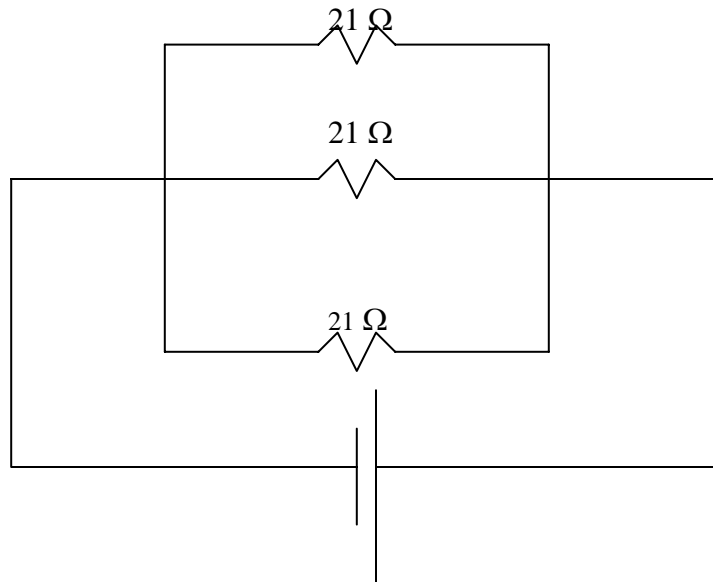


Parallel Circuits
Solutions to p 126b,c

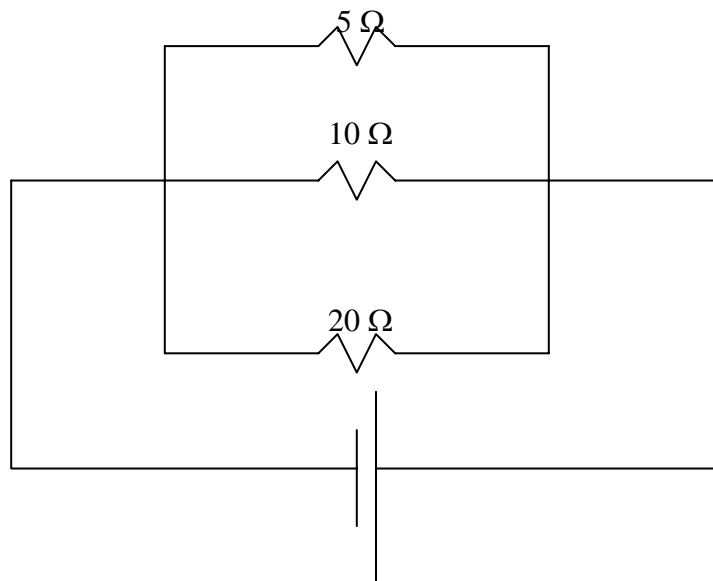
1. Find the total resistance in each case.

a.



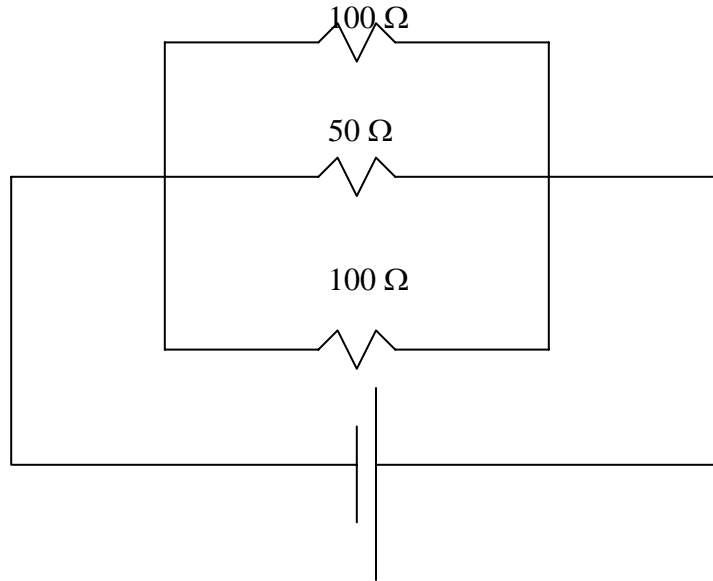
$$R_t = [R_1^{-1} + R_2^{-1} + R_3^{-1}]^{-1} = [21^{-1} + 21^{-1} + 21^{-1}]^{-1} = 7\Omega.$$

b.



$$R_t = [R_1^{-1} + R_2^{-1} + R_3^{-1}]^{-1} = [5^{-1} + 10^{-1} + 20^{-1}]^{-1} = 2.9\Omega.$$

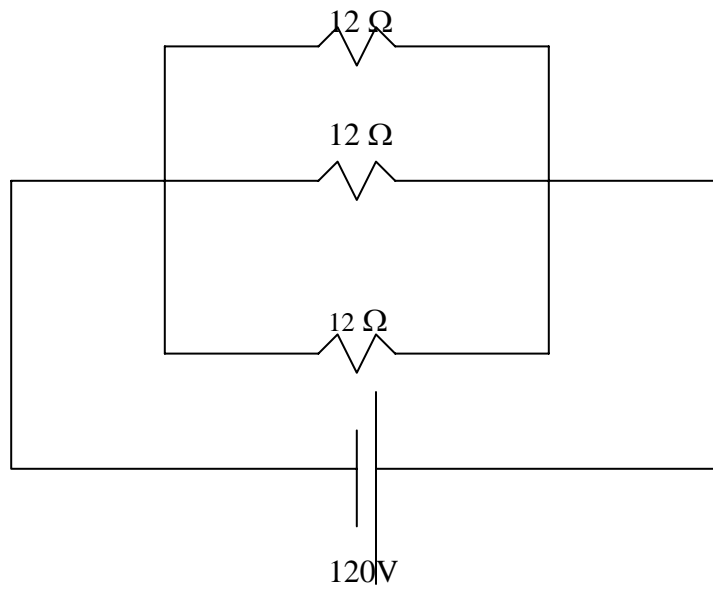
c.



$$R_t = [R_1^{-1} + R_2^{-1} + R_3^{-1}]^{-1} = [100^{-1} + 50^{-1} + 100^{-1}]^{-1} = 25\ \Omega.$$

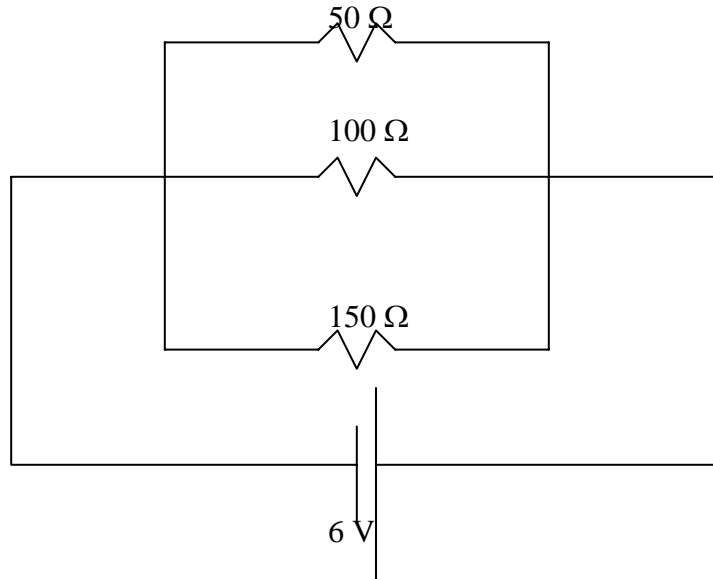
2. Find the current passing through each resistor.

a.



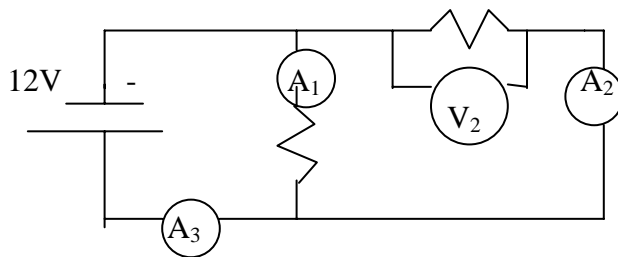
Since voltage is constant in parallel, $I_1 = V/R_1 = 120/12 = 10A$
 $I_2 = V/R_2 = 120/12 = 10A$
 $I_3 = V/R_3 = 120/12 = 10A$

b.



Since voltage is constant in parallel, $I_1 = V/R_1 = 6/50 = 0.12 \text{ A}$
 $I_2 = V/R_2 = 6/100 = 0.06 \text{ A}$
 $I_3 = V/R_3 = 6/150 = 0.04 \text{ A}$

3. Find the missing reading for each meter. $R_1 = 20 \Omega$ and $R_2 = 40 \Omega$.

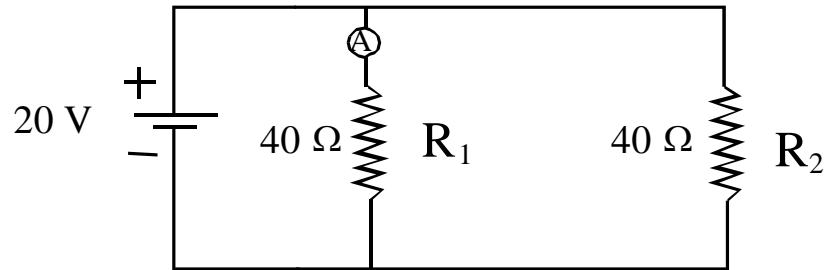


$$I_1 = V/R_1 = 12/20 = 0.60 \text{ A}$$
$$I_2 = V/R_2 = 12/40 = 0.30 \text{ A}$$

$$I_3 = I_T = I_1 + I_2 = 0.60 + 0.30 = 0.90 \text{ A}$$

$V_2 = 12 \text{ V}$ since voltage is constant in a parallel circuit.

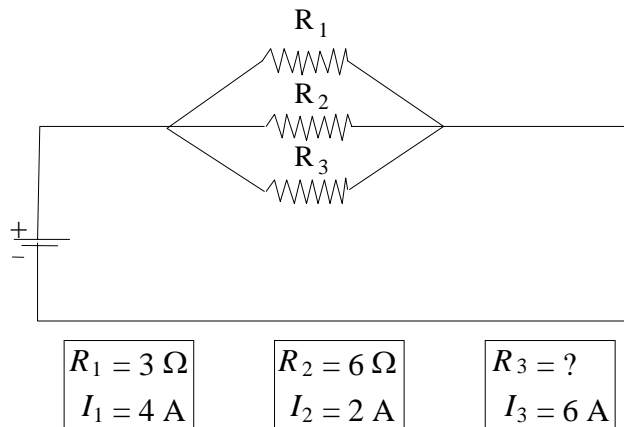
4. The electric circuit shown below consists of an ammeter A, a power supply, and resistors R_1 and R_2 connected in parallel.



What is the current intensity (I) flowing through the ammeter?

$$I = 20/40 = 0.50 \text{ A}$$

5. The following diagram shows a parallel circuit consisting of three resistors.



What is the value of resistor R_3 ?

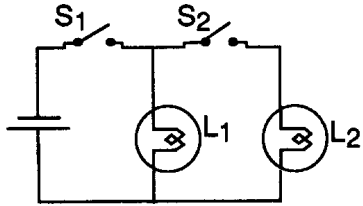
Since voltage is always constant in parallel, $V = 3(4)$ or $(6)(2) = 12\text{V}$. $R_3 = 12\text{V}/6\text{A} = 2\ \Omega$.

6. An electrical circuit consists of a power source, two switches (S_1 and S_2) and two light bulbs (L_1 and L_2). The following table shows what happens to both light bulbs:

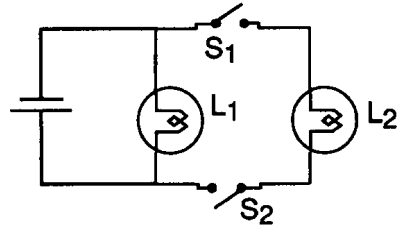
Switch		Light Bulb	
S_1	S_2	L_1	L_2
open	open	out	out
closed	open	bright	out

Which of the following circuit diagrams illustrates the results shown in the table above?

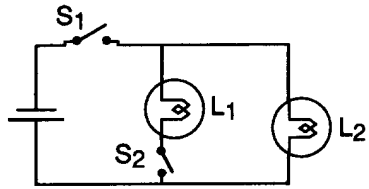
A)



C)



B)



D)

