**Electricity Problems**

**Ohm’s Law**

1. Calculate the resistance of a conductor through which a current of 2 A flows with a potential difference (voltage) of 12 V. **(Answer: 6 Ω)**

2. Calculate the potential difference between the two ends of a conductor which has a resistance of 10 Ω if a current of 7.5 A flows through it. **(Answer 75 V)**

3. Calculate the intensity of current that flows through a conductor with a resistance of 10 Ω, if the potential difference between its ends is of 0.02 mV.

**(Answer 2x10-6 A)**

**Circuits**

1. We have a circuit with two resistors of 10 Ω each connected in parallel, and following we connect another resistor of 20 Ω. The battery of the circuit has a PD of 30 V.
   1. Draw the circuit.
   2. Calculate the total resistance of the circuit. **Sol. 25 Ω;**
   3. Calculate the PD across the resistor of 20 Ω.
2. Given the following circuit, calculate:

12 V

a) The total resistance.

15 Ω

5 Ω

3 Ω

b) The current that flows through it.

c) The PD across each resistor.

**Sol. a) 23 Ω; b) Sol. 0.52 A;**

**c) V1= 7.8V, V2 = 2.6V, V3 = 1.6V**

3. Given the following circuit, calculate:

12 V

a) The total resistance of the circuit.

4 Ω

5 Ω

6 Ω

b) The intensity that flows through the circuit.

**Sol. a) 1.6 Ω; b) 7.5 A**

1. Calculate the current flowing around the circuit. **Sol.: 333 mA**

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1. Calculate the readings given by the ammeters and voltmeters in the circuits below.

**Sol.: a) I=300 mA, V1=3 V, V2=1.5 V b) I=1.35 A, I2=450 mA, I3=900 mA**

a) b)



1. Series circuit. Calculate: the total R of the circuit, the intensity and the voltage reading by each voltmeter.

**Sol.: Rtotal= 7 kΩ, I=0.643 mA, V1=3.21V, V2=0.643V, V3=0.643V**

V1 V2 V3



1. Calculate the Rtotal and Itotal of the following parallel circuit.

**Sol.: Rtotal=2.07 Ω, Itotal=2.17 A.**

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1. Given the circuit, determine the following magnitudes: I1, I2 and I3, VAB, VBC.

**Sol.: I1=47 mA, I2=14.7 mA, I3=32.3 mA, VAB=3.23 V, VBC=1.27 V.**

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1. Series circuit. Could the 3 resistors of this circuit be changed by just one equivalent resistance without changing the current? Calculate it.



1. Parallel circuit. Why do you think home appliances are connected in parallel circuits? Explain it giving two reasonable (convincing) reasons.