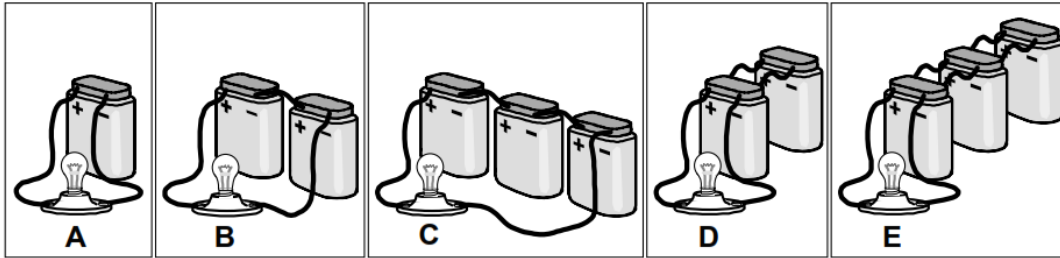


AP Physics 2 – DC Circuits

D2-RT03: BATTERIES AND LIGHT BULBS—BULB BRIGHTNESS

Identical ideal batteries are connected in different arrangements to identical light bulbs as shown.



Rank the brightness of the light bulbs.

					OR			
1	2	3	4	5		All the same	All zero	Cannot determine
Greatest				Least				

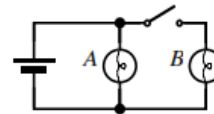
Explain your reasoning.

D2-CT08: CIRCUIT WITH TWO LIGHT BULBS—CURRENT IN BULB

A battery is connected to a circuit with two bulbs and a switch as shown.

When the switch is closed, does the current in bulb A (i) increase, (ii) decrease, or (iii) remain the same? _____

Explain your reasoning.

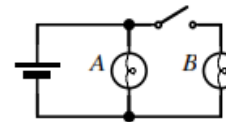


D2-CT10: CIRCUIT WITH TWO LIGHT BULBS—CURRENT IN BATTERY

A battery is connected to a circuit with two bulbs and a switch as shown.

When the switch is closed, does the current in the battery (i) increase, (ii) decrease, or (iii) remain the same? _____

Explain your reasoning.

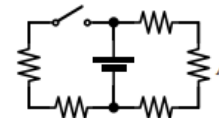


D2-CT13: RESISTOR CIRCUIT WITH SWITCH—CURRENT

Five identical resistors and a switch are connected to a battery as shown.

When the switch closes, will the current in resistor A (i) increase, (ii) decrease, or (iii) remain the same? _____

Explain your reasoning.

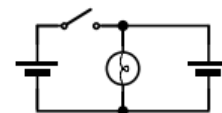


D2-CT16: CIRCUIT WITH TWO BATTERIES—BULB BRIGHTNESS

Two identical ideal batteries, a switch, and a bulb are connected as shown.

When the switch closes, will the brightness of the bulb (i) increase, (ii) decrease, or (iii) remain the same? _____

Explain your reasoning.

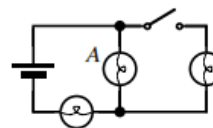


D2-CT18: LIGHT BULB CIRCUIT WITH SWITCH—CURRENT IN BULB

Three light bulbs and a switch are connected to a battery as shown.

When the switch is closed, will the current in bulb A (i) *increase*, (ii) *decrease*, or (iii) *remain the same*? _____

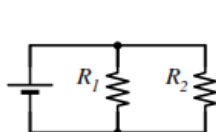
Explain your reasoning.



D2-QRT19: TWO RESISTOR CIRCUITS—CURRENT, RESISTANCE, AND VOLTAGE DROP CHART

For items (a) and (b) below complete the table, showing the value of the currents in and voltages across all elements.

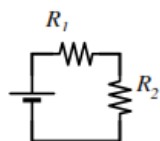
(a) The resistance values for this circuit are given in the table, as is the battery voltage.



	ΔV	I	R
Battery	15.0 V		
R_1			5.0 Ω
R_2			3.0 Ω

Explain your reasoning.

(b) The resistance values for this circuit are given in the table, as is the current in the battery.

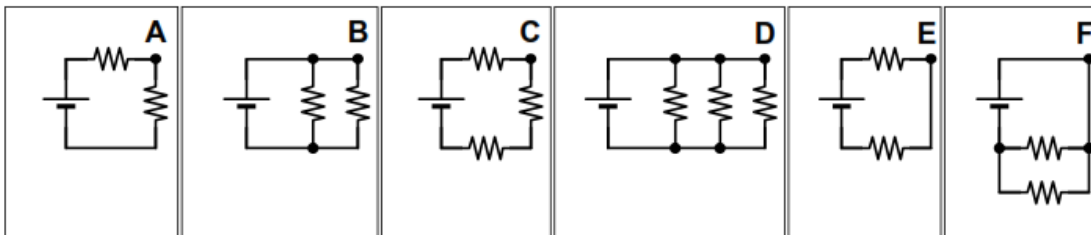


	ΔV	I	R
Battery		4.0 A	
R_1			2.0 Ω
R_2			1.0 Ω

Explain your reasoning.

D2-RT23: SIMPLE RESISTOR CIRCUITS I—CURRENT

All of the resistors in the circuits shown are identical, as are all of the batteries.



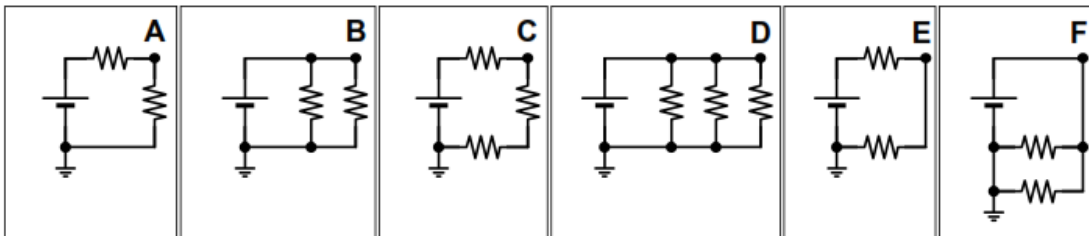
Rank the current at the upper right-hand corner of each circuit.

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	OR	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	2	3	4	5	6		All	All	Cannot
Greatest					Least		the same	zero	determine

Explain your reasoning.

D2-RT24: SIMPLE RESISTOR CIRCUITS WITH A GROUND—VOLTAGE

All of the resistors in the circuits below are identical, as are all of the batteries.



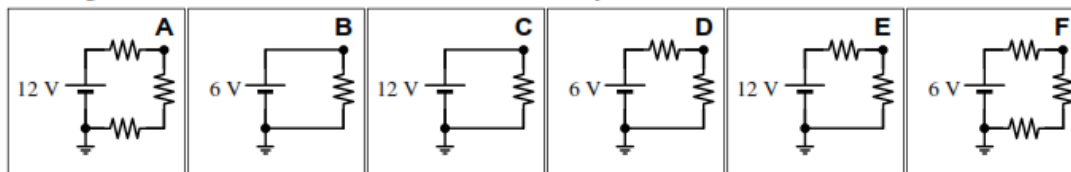
Rank the voltage at the upper right-hand corner of the circuits relative to ground.

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	OR	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	2	3	4	5	6		All	All	Cannot
Greatest					Least		the same	zero	determine

Explain your reasoning.

D2-RT26: SIMPLE RESISTOR CIRCUITS WITH A GROUND—VOLTAGE DROP

The following circuits contain either a 6-volt or a 12-volt battery and one or more identical resistors.



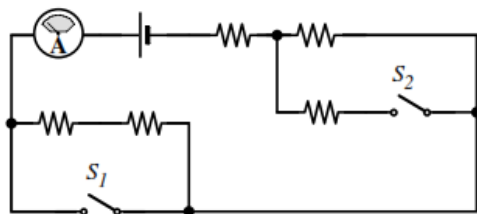
Rank the reading on a voltmeter connected between the upper right-hand corner and ground.

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	OR	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	2	3	4	5	6		All	All	Cannot
Greatest					Least		the same	zero	determine

Explain your reasoning.

D2-RT29: CIRCUIT WITH TWO SWITCHES—AMMETER READINGS

The circuit contains a battery, two switches, five identical resistors, and an ammeter. Four possible switch configurations (open or closed) for the circuit are shown in the table.



Configuration	Switch S_1	Switch S_2
A	Open	Open
B	Open	Closed
C	Closed	Open
D	Closed	Closed

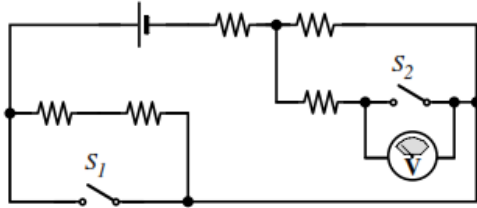
Rank the ammeter reading for the four configurations.

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	OR	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	2	3	4		All	All	Cannot
Greatest			Least		the same	zero	determine

Explain your reasoning.

D2-RT30: CIRCUIT WITH TWO SWITCHES—VOLTMETER READINGS

The circuit contains a battery, two switches, five identical resistors, and a voltmeter. Four possible switch configurations (open or closed) for the circuit are shown in the table.



Configuration	Switch S_1	Switch S_2
A	Open	Open
B	Open	Closed
C	Closed	Open
D	Closed	Closed

Rank the voltmeter reading for the four configurations.

OR
 1 2 3 4 All All Cannot
 Greatest Least the same zero determine

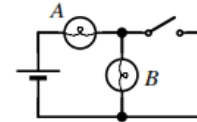
Explain your reasoning.

D2-CT34: LIGHT BULBS CIRCUIT WITH SWITCH—BRIGHTNESS OF BULBS

Two light bulbs and a switch are connected to a battery as shown.

(a) When the switch is closed, will the brightness of bulb B (i) increase, (ii) decrease, or (iii) remain the same? _____

Explain your reasoning.



(b) When the switch is closed, will the brightness of bulb A (i) increase, (ii) decrease, or (iii) remain the same? _____

Explain your reasoning.

D2-SCT41: FOUR RESISTOR CIRCUIT I—CURRENT

In the circuit shown, the sizes of the resistors vary as $R_3 > R_1 > R_2 > R_4$. Four students discussing the currents in this circuit make the following statements:

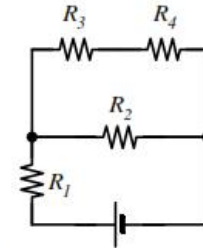
Ajay: "I think the current in R_1 will be the largest because all of the current from the battery goes through it."

Belen: "Right, and after R_1 the current splits into two parts at the junction. The current through R_2 , R_3 , and R_4 will all be the same because there are two branches in the circuit and each branch will get half of the current."

Ciara: "From Ohm's law, current is biggest where resistance is smallest. I think the current through R_2 will be largest because that branch has the lowest resistance in the circuit."

Damaris: "Also using Ohm's law, I think the current in R_3 will be the smallest because R_3 has the largest resistance. The current in R_4 will be largest, because that resistor has the smallest resistance."

Efren: "The current in R_3 will be the same as the current in R_4 because they are in the same branch."



With which, if any, of these students do you agree?

Ajay _____ Belen _____ Ciara _____ Damaris _____ Efren _____ None of them _____

Explain your reasoning.