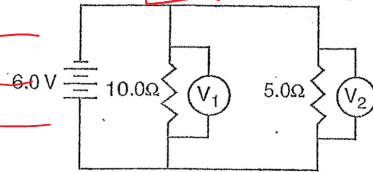


# Parallel Circuit

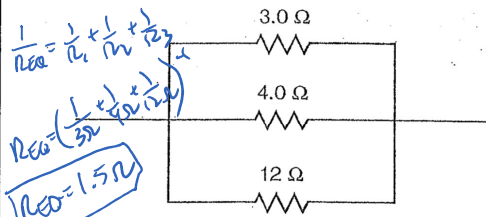
1. In the circuit diagram below, what are the correct readings of voltmeters  $V_1$  and  $V_2$ ?

V	I	R	P
1	6	10	
2	6	5	
T	6V		



6V (SAME FOR ALL)

2. The diagram below represents part of an electric circuit containing three resistors.



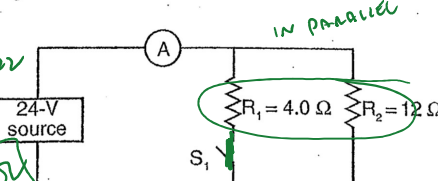
$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$R_{eq} = \left( \frac{1}{3\Omega} + \frac{1}{4\Omega} + \frac{1}{12\Omega} \right)^{-1}$$

$$R_{eq} = 1.5\Omega$$

What is the equivalent resistance of this part of the circuit?

3. Base your answer to the following question on the circuit diagram below.



IN PARALLEL

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R_{eq} = \left( \frac{1}{4\Omega} + \frac{1}{12\Omega} \right)^{-1}$$

$$R_{eq} = 3\Omega$$

If switch  $S_1$  is closed, the equivalent resistance of the circuit is

4. What is the total current in a circuit consisting of six operating 100-watt lamps connected in parallel to a 120-volt source?

5A

5. A physics student is given three 12-ohm resistors with instructions to create the circuit that would have the lowest possible resistance. The correct circuit would be a

- series circuit with an equivalent resistance of 36  $\Omega$ ?
- series circuit with an equivalent resistance of 4.0  $\Omega$ ?
- parallel circuit with an equivalent resistance of 36  $\Omega$ ?
- parallel circuit with an equivalent resistance of 4.0  $\Omega$ ?

If a 15-ohm resistor is connected in parallel with a 30-ohm resistor, the equivalent resistance is

$$R_{eq} = \left( \frac{1}{15\Omega} + \frac{1}{30\Omega} \right)^{-1}$$

$$R_{eq} = 10\Omega$$

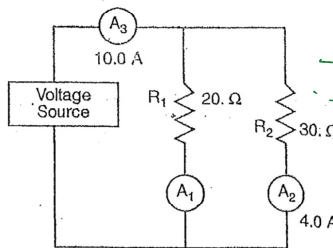
## Whiteboard Problems

7. As the number of resistors in a parallel circuit is increased, what happens to the equivalent resistance of the circuit and total current in the circuit?

- Both equivalent resistance and total current decrease.
- Both equivalent resistance and total current increase.
- Equivalent resistance decreases and total current increases.
- Equivalent resistance increases and total current decreases.

FOR PARALLEL  
↑ #R, ↓ R  
IF R ↓ THEN I ↑

8. Base your answer to the following question on the diagram below, which shows two resistors and three ammeters connected to a voltage source.

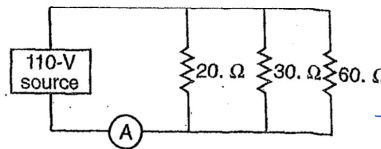


V	I	R	P
1	4	20	
2	6	30	
T	10		

What is the current reading of ammeter  $A_1$ ?

6A

9. In the diagram below of a parallel circuit, ammeter  $A$  measures the current supplied by the 110-volt source.

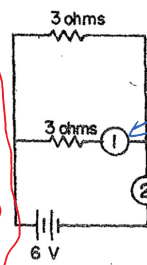


V	I	R	P
1		20	
2		30	
3		60	
T	110		

The current measured by ammeter  $A$  is

11A

10. In the circuit at the right, if an ammeter is moved from position 1 to position 2, the current measured will



THIS READS CURRENT FOR 3Ω ONLY

THIS READS TOTAL CURRENT

$I_T = I_1 + I_2$

$I_T = \frac{V}{R_T} = \frac{110V}{10\Omega} = 11A$

$R_{eq} = \left( \frac{1}{50\Omega} + \frac{1}{30\Omega} + \frac{1}{60\Omega} \right)^{-1}$

$R_{eq} = 10\Omega$

- decrease
- increase
- remain the same