**Electric Circuits**

**Questions from a Conceptual Course**

**Category 1: Electric Circuits and Current**

**Question 1:**

aa. **TRUE** or **FALSE**:

When one light bulb within a two-bulb circuit *turns on*, the other light bulb *turns on* at the same time.

a. True b. False

**Question 2:**

aa. **TRUE** or **FALSE**:

In order for a light bulb to light within a battery-powered circuit, a charge must move from the battery to the light bulb.

a. True b. False

**Question 3:**

aa. **TRUE** or **FALSE**:

Light bulbs within a circuit appear to light immediately when the final connections are made because charge moves at nearly the speed of light from the battery to the light bulb.

a. True b. False

**Question 4:**

aa. Suppose that the final connection of a wire to a battery is made for a two-bulb circuit. Which statement describes the timing by which the light bulbs light?

a. The light bulb closest to the positive (+) terminal will light first.

b. The light bulb closest to the negative (-) terminal will light first.

c. The light bulbs light simultaneously with no apparent lighting of one before the other.

**Question 5:**

aa. Consider the circuit below.

**+**

**-**

**+**

**-**

**+**

**-**

Bulb

Bulb

**A**

**B**

**C**

Suppose that a compass is placed at positions A, B, and C. What observations would be made of the compass needle?

a. The needle would deflect at each position by the same amount and in the same direction.

b. The needle would deflect the same amount but in opposite directions at A and at C and not deflect at B.

c. The needle would deflect in the same direction at each position, but there would be more deflection at A than at B than at C.

**Question 6:**

aa. Charge will flow through the wires of an electric circuit as long as there \_\_\_\_\_.

a. are light bulbs present.

b. is a compass present to observe the deflection.

c. is a D-cell and a wire connected to the positive terminal.

d. is at least one D-cell and a closed conducting pathway between its + and - terminal.

**Question 7:**

aa. The charge that moves through the wires of a circuit is \_\_\_\_\_.

a. supplied by the battery; if it weren't there would be no current.

b. already present in the wires; it simply takes a batter to force it to move.

c. a fictional idea that originated when scientists gave up on the possibility of determining what was really happening.

**Question 8:**

aa. **TRUE** or **FALSE**:

The charge that moves through the wires of a circuit originates in the battery. If it didn't, then there would be no current.

a. True b. False

**Question 9:**

aa. **TRUE** or **FALSE**:

The battery does not supply the charge that moves through a circuit. The charge that moves is already present in the wires.

a. True b. False

**Question 10:**

aa. **TRUE** or **FALSE**:

The battery's role is not to supply the charge, but rather to force the charge that is already present to move in a single direction.

a. True b. False

**Question 11:**

aa. Which one of the following statements describes the role of the battery in an electric circuit?

a. The battery is the supplier of charge that moves through an electric circuit.

b. The battery's role is to force the charge to move through the wires of the circuit.

c. The battery generates the energy that flows through the wires of an electric circuit.

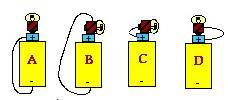
**Question 12:**

aa. Which diagram below accurately depicts the path of charge through a light bulb?

a. b. c. d.

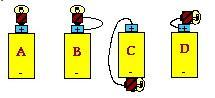
**Question 13:**

aa. In which one of the following situations would the light bulb light?



**Question 14:**

aa. In which one of the following situations would the light bulb light?



**Question 15:**

aa. The rate at which charge flows through a circuit is referred to as the \_\_\_\_\_.

a. current b. resistance

c. electric curcuit d. electric potential difference

**Question 16:**

aa. What does current refer to?

a. Current refers to how fast a charge moves.

b. Current refers to the rate at which charge flows.

c. Current refers to the amount of charge in a circuit.

**Question 17:**

aa. The unit used to measure current is \_\_\_\_\_.

a. ohms (abbreviated Ω) b. volts (abbreviated V)

c. watts (abbreviated W) d. amperes (abbreviated A)

**Question 18:**

aa. Which one of the following expressions is a current?

a. 4.0 Ω b. 1.5 V

c. 7.5 Watt d. 2.0 A

**Question 19:**

aa. Which two types of observations can be used to indicate the rate at which charge flows? Select two answers.

a. Observe the bulb brightness.

b. Observe the number of the wires.

c. Observe the color of the wires.

d. Observe the direction of compass deflection.

e. Observe the amount of compass deflection

**Question 20:**

**A**

**B**

**C**

**+**

**-**

**+**

**-**

**+**

**-**

Bulb

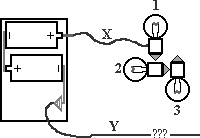
**D**

aa. Consider the diagram at the right with a single light bulb and four labeled positions on the wires. Which statement describes how charge flows through this circuit?

a. Charge flows from the + terminal to A to B to the bulb to C to D and back to the - terminal.

b. Charge flows from the - terminal to D to C to the bulb to C to D and back to the + terminal.

c. Charge flows from the + terminal to A to B and meets up at the bulb with charge that flows from the - terminal to D to C to the bulb.

**Questions 21 - 24:**

Consider the diagram at the right. Wire X is connected to the ribbed side of Bulb 1. Wire Y is currently not connected to any light bulb.

aa. As currently shown in the diagram, which light bulb will light?

a. All three bulbs light.

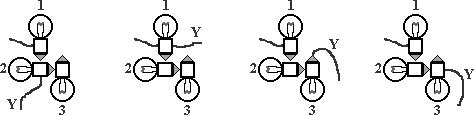
b. None of the bulbs light.

c. Only bulb 1 will be lit.

d. Bulb 1 and bulb 2 will be lit.

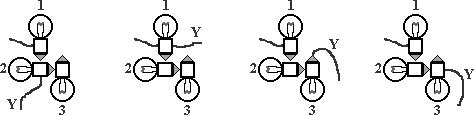
aa. A student wishes both bulbs 1 and 2 to be lit but not bulb 3. Where must wire Y be connected?

a. b. c. d.



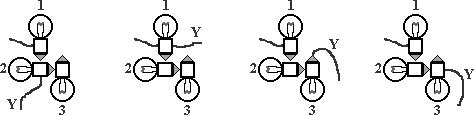
aa. A student wishes bulb 1 to be lit but not bulbs 2 and 3. Where must wire Y be connected?

a. b. c. d.



aa. A student wishes all three bulbs to be lit. Where must wire Y be connected?

a. b. c. d.



**Questions 25-30:**

**+**

**-**

**+**

**-**

**+**

**-**

Bulb

Bulb

**A**

**B**

**C**

A two-bulb circuit is constructed as shown in the diagram at the right. A compass is placed under the wire at positions A, B and C. The compass needle is deflected; the amount and the direction of the needle's deflection is shown in the table. Use the data and the diagram to answer the next several questions.

|  |  |  |
| --- | --- | --- |
| **Position** | **Deflection Dir'n** | **Deflection Amount** |
| A | Counter-clockwise | 20° |
| B | Counter-clockwise | 20° |
| C | Counter-clockwise | 20° |

aa. Select two observations that would represent evidence that charge is flowing through the wires. Select two answers.

a. The light bulbs are lit.

b. The light bulbs do not light.

c. An obvious *hum* is made by the batteries.

d. The compass needle deflects when placed under a wire.

aa. The observation that the needle of a compass deflects in the counter-clockwise direction is evidence that supports the conclusion that \_\_\_\_\_.

a. charge flows in one direction around the circuit

b. charge flows around the circuit from C to B to A

c. the rate at which charge flows is the same at positions A, B and C

d. the battery is supplying the charge that gets used up by the light bulbs

aa. The observation that the needle of a compass deflects by the same amount under each wire is evidence that supports the conclusion that \_\_\_\_\_.

a. the rate at which charge flows is the same at positions A, B and C

b. the battery is supplying the charge that gets used up by the light bulbs

c. charge is present in each wire, but necessarily not moving within the circuit

d. the rate at which charge flows is greatest at A, second greatest at B, and least at C

aa. Suppose that the battery were switched around such that its positive (+) terminal was closest to C and its negative (-) terminal closest to A. Which observation would be made?

a. The light bulbs would not light as brightly.

b. The compass needle would not deflect.

c. The compass needle would deflect by a different amount.

d. The compass needle would deflect in a different direction.

aa. The light bulb located between positions B and C is removed from its socket. The socket and the wires remain as they were. Which observation would be made about the compass deflection?

a. The compass needle would no longer deflect at any of the positions.

b. The compass needle would deflect only at positions A and B, but not a position C.

c. The compass needle would deflect only at position C, but not at positions A and B.

d. The compass needle would still deflect at all positions, but the amount would be less.

e. The compass needle would deflect at all positions; the amount would be more than before.

aa. The light bulb located between positions B and C is removed from its socket. The socket and the wires remain as they were. Which observation would be made about the other light bulb?

a. The other light bulb would no longer light.

b. The other light bulb would still light, but it would not be as bright.

c. The other light bulb would still light; its brightness would be unchanged.

d. The other light bulb would still light; its brightness would be brighter than it was.

**Category 2: Electric Resistance and Ohm's Law**

**Question 31:**

aa. The amount of hindrance to the flow of charge through a circuit is referred to as the \_\_\_\_\_.

a. current b. resistance

c. electric circuit d. electric potential difference

**Question 32:**

aa. What does resistance refer to?

a. Resistance refers to how slow a charge moves.

b. Resistance refers to the rate at which charge flows.

c. Resistance refers to the amount of charge in a circuit.

d. Resistance refers to the amount of hindrance to charge flow

**Question 33:**

aa. The unit used to measure resistance is \_\_\_\_\_.

a. ohms (abbreviated Ω) b. volts (abbreviated V)

c. watts (abbreviated W) d. amperes (abbreviated A)

**Question 34:**

aa. Which one of the following expressions is a resistance?

a. 4.0 Ω b. 1.5 V

c. 7.5 Watt d. 2.0 A

**Question 35:**

aa. Adding more resistance to an electrical circuit will cause \_\_\_\_\_.

a. current to increase and light bulbs to become brighter

b. current to increase and light bulbs to become dimmer

c. current to decrease and light bulbs to become brighter

d. current to decrease and light bulbs to become dimmer

**Question 36:**

aa. A circuit with a light bulb has a current of 2.0 Amps. A second light bulb is added to the circuit. What affect will this have upon the resistance of the circuit?

a. The resistance will increase.

b. The resistance will decrease.

c. This will not affect the resistance since light bulbs do not have resistance.

**Question 37:**

aa. A circuit with a light bulb has a current of 2.0 Amps. A second light bulb is added to the circuit. What affect will this have upon the current in the circuit?

a. The current will increase.

b. The current will decrease.

c. This will not affect the current.

**Question 38:**

aa. A circuit with a light bulb has a current of 2.0 Amps. A second light bulb is added to the circuit. What affect will this have upon the current and the resistance of the circuit?

a. The current and the resistance will increase.

b. The current and the resistance will decrease.

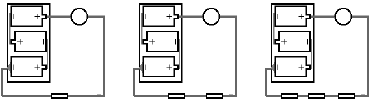
c. The current will increase and the resistance will decrease.

d. The current will decrease and the resistance will increase.

**Question 39:**

aa. The three circuits below consist of a light bulb and varying numbers of resistors (). In which circuit will the current be the greatest?

**Circuit A Circuit B Circuit C**



a. The current will be greatest in Circuit A.

b. The current will be greatest in Circuit B.

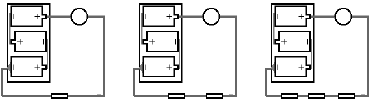
c. The current will be greatest in Circuit C.

d. The current will be the same in all three circuits.

**Question 40:**

aa. The three circuits below consist of a light bulb and varying numbers of resistors (). In which circuit will the light bulb be the brightest?

**Circuit A Circuit B Circuit C**



a. The light bulb will be brightest in Circuit A.

b. The light bulb will be brightest in Circuit B.

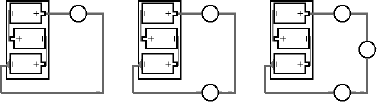
c. The light bulb will be brightest in Circuit C.

d. The light bulbs will have the same brightness in all three circuits.

**Question 41:**

aa. The three circuits below consist of varying number of light bulbs. In which circuit will the light bulb(s) be the brightest?

**Circuit A Circuit B Circuit C**



a. The light bulb will be brightest in Circuit A.

b. The light bulbs will be brightest in Circuit B.

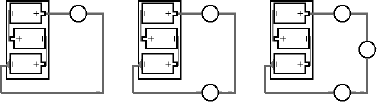
c. The light bulbs will be brightest in Circuit C.

d. The light bulbs will have the same brightness in all three circuits.

**Question 42:**

aa. The three circuits below consist of varying number of light bulbs. Which circuit has the greatest resistance?

**Circuit A Circuit B Circuit C**



a. The resistance will be greatest in Circuit A.

b. The resistance will be greatest in Circuit B.

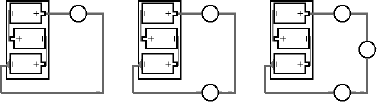
c. The resistance will be greatest in Circuit C.

d. The resistance will be the same in all three circuits.

**Question 43:**

aa. The three circuits below consist of varying number of light bulbs. Which circuit has the greatest current?

**Circuit A Circuit B Circuit C**



a. The current will be greatest in Circuit A.

b. The current will be greatest in Circuit B.

c. The current will be greatest in Circuit C.

d. The current will be the same in all three circuits.

**Question 44:**

aa. Based on their description, which wire would have the greatest resistance?

a. A long, wide wire b. A long, narrow wire

c. A short, wide wire d. A short, narrow wire

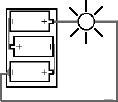
**Question 45:**

aa. Based on their description, which wire would have the lowest resistance?

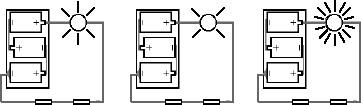
a. A long, wide wire b. A long, narrow wire

c. A short, wide wire d. A short, narrow wire

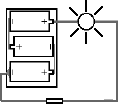
**Question 46:**

aa. A light bulb is placed in a circuit as shown at the right. The *starbursts* indicate the relative brightness of the bulb. Two resistors () are added to the circuit. Which diagram below represents the brightness of the bulb?

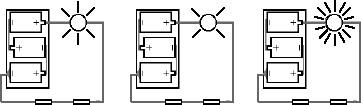
a. b. c.



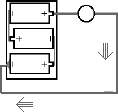
**Question 47:**

aa. A light bulb and a resistor () is placed in a circuit as shown at the right. The *starbursts* indicate the relative brightness of the bulb. A second resitor is added to the circuit. Which diagram below represents the brightness of the bulb once the additional resistor is added?

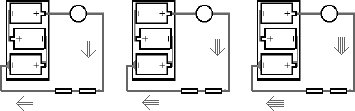
a. b. c.



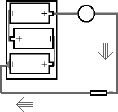
**Question 48:**

aa. A light bulb is placed in a circuit as shown at the right. The *arrowtails* indicate the relative current in the wires. Two resistors () are added to the circuit. Which diagram below represents the current in the wires of this modified circuit?

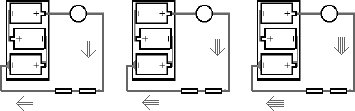
a. b. c.



**Question 49:**

aa. A light bulb and a resistor () is placed in a circuit as shown at the right. The *arrowtails* indicate the relative current in the wires. A second resistor () is added to the circuit. Which diagram below represents the current in the wires of this modified circuit?

a. b. c.



**Question 50:**

aa. What affect will adding more light bulbs *in series* have upon the overall resistance of a circuit?

a. As more light bulbs are added *in series*, the overall resistance increases.

b. As more light bulbs are added *in series*, the overall resistance decreases.

c. Adding more light bulbs *in series* will have no affect upon the overall resistance.

d. Its not that simple to predict; one must know if they are round bulbs or long bulbs.

**Question 51:**

aa. What affect will adding more light bulbs *in series* have upon the current in a circuit?

a. As more light bulbs are added *in series*, the current increases.

b. As more light bulbs are added *in series*, the current decreases.

c. Adding more light bulbs *in series* will have no affect upon the resistance.

d. Its not that simple to predict; one must know if they are round bulbs or long bulbs.

**Question 52:**

aa. What affect will adding more light bulbs *in parallel* have upon the overall resistance of a circuit?

a. As more light bulbs are added *in parallel*, the overall resistance increases.

b. As more light bulbs are added *in parallel*, the overall resistance decreases.

c. Adding more light bulbs *in parallel* will have no affect upon the overall resistance.

d. Its not that simple to predict; one must know if they are round bulbs or long bulbs.

**Question 53:**

aa. What affect will adding more light bulbs *in parallel* have upon the current in a circuit?

a. As more light bulbs are added *in parallel*, the current increases.

b. As more light bulbs are added *in parallel*, the current decreases.

c. Adding more light bulbs *in parallel* will have no affect upon the resistance.

d. Its not that simple to predict; one must know if they are round bulbs or long bulbs.

**Question 54:**

aa. What affect will adding more light bulbs *in series* have upon the overall resistance of and the current in the circuit?

a. The overall resistance and the current will both increase.

b. The overall resistance and the current will both decrease.

c. The overall resistance will increase and the current will decrease.

d. The overall resistance will decrease and the current will increase.

**Question 55:**

aa. What affect will adding more light bulbs *in parallel* have upon the overall resistance of and the current in the circuit?

a. The overall resistance and the current will both increase.

b. The overall resistance and the current will both decrease.

c. The overall resistance will increase and the current will decrease.

d. The overall resistance will decrease and the current will increase.

**Question 56:**

aa. Circuit A and Circuit B use identical batteries (i.e., batteries with the same *voltage*), identical wires and different light bulbs. The two light bulbs used in Circuit A are identical to each other, but quite different than the two light bulbs used in Circuit B. The light bulbs in Circuit A are much brighter than those in Circuit B. And a compass placed under the wires of Circuit A deflects a greater amount than a compass placed under the wires of Circuit B. These observations are explained by the fact that \_\_\_\_\_.

a. The bulbs in Circuit A offer a greater resistance to the flow of charge.

b. The bulbs in Circuit B offer a greater resistance to the flow of charge.

c. The bulbs have identical resistance, but the bulbs in Circuit A absorb more charge than the bulbs in Circuit B.

d. The bulbs have identical resistance, but the bulbs in Circuit B absorb more charge than the bulbs in Circuit A.

**Question 57:**

aa. Circuit A and Circuit B use identical batteries (i.e., batteries with the same *voltage*), identical wires and different light bulbs. The two light bulbs used in Circuit A are identical to each other, but quite different than the two light bulbs used in Circuit B. The light bulbs in Circuit A are much dimmer than those in Circuit B. And a compass placed under the wires of Circuit A deflects a lesser amount than a compass placed under the wires of Circuit B. These observations are explained by the fact that \_\_\_\_\_.

a. The bulbs in Circuit A offer a greater resistance to the flow of charge.

b. The bulbs in Circuit B offer a greater resistance to the flow of charge.

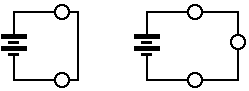
c. The bulbs have identical resistance, but the bulbs in Circuit A absorb more charge than the bulbs in Circuit B.

d. The bulbs have identical resistance, but the bulbs in Circuit B absorb more charge than the bulbs in Circuit A.

**Question 58:**

aa. The batteries and bulbs of the two circuits shown below are identical. In which circuit will there be the greatest current?

**Circuit A Circuit B**



a. The current will be greatest in Circuit A.

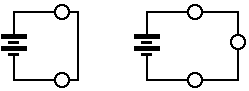
b. The current will be greatest in Circuit B.

c. The current will be the same in both circuits.

**Question 59:**

aa. The batteries and bulbs of the two circuits shown below are identical. In which circuit will there be the greatest resistance?

**Circuit A Circuit B**



a. The resistance will be greatest in Circuit A.

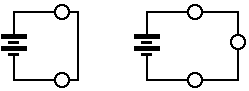
b. The resistance will be greatest in Circuit B.

c. The resistance will be the same in both circuits.

**Question 60:**

aa. The batteries and bulbs of the two circuits shown below are identical. In which circuit will the bulbs shine the brightest?

**Circuit A Circuit B**



a. The bulbs will shine the brightest in Circuit A.

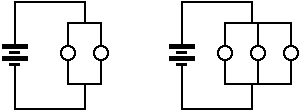
b. The bulbs will shine the brightest in Circuit B.

c. The bulb brightness will be the same in both circuits.

**Question 61:**

aa. The batteries and bulbs of the two circuits shown below are identical. In which circuit will there be the greatest current?

**Circuit A Circuit B**



a. The current will be greatest in Circuit A.

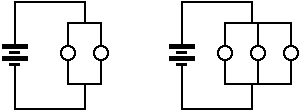
b. The current will be greatest in Circuit B.

c. The current will be the same in both circuits.

**Question 62:**

aa. The batteries and bulbs of the two circuits shown below are identical. In which circuit will there be the greatest resistance?

**Circuit A Circuit B**



a. The resistance will be greatest in Circuit A.

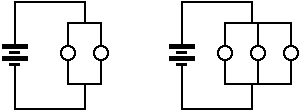
b. The resistance will be greatest in Circuit B.

c. The resistance will be the same in both circuits.

**Question 63:**

aa. The batteries and bulbs of the two circuits shown below are identical. In which circuit will the bulbs shine the brightest?

**Circuit A Circuit B**



a. The bulbs will shine the brightest in Circuit A.

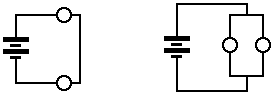
b. The bulbs will shine the brightest in Circuit B.

c. The bulb brightness will be the same in both circuits.

**Question 64:**

aa. The batteries, wires and bulbs in the two circuits below are identical in every way.

**Circuit A Circuit B**



In which circuit will there be the greatest current?

a. The current will be greatest in Circuit A.

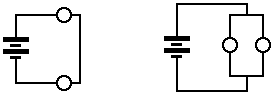
b. The current will be greatest in Circuit B.

c. The current will be the same in both circuits.

**Question 65:**

aa. The batteries, wires and bulbs in the two circuits below are identical in every way.

**Circuit A Circuit B**



In which circuit will there be the greatest resistance?

a. The resistance will be greatest in Circuit A.

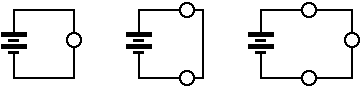
b. The resistance will be greatest in Circuit B.

c. The resistance will be the same in both circuits.

**Question 66:**

aa. In Circuits A, B and C below, more light bulbs are added to the battery. The bulbs are identical in each of the circuits.

**Circuit A Circuit B Circuit C**



Which statement accurately compares and explains the brightness of the bulbs?

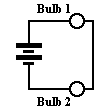
a. The bulbs shine with equal brightness in each circuit. This is because the bulbs are identical.

b. The bulbs are brightest in Circuit C compared to the other two circuits. This is because there are more bulbs pulling charge from the battery.

c. The bulbs are brightest in Circuit A and dimmest in Circuit C. This is because additional bulbs cause more resistance and less current.

d. The bulbs are brightest in Circuit A and dimmest in Circuit C. This is because there are more bulbs using up the charge, so they become less bright.

**Question 67:**

aa. Consider the two-bulb circuit shown at the right. The two bulbs are identical. They are labeled **Bulb 1** and **Bulb 2**. Which bulb will be the brightest and why?

a. Both bulbs will be equally bright since the current that flows through them is identical.

b. Bulb 1 will be brightest since it is first. The first bulb gets most the charge, leaving little for the second.

c. Bulb 2 will be brightest since it is first. The first bulb gets most the charge, leaving little for the second.

**Question 68:**

aa. **TRUE** or **FALSE**:

Light bulbs have resistance. Adding them to a circuit will affect the overall resistance.

a. True b. False

**Question 69:**

aa. **TRUE** or **FALSE**:

Light bulbs do not offer any resistance to the flow of charge. They simply light up.

a. True b. False

**Question 70:**

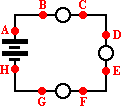
aa. **TRUE** or **FALSE**:

Light bulbs do not offer any resistance to the flow of charge. Adding more light bulbs would not affect the overall resistance.

a. True b. False

**Category 3: Electric Pressure Difference**

**Question 71:**

aa. Consider the diagram of a 2-cell, 3-bulb circuit at the right. Several positions on the circuit are labeled with a letter. At which two positions is the electric pressure the same value?

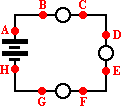
a. Positions A and H

b. Positions B and D

c. Positions E and F

d. Positions F and G

e. The electric pressure is the same at all labeled positions.

**Question 72:**

aa. Consider the diagram of a 2-cell, 3-bulb circuit at the right. Several positions on the circuit are labeled with a letter. At which two positions is the electric pressure the same value?

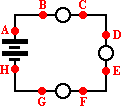
a. Positions A and H

b. Positions A and B

c. Positions B and C

d. Positions F and G

e. The electric pressure is the same at all labeled positions.

**Question 73:**

aa. Consider the diagram of a 2-cell, 3-bulb circuit at the right. Several positions on the circuit are labeled with a letter. At which position is the electric pressure the greatest?

a. Position A

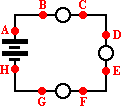
b. Position C

c. Position E

d. Position H

e. The electric pressure is the same at all labeled positions.

**Question 74:**

aa. Consider the diagram of a 2-cell, 3-bulb circuit at the right. Several positions on the circuit are labeled with a letter. At which position is the electric pressure the least?

a. Position A

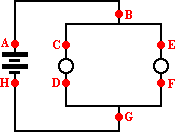
b. Position C

c. Position E

d. Position H

e. The electric pressure is the same at all labeled positions.

**Question 75:**

aa. Consider the diagram of a 2-cell, 2-bulb circuit at the right. Several positions on the circuit are labeled with a letter. At which two positions is the electric pressure the same value?

a. Positions A and H

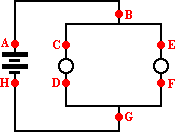
b. Positions C and D

c. Positions C and E

d. Positions B and G

e. The electric pressure is the same at all labeled positions.

**Question 76:**

aa. Consider the diagram of a 2-cell, 2-bulb circuit at the right. Several positions on the circuit are labeled with a letter. Which one of the listed positions is at a different electric pressure than the other three listed positions?

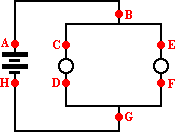
a. Positions A

b. Positions B

c. Positions C

d. Positions G

**Question 77:**

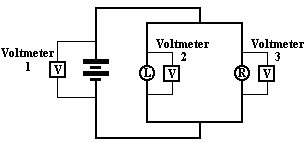
aa. Consider the diagram of a 2-cell, 2-bulb circuit at the right. Several positions on the circuit are labeled with a letter. Which one of the listed positions is at a different electric pressure than the other three listed positions?

a. Positions A

b. Positions D

c. Positions F

d. Positions G



**Question 78:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The bulbs include both a long (L) and a round (R) bulb. A voltmeter is used to determine the electric pressure difference across the battery pack (with 2 cells), the Long bulb and the Round bulb. Which statement describes the three voltmeter readings?

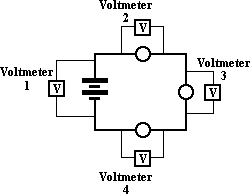
a. All three voltmeters will read approximately the same value.

b. Voltmeters 2 and 3 will read the same value. It will be a much greater value than voltmeter 1.

c. Voltmeters 2 and 3 will read the same value. It will be a much smaller value than voltmeter 1.

d. Voltmeter 1 will read a much greater value than 2 and 3; voltmeter 2 will read about the same value as voltmeter 3.

**Question 79:**

aa. A 2-cell, 3-bulb circuit is shown in the diagram at the right. All the bulbs are identical. A voltmeter is used to measure several electric pressure difference between two points. Which voltmeter reading would be greatest?

a. Voltmeter 1

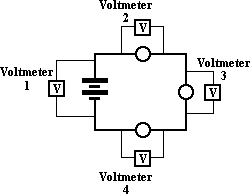
b. Voltmeter 2

c. Voltmeter 3

d. Voltmeter 4

e. Nonsense! All the readings would be the same.

**Question 80:**

aa. A 2-cell, 3-bulb circuit is shown in the diagram at the right. All the bulbs are identical. A voltmeter is used to measure several electric pressure difference between two points. Which statement describes the four different voltmeter reading?

a. All four voltmeters will read approximately the same value.

b. Voltmeter 1 would be the highest; the other three voltmeter readings would be equal.

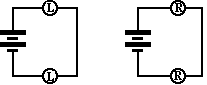
c. Voltmeter 1 would be the highest, followed by Voltmeter 2, then Voltmeter 3 and finally Voltmeter 4.

d. Voltmeter 1 would be the highest, followed by Voltmeter 4, then Voltmeter 3 and finally Voltmeter 4.

**Question 81:**

aa. Consider the two circuits below. Circuit A consists of 2 long (L) bulbs. Circuit B consists of 2 round (R) bulbs.

**Circuit A Circuit B**



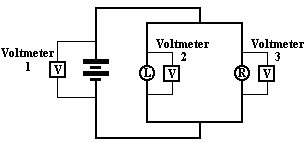
The batteries are identical in each. In which case would the electric pressure difference across the battery be the greatest?

a. The electric pressure difference across the battery would be greatest in Circuit A.

b. The electric pressure difference across the battery would be greatest in Circuit B.

c. The electric pressure difference across the battery would be the same in each circuit.

**Question 82:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other a round (R) bulb. A voltmeter is used to measure several electric pressure differences between two points. Which statement describes the mathematical relationship between the three voltmeter readings.

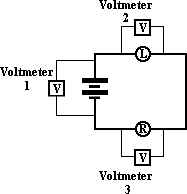
a. Voltmeter 2 and Voltmeter 3 would read the same value; their sum would be equal to the Voltmeter 1 reading.

b. Voltmeter 2 would have a greater reading than Voltmeter 3; their sum would be equal to the Voltmeter 1 reading.

c. Voltmeter 3 would have a greater reading than Voltmeter 2; their sum would be equal to the Voltmeter 1 reading.

d. While there may be some very minor differences in the readings, all three voltmeters would read about the same value.

**Question 83:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other a round (R) bulb. A voltmeter is used to measure several electric pressure differences between two points. Which statement describes the mathematical relationship between the three voltmeter readings.

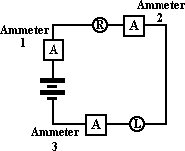
a. Voltmeter 2 and Voltmeter 3 would read the same value; their sum would be equal to the Voltmeter 1 reading.

b. Voltmeter 2 would have a greater reading than Voltmeter 3; their sum would be equal to the Voltmeter 1 reading.

c. Voltmeter 3 would have a greater reading than Voltmeter 2; their sum would be equal to the Voltmeter 1 reading.

d. While there may be some very minor differences in the readings, all three voltmeters would read about the same value.

**Question 84:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other a round (R) bulb. Three ammeters are placed in the circuit to measure the current at the three indicated locations. Which statement describes the ammeter readings?

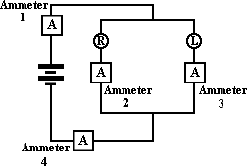
a. All ammeters will read approximately the same value.

b. Ammeter 1 will have the highest reading; Ammeter 2 will have the second highest; Ammeter 3 will have the lowest reading.

c. Ammeter 1 will have the highest reading; Ammeter 3 will have the second highest; Ammeter 2 will have the lowest reading.

d. Ammeter 1 will clearly have the highest reading; Ammeters 2 and 3 will have about the same reading.

**Question 85:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other a round (R) bulb. Three ammeters are placed in the circuit to measure the current at the three indicated locations. Which statement describes the ammeter readings?

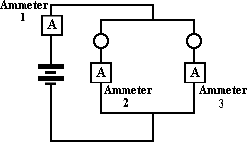
a. All ammeters will read approximately the same value.

b. Ammeter 1 will have the highest reading; Ammeter 2 will have the second highest; Ammeter 3 will have the lowest reading.

c. Ammeter 1 will have the highest reading; Ammeter 3 will have the second highest; Ammeter 2 will have the lowest reading.

d. Ammeter 1 will clearly have the highest reading; Ammeters 2 and 3 will have about the same reading.

**Question 86:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Three ammeters are placed in the circuit to measure the current at the three indicated locations. Which statement describes the ammeter readings?

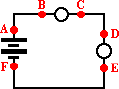
a. All ammeters will read approximately the same value.

b. Ammeter 1 will have the highest reading; Ammeter 2 will have the second highest; Ammeter 3 will have the lowest reading.

c. Ammeter 1 will have the highest reading; Ammeter 3 will have the second highest; Ammeter 2 will have the lowest reading.

d. Ammeter 1 will clearly have the highest reading; Ammeters 2 and 3 will have about the same reading.

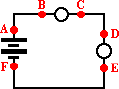
**Question 87:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point B and point D compare?

a. The current is greatest at point B.

b. The current is greatest at point D.

c. The current is the same at points B and D.

**Question 88:**

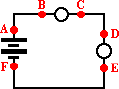
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point B and point E compare?

a. The current is greatest at point B.

b. The current is greatest at point E.

c. The current is the same at points B and E.

**Question 89:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point A and point F compare?

a. The current is greatest at point A.

b. The current is greatest at point F.

c. The current is the same at points A and F.

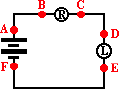
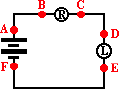
**Question 90:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One light bulb is a round (R) bulb and the other a long (L) bulb. Several points are labeled around the circuit. How do the currents at point B and point D compare?

a. The current is greatest at point B.

b. The current is greatest at point D.

c. The current is the same at points B and D.

**Question 91:**

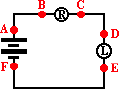
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One light bulb is a round (R) bulb and the other a long (L) bulb. Several points are labeled around the circuit. How do the currents at point B and point E compare?

a. The current is greatest at point B.

b. The current is greatest at point E.

c. The current is the same at points B and E.

**Question 92:**

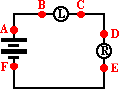
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One light bulb is a round (R) bulb and the other a long (L) bulb. Several points are labeled around the circuit. How do the currents at point A and point F compare?

a. The current is greatest at point A.

b. The current is greatest at point F.

c. The current is the same at points A and F.

**Question 93:**

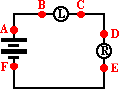
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One light bulb is a round (R) bulb and the other a long (L) bulb. Several points are labeled around the circuit. How do the currents at point B and point D compare?

a. The current is greatest at point B.

b. The current is greatest at point D.

c. The current is the same at points B and D.

**Question 94:**

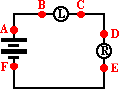
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One light bulb is a round (R) bulb and the other a long (L) bulb. Several points are labeled around the circuit. How do the currents at point B and point E compare?

a. The current is greatest at point B.

b. The current is greatest at point E.

c. The current is the same at points B and E.

**Question 95:**

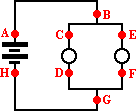
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One light bulb is a round (R) bulb and the other a long (L) bulb. Several points are labeled around the circuit. How do the currents at point A and point F compare?

a. The current is greatest at point A.

b. The current is greatest at point F.

c. The current is the same at points A and F.

**Question 96:**

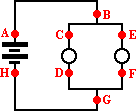
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point B and point C compare?

a. The current is greatest at point B.

b. The current is greatest at point C.

c. The current is the same at points B and C.

**Question 97:**

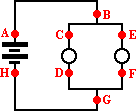
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point B and point D compare?

a. The current is greatest at point B.

b. The current is greatest at point D.

c. The current is the same at points B and D.

**Question 98:**

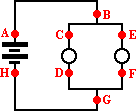
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point B and point G compare?

a. The current is greatest at point B.

b. The current is greatest at point G.

c. The current is the same at points B and G.

**Question 99:**

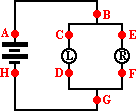
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. The two light bulbs are identical. Several points are labeled around the circuit. How do the currents at point A and point H compare?

a. The current is greatest at point A.

b. The current is greatest at point H.

c. The current is the same at points A and H.

**Question 100:**

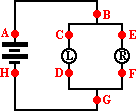
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other is a round (R) bulb. Several points are labeled around the circuit. How do the currents at point A and point B compare?

a. The current is greatest at point A.

b. The current is greatest at point B.

c. The current is the same at points A and B.

**Question 101:**

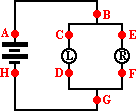
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other is a round (R) bulb. Several points are labeled around the circuit. How do the currents at point B and point C compare?

a. The current is greatest at point B.

b. The current is greatest at point C.

c. The current is the same at points B and C.

**Question 102:**

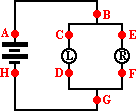
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other is a round (R) bulb. Several points are labeled around the circuit. How do the currents at point C and point E compare?

a. The current is greatest at point C.

b. The current is greatest at point E.

c. The current is the same at points C and E.

**Question 103:**

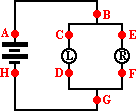
aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other is a round (R) bulb. Several points are labeled around the circuit. How do the currents at point C and point D compare?

a. The current is greatest at point C.

b. The current is greatest at point D.

c. The current is the same at points C and D.

**Question 104:**

aa. A 2-cell, 2-bulb circuit is shown in the diagram at the right. One bulb is a long (L) bulb and the other is a round (R) bulb. Several points are labeled around the circuit. How do the currents at point D and point G compare?

a. The current is greatest at point D.

b. The current is greatest at point G.

c. The current is the same at points D and G.