

ELECTRICITY EXERCISES- Intro I, V, R

Current

1. Calculate the current flowing through a point in an electric circuit, given that a charge of 0.05 C has passed through a section of the conductor in 3 seconds.

Answer: $I = 16.7 \text{ mA}$

2. Given that the current at a point of an electric circuit is 5 mA, how long must the circuit operate for a charge of 0.1 C to pass through that point?

Answer: $t = 20 \text{ s}$

3. Using an ammeter, a current of 0.6 A has been measured in an electric circuit. How much charge will pass through a section of the circuit in 20 s?

Answer: $Q = 12 \text{ C}$

4. How much time is required for a 2 A current to transport 4.8 C? If we reduce the current to 0.5 A, will more or fewer electrons move in the same amount of time? Why?

Answer: $t = 2.4 \text{ s}$

Voltage

5. Using a voltmeter, a 5 V voltage was measured between the two terminals in a component in an electric circuit. At a certain point, a charge of 0.23 C passed through that component. Calculate the amount of energy released by the electrons during the process.

Answer: $E = 1.15 \text{ J}$

Ohm's law

6. A 4.5 V cell has been connected to a light bulb. If the current flowing through the cell is 0.7 A, calculate the resistance in the bulb's filament (assuming the resistance of the circuit wires is negligible).

Answer: $R = 6.43 \Omega$

7. Two resistors of 12 y 20 Ω are connected in series to a 120 V cell. Calculate the equivalent resistance and the current running through the cell.

Answers: $R = 32 \Omega$ $I = 3.75 \text{ A}$

Energy and power

8. Using a voltmeter, a 4,5 V voltage was measured between two points in a component on an electric circuit. Knowing that over a period of three hours, a current of 375 mA flowed through the component, calculate the amount of energy released during the process.

Answer: $18,225 \text{ kJ}$

9. A current of 30 mA flowed through a 2 k Ω resistor. Calculate:
 - a. The voltage across the resistor terminals.
 - b. The charge passing through the resistor in 1.5 hours.
 - c. The energy released during the process.
 - d. The power dissipated by the resistor.

Answers: a) 60 V b) 162 C c) 9.72 kJ d) 1.8 W.

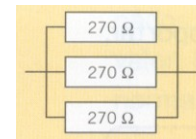
10. A 4.5 V cell and a light bulb are connected between two points (a and b) in an electric circuit. Using a multimeter, a voltage of 3V between these two points, and current of 200 mA through point a were measured. Calculate:

- a. Voltage across the light bulb terminals.
- b. The resistance of the light bulb.

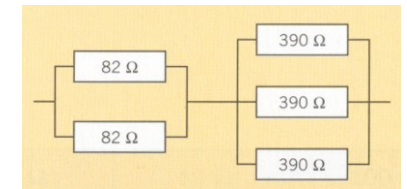
Sol: a) 1.5 V b) 7.5 Ω

11. Calculate the equivalent resistance for the following sets of resistors.

a)



b)



Answers: a) $R = 90 \Omega$ b) $R = 171 \Omega$