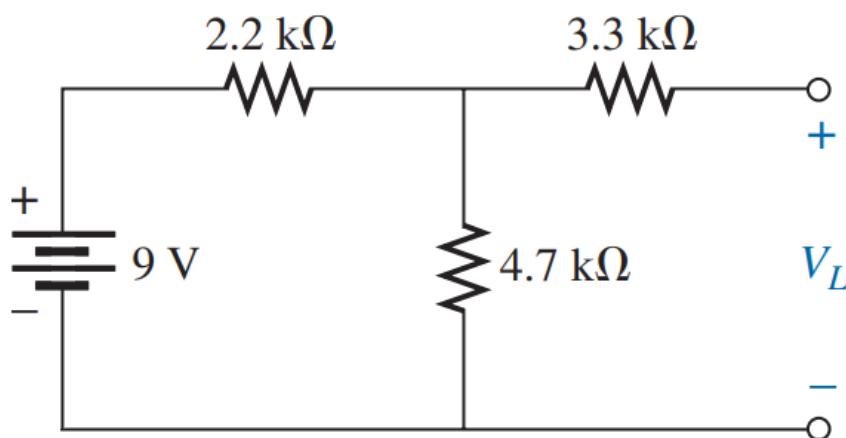


9. For the network shown below,

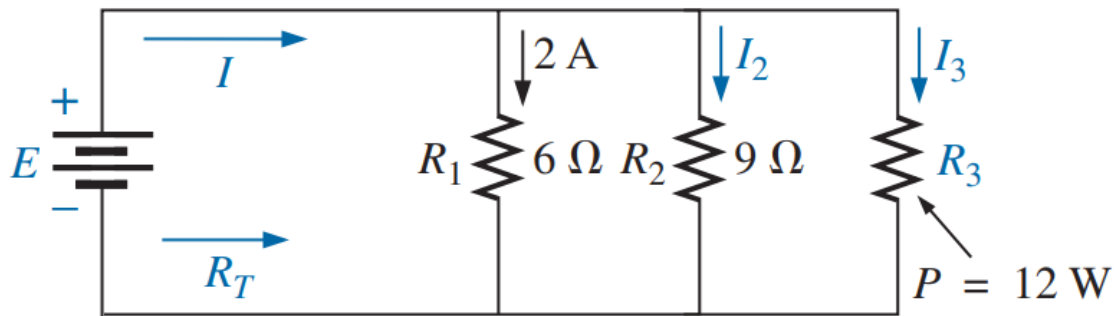
Answer:

$6.13\text{ V}, 9\text{ V}, 9\text{ V}.$

- Determine the open-circuit voltage V_L .
- If the $2.2\text{ k}\Omega$ resistor is short circuited, what is the new value of V_L ?
- Determine V_L if the $4.7\text{ k}\Omega$ resistor is replaced by an open circuit.

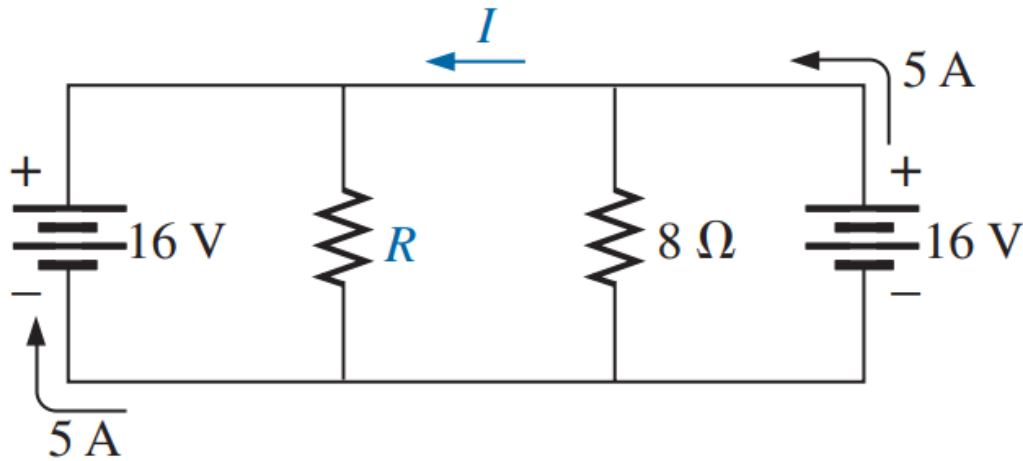


10. Find R_3 , I_3 , I_2 , I , R_T , and E .

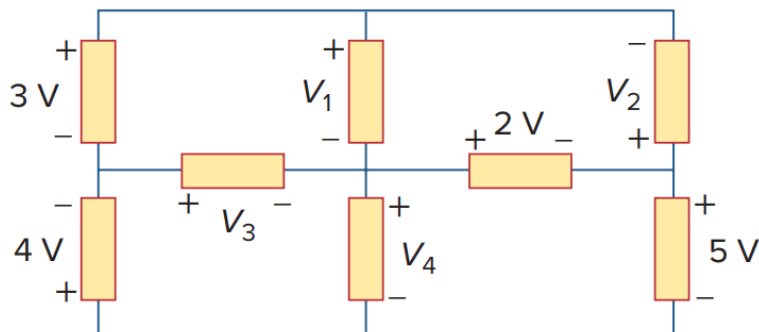


Answer:
 $12, 1 \text{ A}, \frac{4}{3} \text{ A},$
 $\frac{11}{3} \text{ A}, \frac{36}{13} \text{ A},$
 12 V

11. Assuming identical supplies, determine the current I and resistance R for the parallel network shown below. **Answer:** $3 \text{ A}, 2 \Omega$

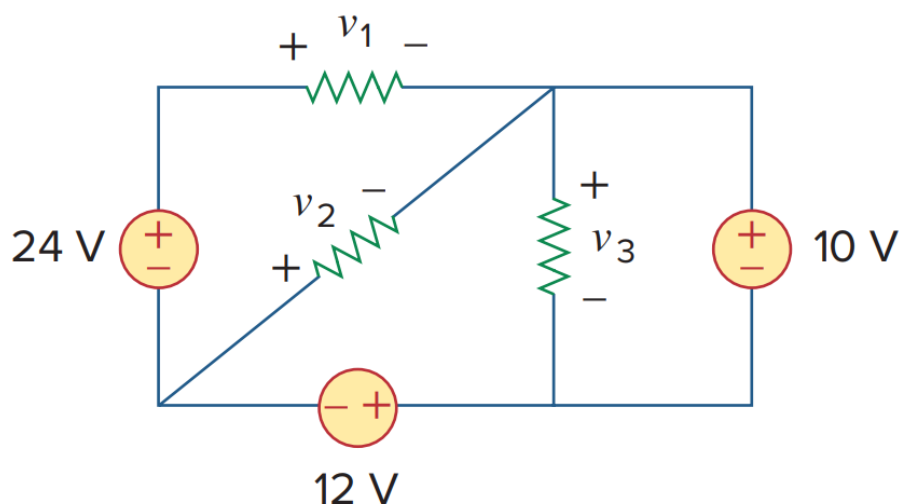


12. Given the circuit below, use KVL to find the branch voltages V_1 to V_4 . **Answer:** $-9 \text{ V}, 6 \text{ V}, -11 \text{ V}, 7 \text{ V}$



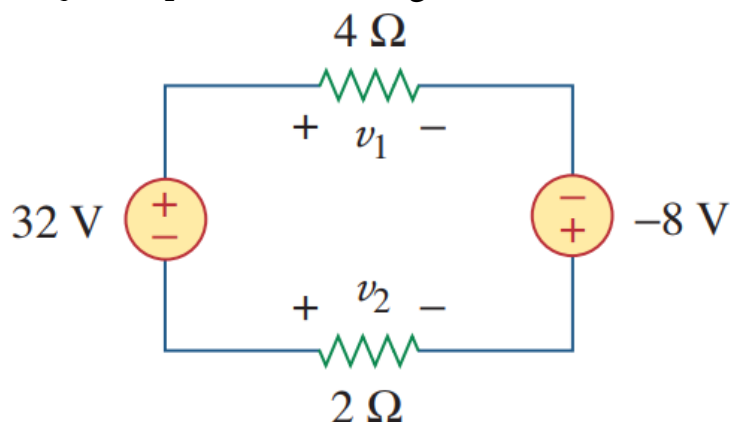
13. Obtain v_1 through v_3 in the following circuit.

Answer: 2 V ,
 -22 V , 10 V .



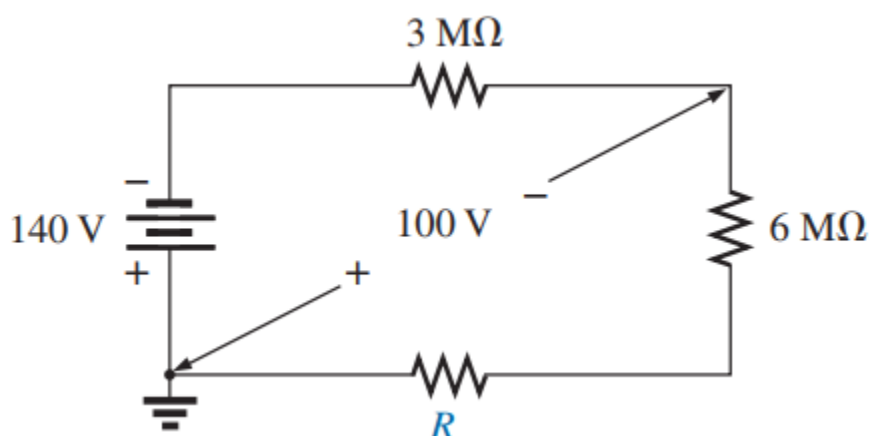
14. Find V_1 and V_2 in the following circuit.

Answer: 16 V , -8 V .



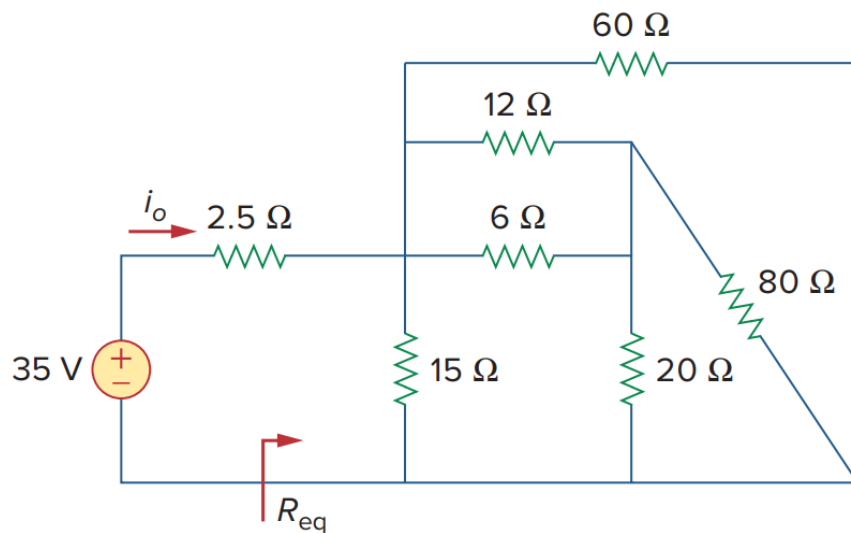
15. Using the voltage divider rule, find the unknown resistance for the configuration below.

Answer: $1.5\text{ M}\Omega$.



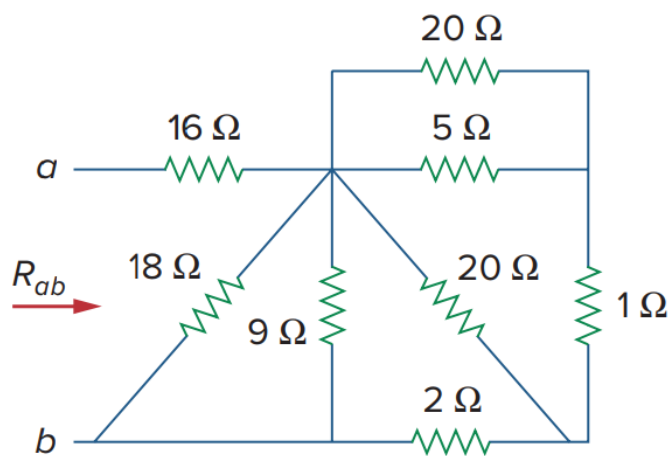
16. Find R_{eq} and i_o in the circuit shown below.

Answer: 7.5 , 3.5 A



17. Find R_{ab} for the circuit shown below.

Answer: 19 Ω



18. Find the equivalent resistance at terminals $a - b$.

Answer: 32.5 Ω .

