

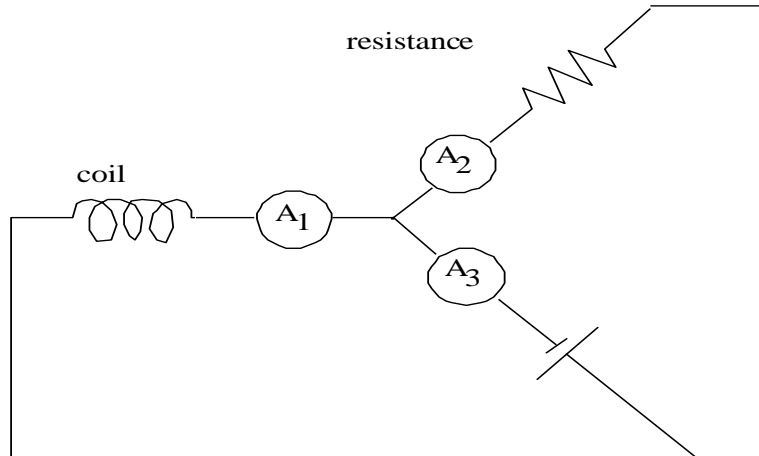
## Circuit Worksheet

1. Two electrical appliances and a power source are set up as shown on the diagram below.  
Three ammeters are installed in the circuit.

Ammeter  $A_1$  shows value  $I_1$ .

Ammeter  $A_2$  shows value  $I_2$ .

Ammeter  $A_3$  shows value  $I_3$ .



What relation exists among the three values?

A)  $I_3 = I_1 + I_2$

B)  $I_1 = I_2 - I_3$

C)  $I_2 = I_1 + I_3$

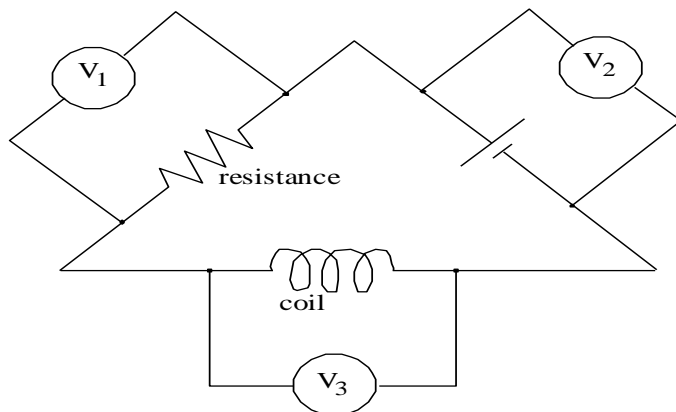
D)  $I_1 = I_2 + I_3$

2. Two electrical appliances and a power source are set up as shown on the diagram below.  
Three voltmeters are installed in the circuit.

Voltmeter  $V_1$  shows value  $V_1$ .

Voltmeter  $V_2$  shows value  $V_2$ .

Voltmeter  $V_3$  shows value  $V_3$ .



What relation exists among the three values?

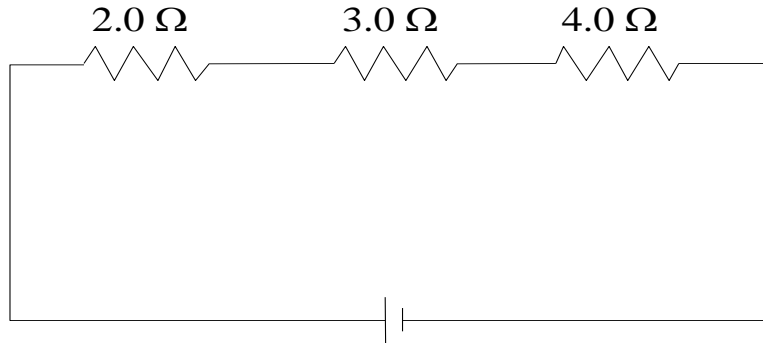
A)  $V_1 = V_2 + V_3$

B)  $V_2 = V_1 + V_3$

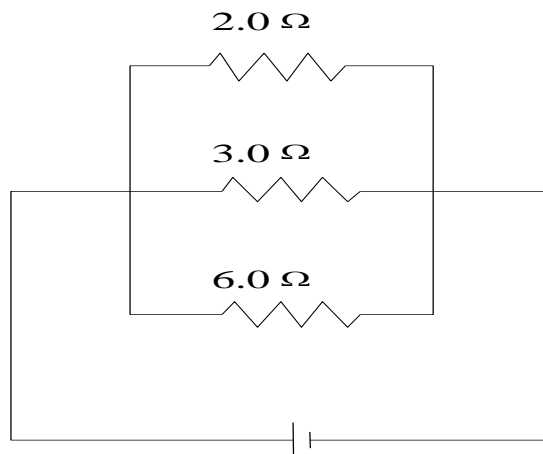
C)  $V_3 = V_1 + V_2$

D)  $V_1 = V_2 + V_3$

3. Three known resistances are connected in series to the terminals of a power source. The potential difference at the terminals of the  $3.0\ \Omega$  resistance is  $12\ \text{V}$ . What is the potential difference of the power source?

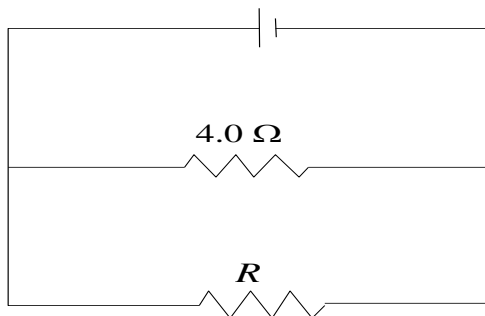


4. Three known resistances are connected in parallel to the terminals of a power source. The current passing through the  $3.0\ \Omega$  resistance is  $1.0\ \text{A}$ .



What is the intensity of the current coming from the power source?

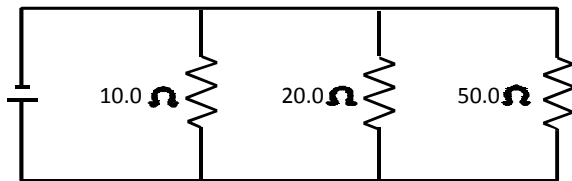
5. In the following electric circuit, one of the two resistances is  $4.0\ \Omega$ . The other resistance, " $R$ ", is unknown. The voltage of the power source is  $12\ \text{V}$  and the electric current from the source is  $4.5\ \text{A}$ .



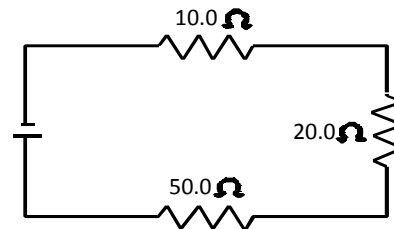
What is the value of resistance " $R$ "?

6. Calculate the equivalent resistance that could replace three resistors in each of the circuits.

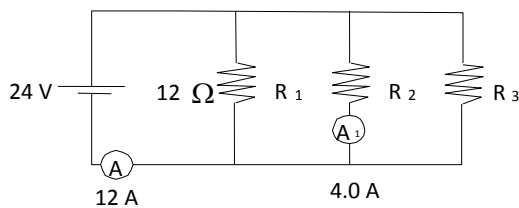
Circuit 1



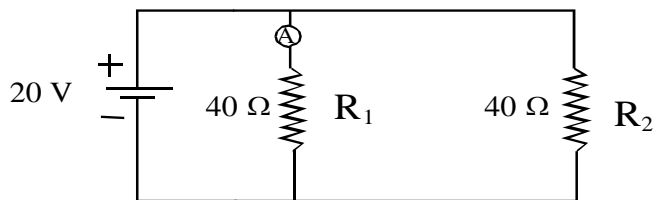
Circuit 2



7. A circuit consisting of 3 resistors  $R_1$ ,  $R_2$  and  $R_3$ , connected in parallel is illustrated below. The power supply is fixed at 24 V. According to this diagram, what is the value of the resistance of resistor  $R_3$ ?

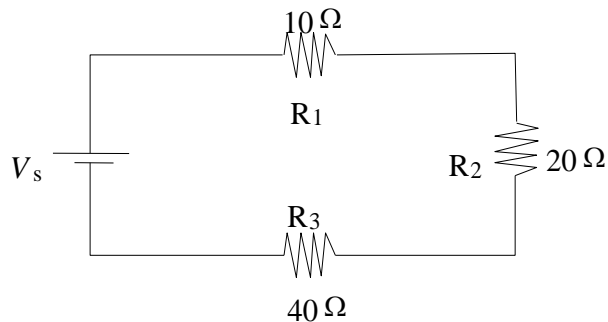


8. The electric circuit shown below consists of an ammeter A, a power supply, and resistors  $R_1$  and  $R_2$  connected in parallel.

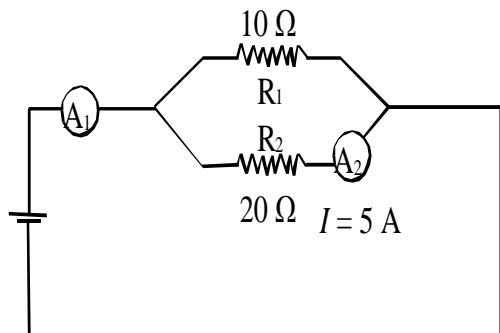


What is the current intensity ( $I$ ) flowing through the ammeter?

9. In the electric circuit illustrated below, the current intensity ( $I$ ) is 0.25 A. What is the potential difference across the terminals of the power source,  $V_s$ ?

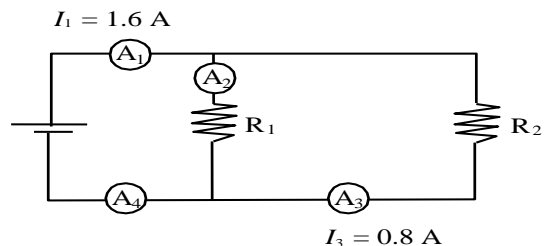


10. The following circuit consists of two resistors  $R_1$  and  $R_2$ , two ammeters  $A_1$  and  $A_2$  and a power supply.



Ammeter  $A_2$  reads 5 A. What is the reading given by ammeter  $A_1$ ?

11. The following electric circuit consists of a power source, two identical resistors ( $R_1$  and  $R_2$ ) and four ammeters  $A_1, A_2, A_3$  and  $A_4$ .

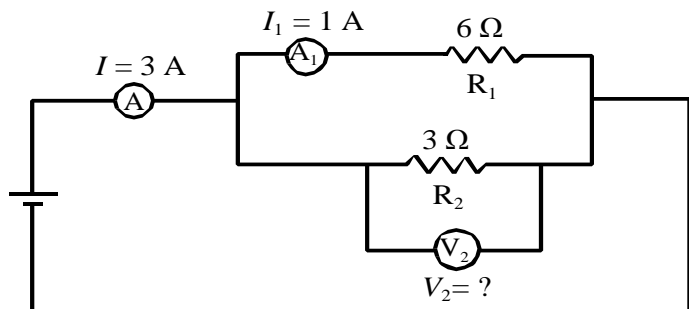


Ammeter  $A_1$  reads 1.6 A and ammeter  $A_3$  reads 0.8 A.

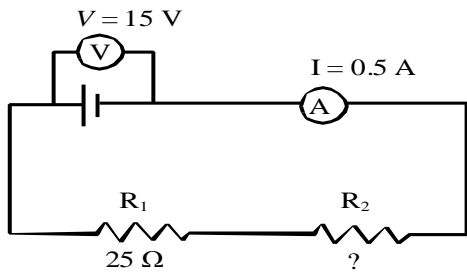
What do ammeter  $A_2$  and ammeter  $A_4$  read?

- A) Ammeter  $A_2$  reads 0.8 A and ammeter  $A_4$  reads 0.8 A.
- B) Ammeter  $A_2$  reads 0.8 A and ammeter  $A_4$  reads 1.6 A.
- C) Ammeter  $A_2$  reads 1.6 A and ammeter  $A_4$  reads 1.6 A
- D) Ammeter  $A_2$  reads 1.6 A and ammeter  $A_4$  reads 2.4 A.

12. The following electric circuit consists of a power source, two ammeters ( $A$  and  $A_1$ ), two resistors ( $R_1$  and  $R_2$ ) and a voltmeter ( $V_2$ ). Ammeter  $A$  reads 3 A and ammeter  $A_1$  reads 1 A. What is the potential difference (voltage),  $V_2$ , across the terminals of resistor  $R_2$ ?



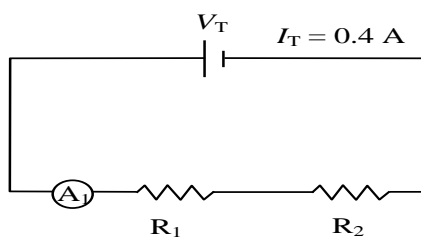
13. The following circuit consists of a battery, two resistors ( $R_1$  and  $R_2$ ), a voltmeter  $\textcircled{V}$  and an ammeter  $\textcircled{A}$ . The voltmeter reads 15 V and the ammeter reads 0.5 A.



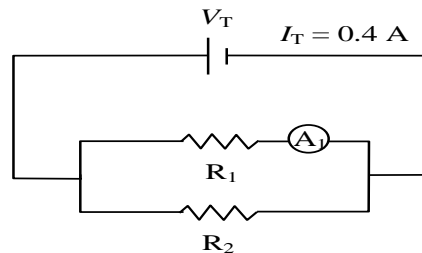
What is the resistance of resistor  $R_2$ ?

14. The following two electric circuits consists of a power supply,  $V_T$ , an ammeter  $\textcircled{A_1}$  and two identical resistors ( $R_1$  and  $R_2$ ).

Circuit 1



Circuit 2

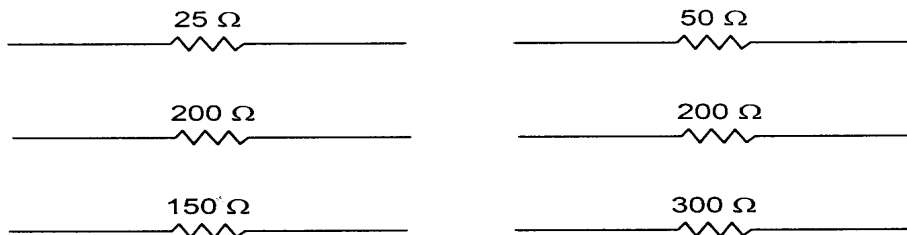


The total current intensity,  $I_T$ , in both circuits is 0.4 A.

What is the current intensity reading given by ammeter  $\textcircled{A_1}$  in each circuit?

- A) The ammeter reads 0.2 A in Circuit 1 and 0.2 A in Circuit 2.
- B) The ammeter reads 0.2 A in Circuit 1 and 0.4 A in Circuit 2.
- C) The ammeter reads 0.4 A in Circuit 1 and 0.2 A in Circuit 2.
- D) The ammeter reads 0.4 A in Circuit 1 and 0.4 A in Circuit 2.

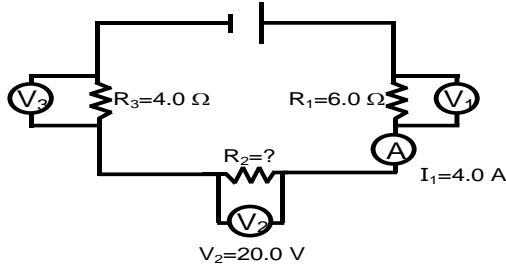
15. In the laboratory, you are given a power supply ( $\text{---}\text{---}$ ), conducting wires and the six resistors shown below.



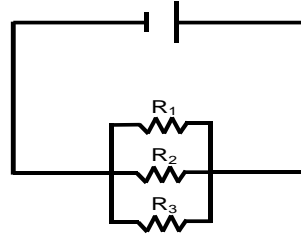
Using the power supply and two of these resistors, you must build **two** circuits that each have an equivalent resistance of  $100 \Omega$ .

16. A student is asked to create two circuits using the same three resistors. He sets up Circuit A so that all the resistors are in series. He then takes it apart and places these same resistors in parallel in Circuit B. (See diagrams below.)

Circuit A

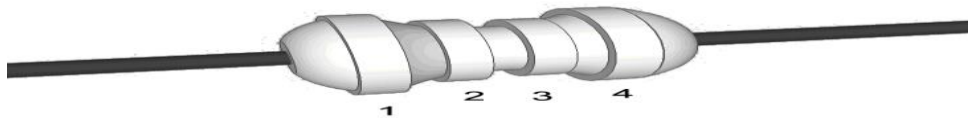


Circuit B



Calculate the equivalent resistance ( $R_{eq}$ ) of Circuit A and Circuit B.

17. As the values of manufactured resistors are never perfectly precise, they are manufactured with a certain tolerance.



Determine, in order from left to right, the band colors of a resistor if it had a true resistance value of  $340 \Omega \pm 5\%$ .

18. The circuit below represents a toy fire truck. This truck can either activate its lights or sound its siren, but cannot do both at the same time.



Which of the following identifies the type of switch that must be used?

- A) Bipolar unidirectional
- B) Bipolar bidirectional
- C) Unipolar unidirectional
- D) Unipolar bidirectional

19. Calculate the equivalent resistance of the circuit below.

