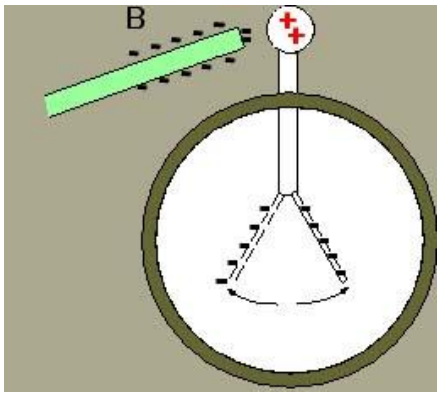
ST Pretest 2.2 version 2016

1. When clothes tumble-dry they become statically charged.

   a) Why?
   b) If the clothes are *not* allowed to dry completely, will they still be charged?

2. In the diagram below,
   a) explain why the leaves of the electroscope are moving apart.
   b) explain how the leaves both became negative, and why the metal sphere is positive.
   c) explain what would happen if the rod actually touched or was placed extremely close to the sphere.



3. For each set, choose the one which offers the ***more*** resistance

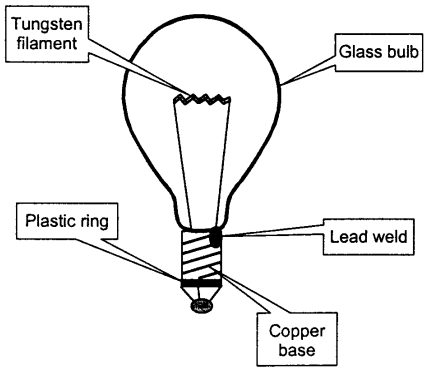
a) a wire 40 cm in length and 3 cm wide___
   a wire 40 cm in length and 8 cm wide___

b) a 20 cm wire(length) made of Cu ____
   a 30 cm wire made of Cu____

c) a circuit operating at -3 ºC___
   one operating at 2 ºC__

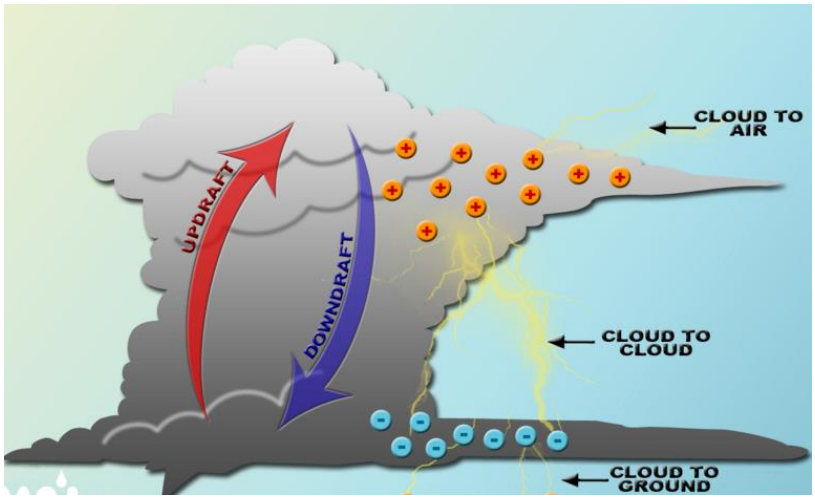
4.

The diagram on the right shows the main parts of an incandescent light bulb.



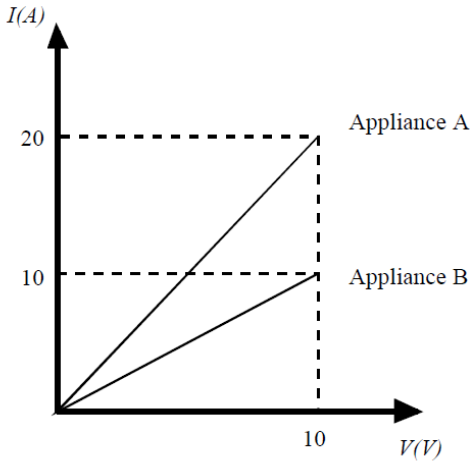
Which of the above substances used to make this light bulb are ***insulators***?

6. The diagram to the right shows that friction between water droplets and or ice particles leaves the bottom of thunderclouds negatively charged.
What charge will develop on the surface of the earth below such a cloud and why?



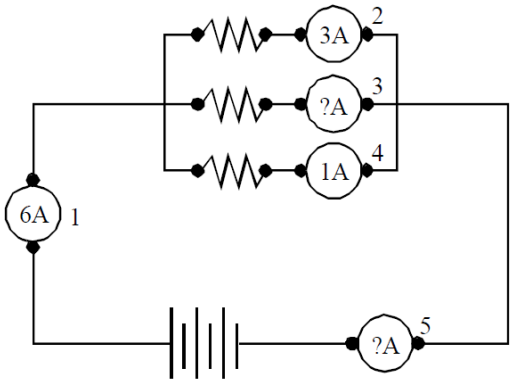
7. What is the conductance of a wire if its resistance is 30 Ω?

8. Which appliance in the graph has the greatest electrical resistance? Why?



9. If a circuit's current is 200 mA and its resistance is 10 W, what is the voltage at the source?

10.

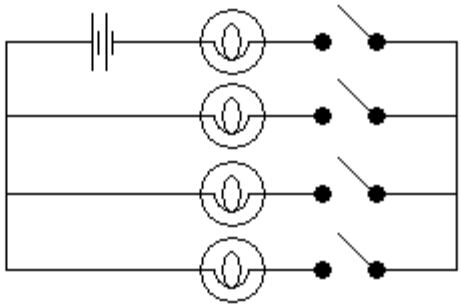


a). What are the readings of ammeter 3 and ammeter 5?

b) If the total resistance of the circuit is 0.100 Ω, find the voltage of the circuit.

11.

How many switches need to be closed to light up one bulb?



A) 1 B) 2 C) 3 D)4

b) What kind of circuit will be created by closing that number of switches?

12. Draw a circuit that would force the current to flow through every resistor.

ANSWERS

1. When clothes tumble-dry they become statically charged?

   a. Why?

   b.

   As they tumble, they rub against the metal, which transfers electrons to the bed sheets.

   b. If the clothes are *not* allowed to dry completely, will they still be charged?

   No. Water is great at removing static.

2. In the diagram below,

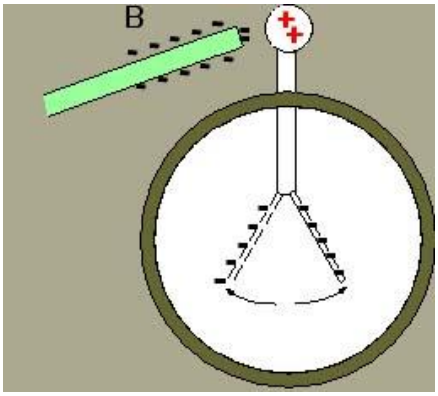
   a. explain why the leaves of the electroscope are moving apart.

   Like charges repel. Both pieces are (-)

   b. explain how the leaves both became negative, and why the metal sphere is positive.

   The negative charge from the rod repelled the electrons from the sphere into the pieces at the bottom.

   c. explain what would happen if the rod actually touched or was placed extremely close to the sphere. The entire electroscope (knob and leaves) would become negative.



3. For each set, choose the one which offers the ***more*** resistance

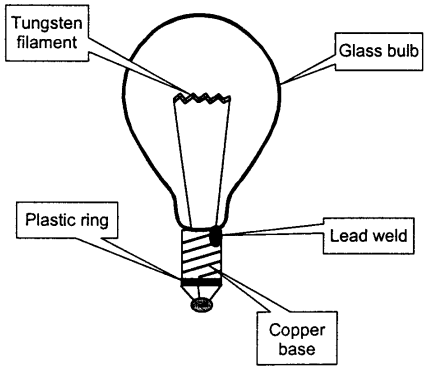
a. a wire 40 cm in length and 3 cm wide__X_
   a wire 40 cm in length and 8 cm wide___

b. a 20 cm wire made of Cu ____
   a 30 cm wire made of Cu__X__

c. a circuit operating at -3 ^{o}C___
   one operating at 2 ^{o}C__X

4.

The diagram on the right shows the main parts of an incandescent light bulb.



Which of the above substances used to make this light bulb are ***insulators***?

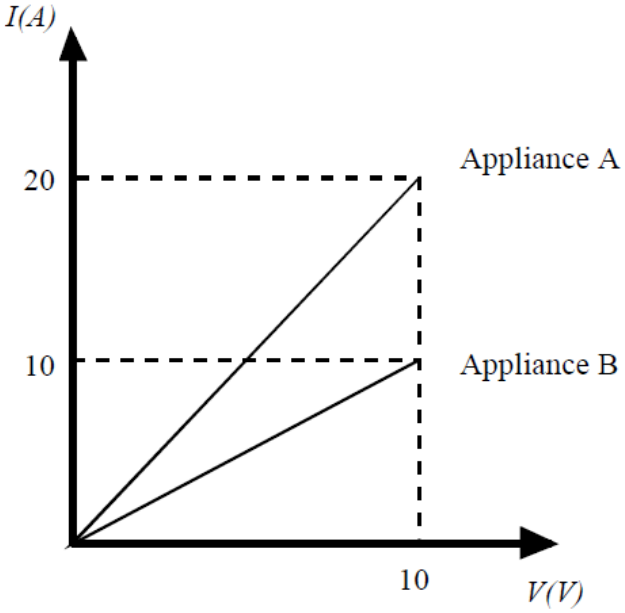
Plastic, glass

6. Electrons will be repelled slightly deeper into the ground, leaving the surface positively charged.

7. What is the conductance of a wire if its resistance is 30 Ω?

G = 1/R = 1/30 = 0.033 S

8. Which appliance has the greater electrical resistance**? B has the lowest conductivity) lowest slope (I/V) and therefore the higher resistance.**



9. **If a circuit's current is 200 mA and its resistance is 10 Ω, what is the voltage at the source?**

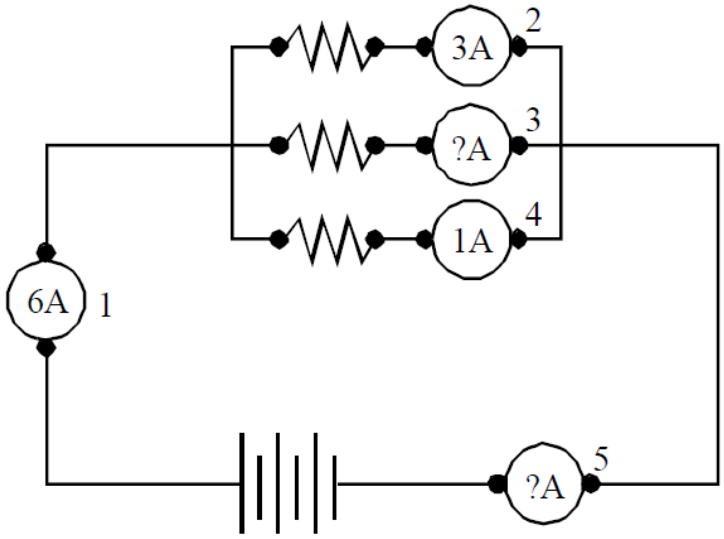
First convert 200mA to amps = 0.200 A

V = IR

V= 0.200A(**10 Ω**)

= 2 V

10.



What are the readings of ammeter 3 and ammeter 5?

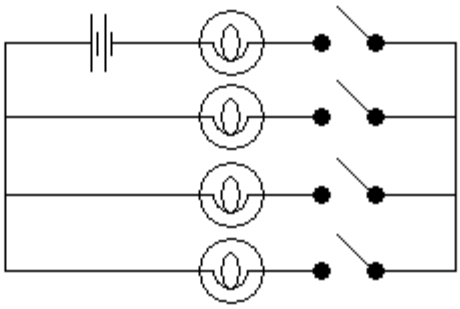
b) If the total resistance of the circuit is 0.100 Ω, find the voltage of the circuit.

a) $A_3 = 6 - (3 + 1) = 2$ A

$A_5 = A_{total} = 6$ A

b) V = IR = 6(0.10) = 0.6 V.

11. How many switches need to be closed to light up one bulb?



A) 1 B) 2 C) 3 D)4

a) Answer B

b) What kind of circuit will be created by closing that number of switches?

Series.

12. Draw a circuit that would force the current to flow through every resistor.

Draw any series circuit such as the one below. You don't have to include the switch.