Study of serial and parallel connection of conductors

Purpose of work: check the validity of the laws of serial and parallel connection of conductors.

Equipment:
043 - power supply,
099 - light bulb
074 - Resistor
042 - Kluch,
040 - ammeter,
041 - voltmeter,

Theory:
1) for serial connection of conductors:

$$U = U_1 + U_2, \; R = R_1 + R_2, \; \frac{U_1}{U_2} = \frac{R_1}{R_2}$$

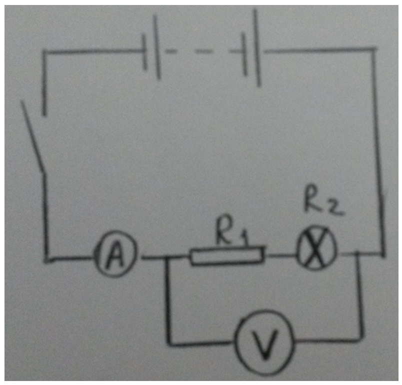
2) for parallel connection of conductors:

$$I = I_1 + I_2, \; \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}, \; \frac{I_1}{I_2} = \frac{R_2}{R_1}$$

Progress:

1. It is necessary to collect 2 electrical circuits. After assembling the circuit, run the simulation. Voltage will appear in the voltage source and the measuring instruments will show the corresponding data.

2. Assemble the electrical circuit No. 1 shown in the figure. Start simulation. Enter the readings of the measuring devices into table # 1.



3. Draw up a formula to calculate the resistance of an electrical circuit depending on voltage and current.

R = U / I

4. Table # 1.

I, (A)	U_1, (B)	U_2, (B)	U_{total}, (B)	R_1, (Ohm)	R_2, (Ohm)	R_{total}, (Ohm)	$U_1 + U_2$, (B)	$R_1 + R_2$, (Ohm)
...	...	...	...					

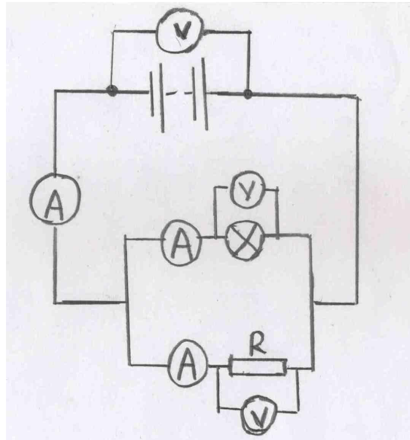
5. Make a conclusion.

A. With a series connection of conductors, the current strength in any part of the circuit is the same. The total voltage in the circuit is equal to the sum of the voltages in individual sections of the circuit. The total resistance of the circuit is the sum of the resistances at each of its sections.

B. The amperage is the same when the conductors are connected in series. The voltage of an electrical circuit is the sum of the voltages at each of its sections. The resistance is equal to the resistance in each of its sections.

C. When the conductors are connected in series, the current and voltage in any part of the circuit are the same. The resistance of an electrical circuit when connected in series is inversely proportional to the sum of the resistances in each of its sections.

6. Assemble the electrical circuit No. 4 shown in the figure. Start simulation. Enter the readings of the measuring devices in table # 2.



7. Make a formula to calculate the total resistance of the circuit from the resistances of individual sections of the circuit.

$$R_{total} = \frac{R_1 R_2}{R_1 + R_2}$$

8. Table No. 2.

U (B)	I_1 (A)	I_2 (A)	I_{total} (A)	R_1 (Ohm)	R_2 (Ohm)	R_{total} (Ohm)	$I_1 + I_2$ (A)	$R_{total} = \frac{R1R2}{R1+R2}$
...	...	...	...					

9. Make a conclusion.

AND. The current in parallel connection is equal to the sum of the currents on each conductor, and the voltage remains constant. The current in parallel connection is equal to the sum of the currents on each conductor, and the voltage remains constant.

B. The current in parallel connection is equal to the sum of the currents on each conductor, and the voltage remains constant. The total resistance of the circuit is equal to the sum of the values opposite to the resistances of the parallel-connected conductors.

C. The current in parallel connection is equal to the sum of the currents on each conductor, and the voltage is equal to the sum of the voltages on each of the sections of the circuit. The current in parallel connection is equal to the sum of the currents on each conductor, and the voltage remains constant.