Question#18474

Two resistors, having resistances of 30 and 60 ohms are connected in parallel, and in series with them is a resistor having a resistance of 5 ohms. What p.d. must be applied to the whole circuit to cause a current of 4.8 Amps through the 5 ohm resistor?
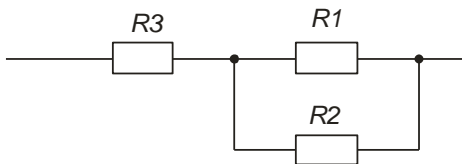
Solution:

Let:

$R_1 = 30 \, ohm$

$R_2 = 60 \, ohm$

$R_3 = 5 \, ohm$

$I = 4.8 \, Amp$

$U-?$

The current through the resistor R3 is equal to total current through circuit and according to the Ohm's Law is:

$I = \dfrac{U}{R_z}$, were R_z the total resistance of the circuit

$R_z = R_3 + \dfrac{R_1 * R_2}{R_1 + R_2} = 5 + \dfrac{30 * 60}{30 + 60} = 25 \, ohm$

$U = IR_z = 4.8 * 25 = 120 \, V$

Answer: 120 V