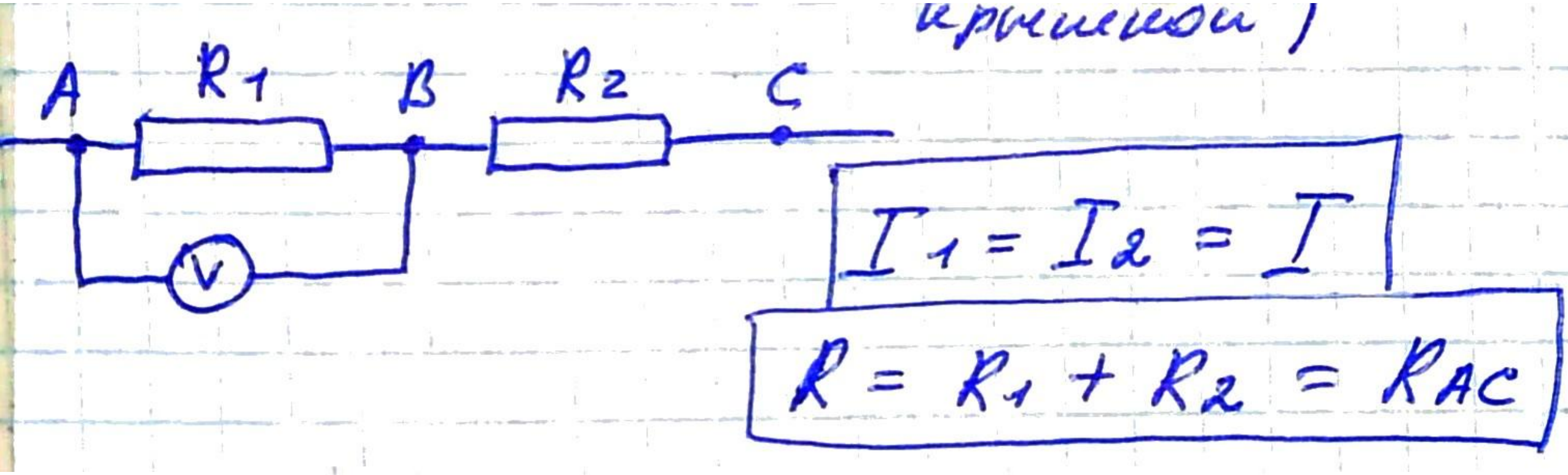
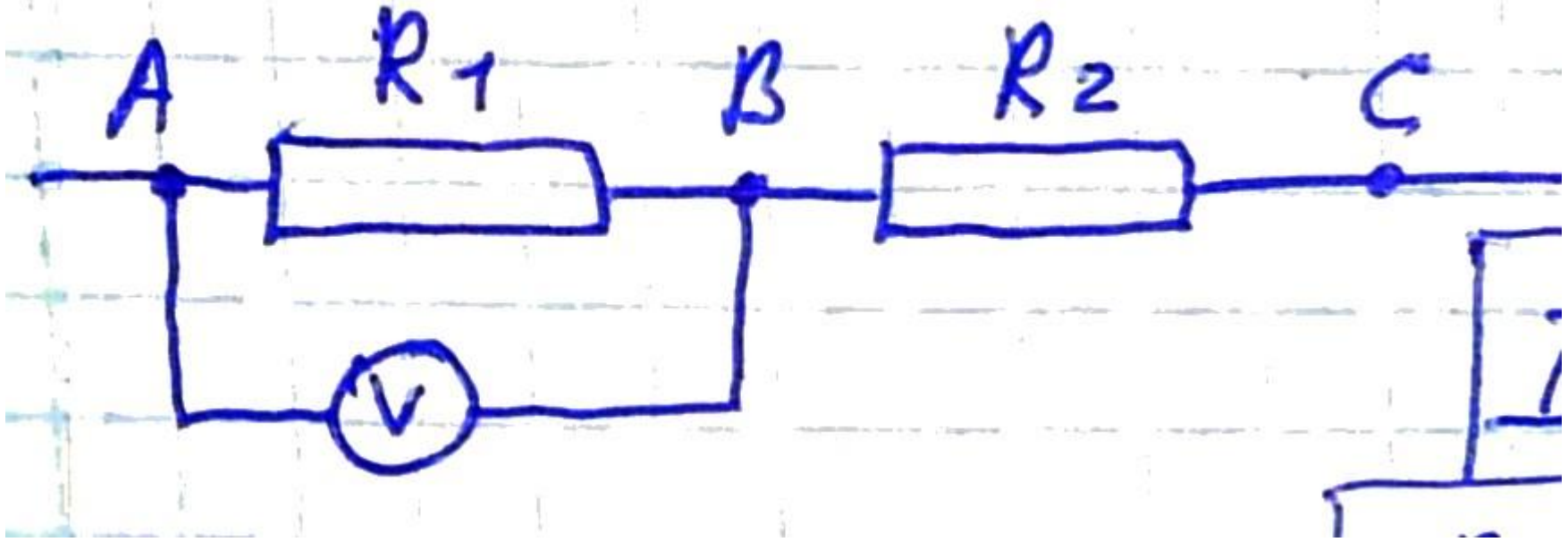
§102 Последовательное и параллельное соединения проводников



$$I_1 = I_2 = I$$

$$R = R_1 + R_2 = R_{AC}$$



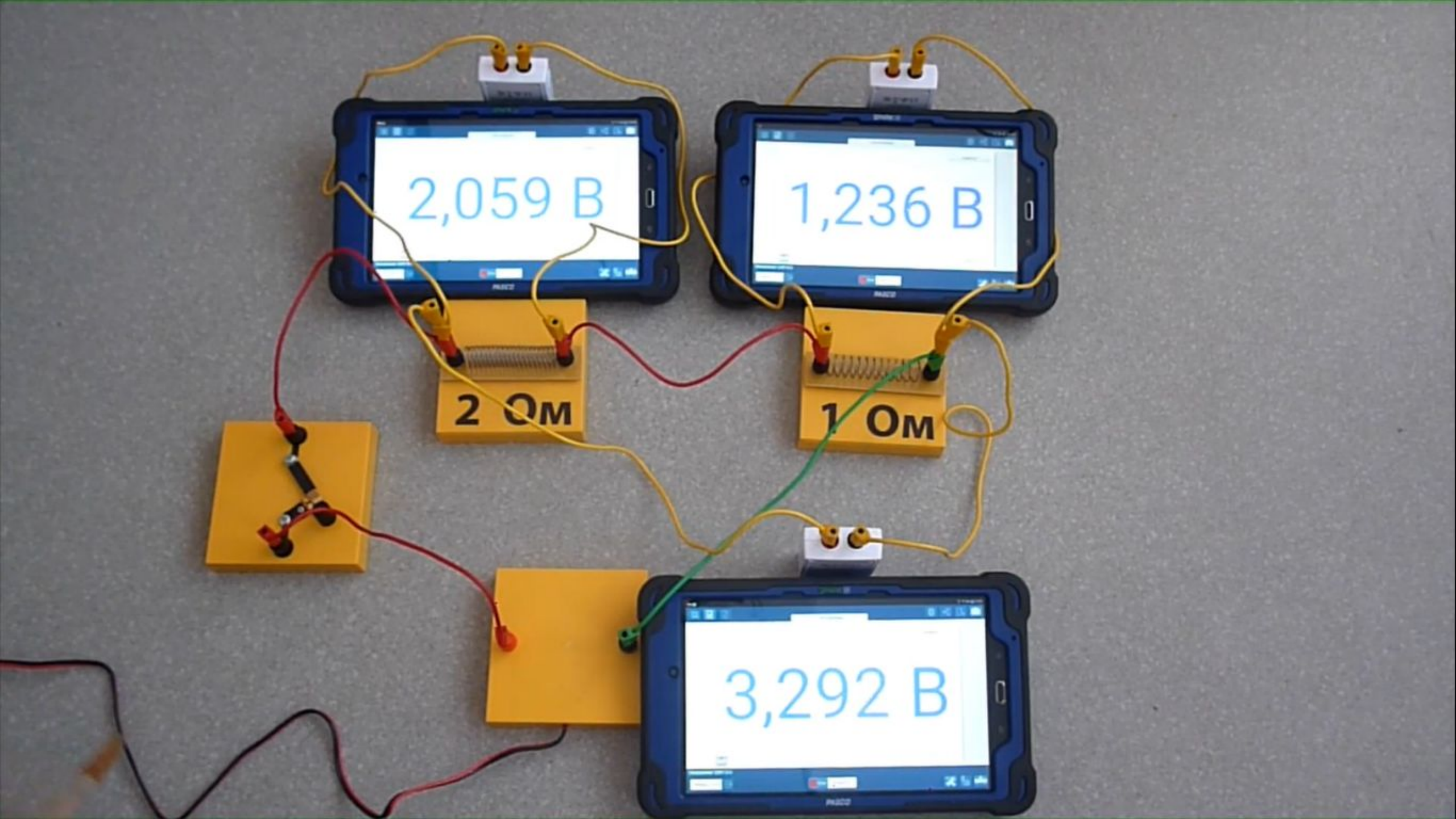
$U_1 = IR_1$, $U_2 = IR_2$

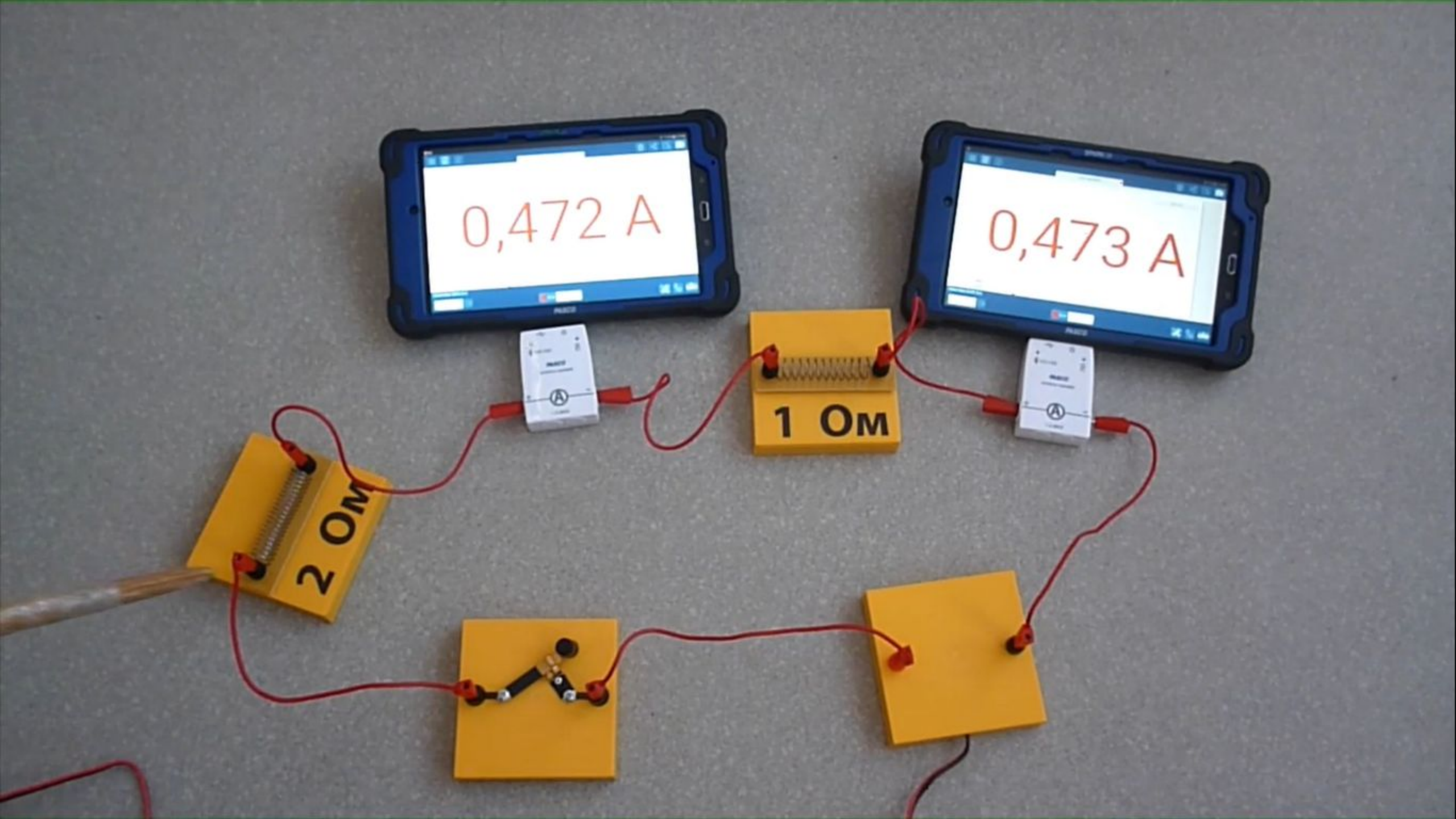
→ чем больше R, тем больше U!

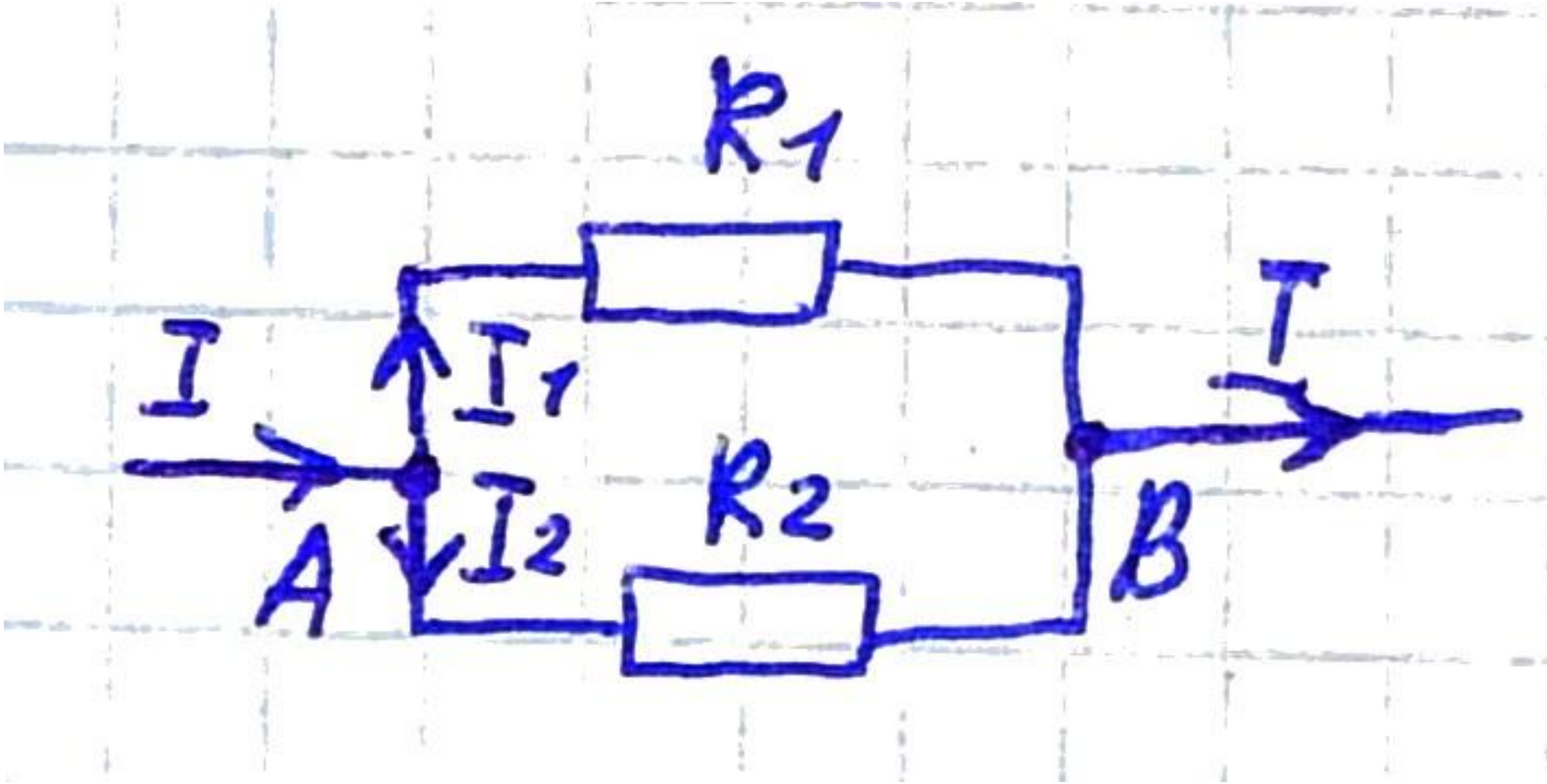
$U_{AC} = \boxed{U = U_1 + U_2}$

$U_{AC} = U_{AB} + U_{BC}$

$$\frac{U_1}{U_2} = \frac{R_1}{R_2}$$

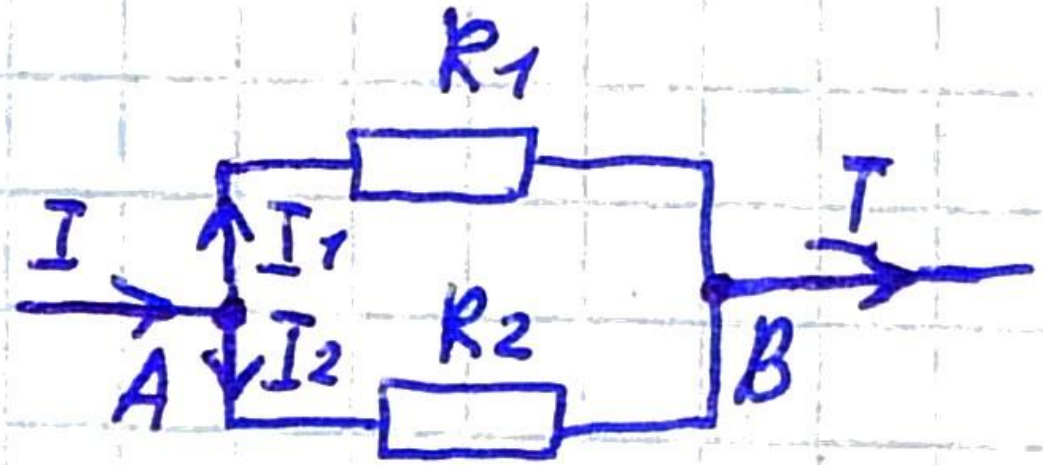

2,059 В
1,236 В
2 Ом
1 Ом
3,292 В


0,472 A
0,473 A
1 Ом
2 Ом


R1
I
I1
I
A
I2
R2
B

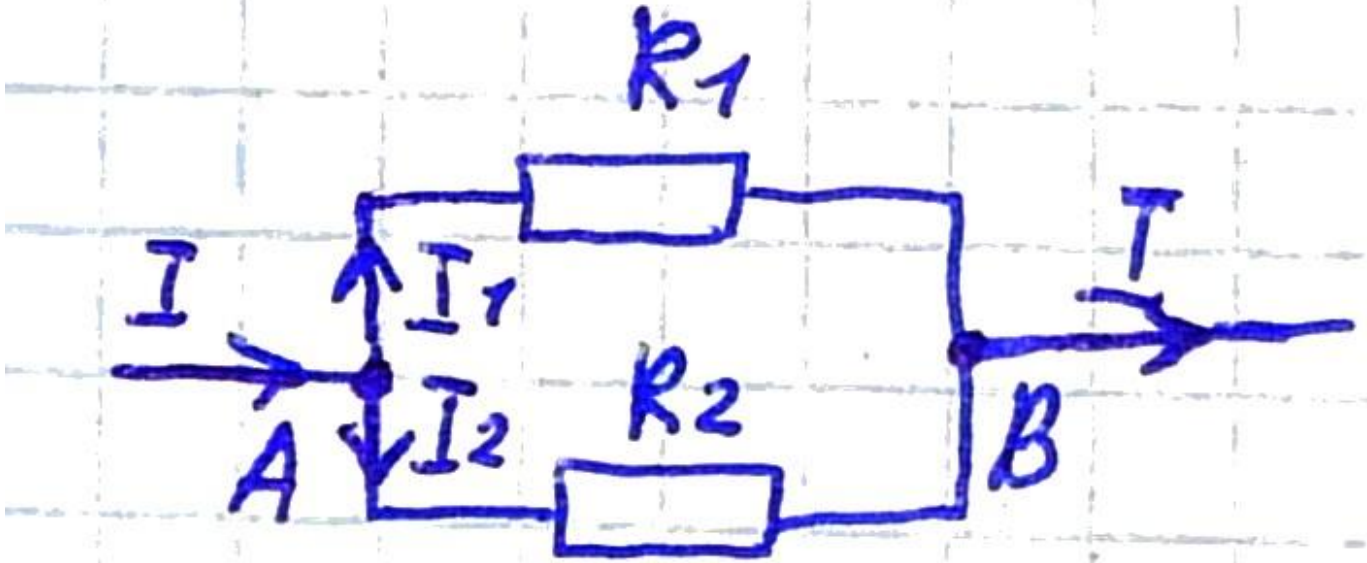
$$U = U_1 = U_2$$

$$I = I_1 + I_2$$



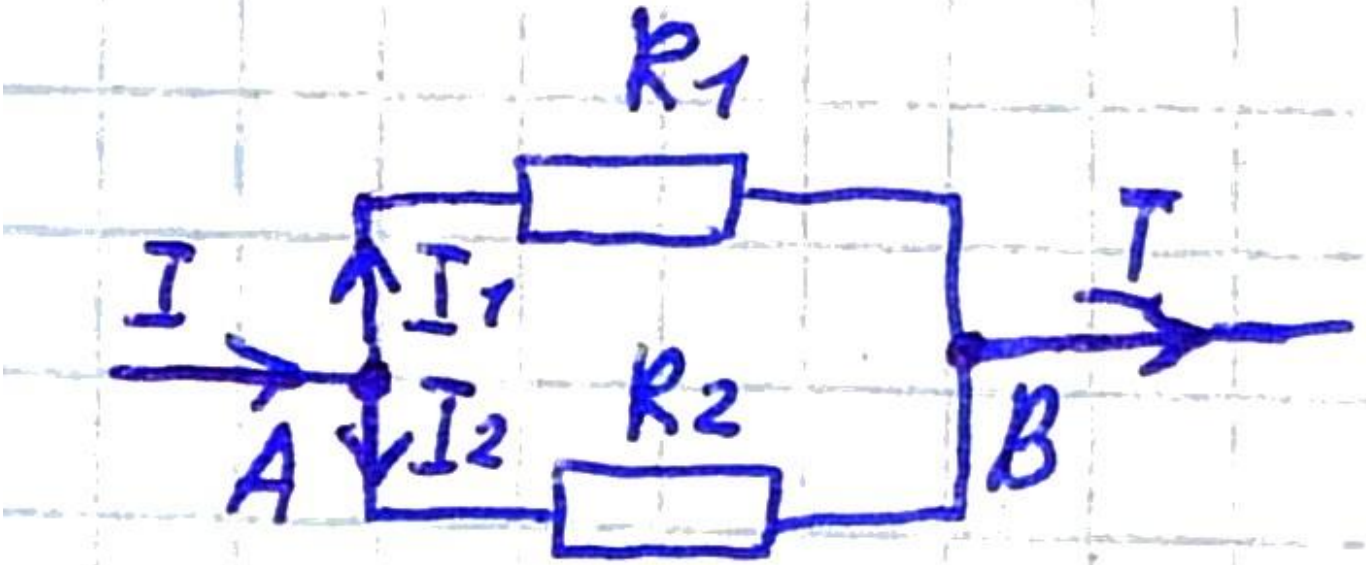
$$I_1 = \frac{U}{R_1}, \quad I_2 = \frac{U}{R_2}$$

тем меньше сопротивление цепи, тем больше в ней течёт ток.



$$I_1 = \frac{U}{R_1}, \quad I_2 = \frac{U}{R_2}$$

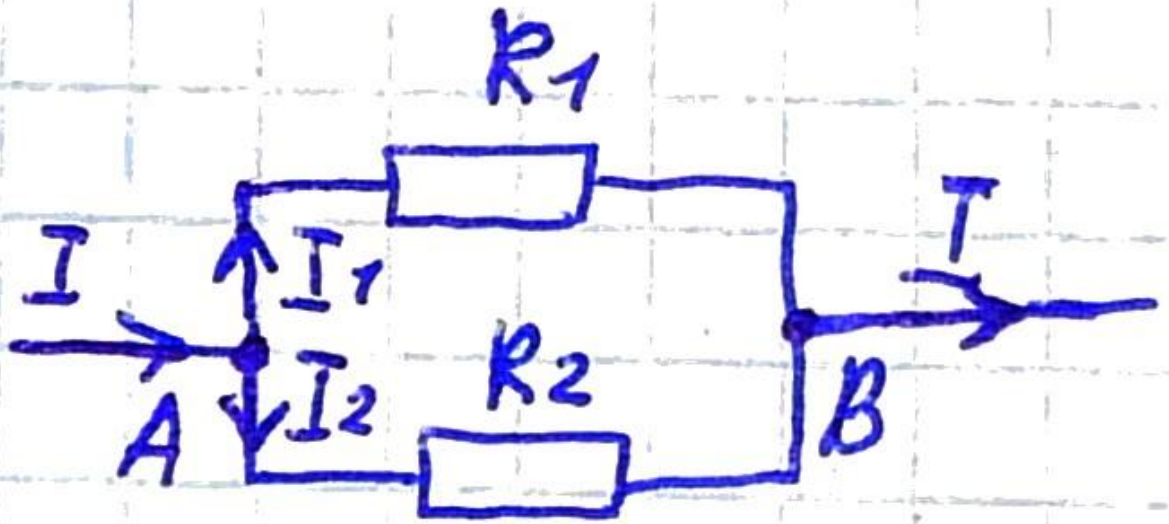
если $R_1 = R_2$, то $I_1 = I_2 = \frac{I}{2}$

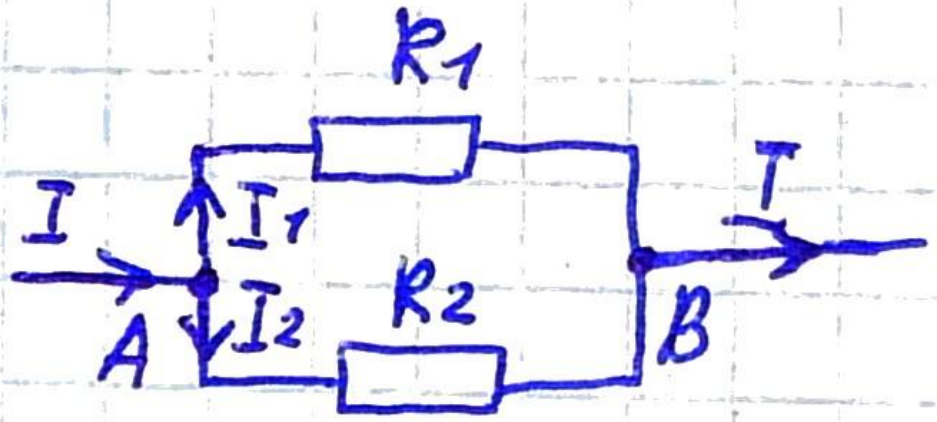


$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$$

сопротивление при двух пров-х

$$\frac{1}{R} = \frac{R_2 + R_1}{R_1 R_2} \Rightarrow \boxed{R = \frac{R_1 \cdot R_2}{R_1 + R_2}}$$





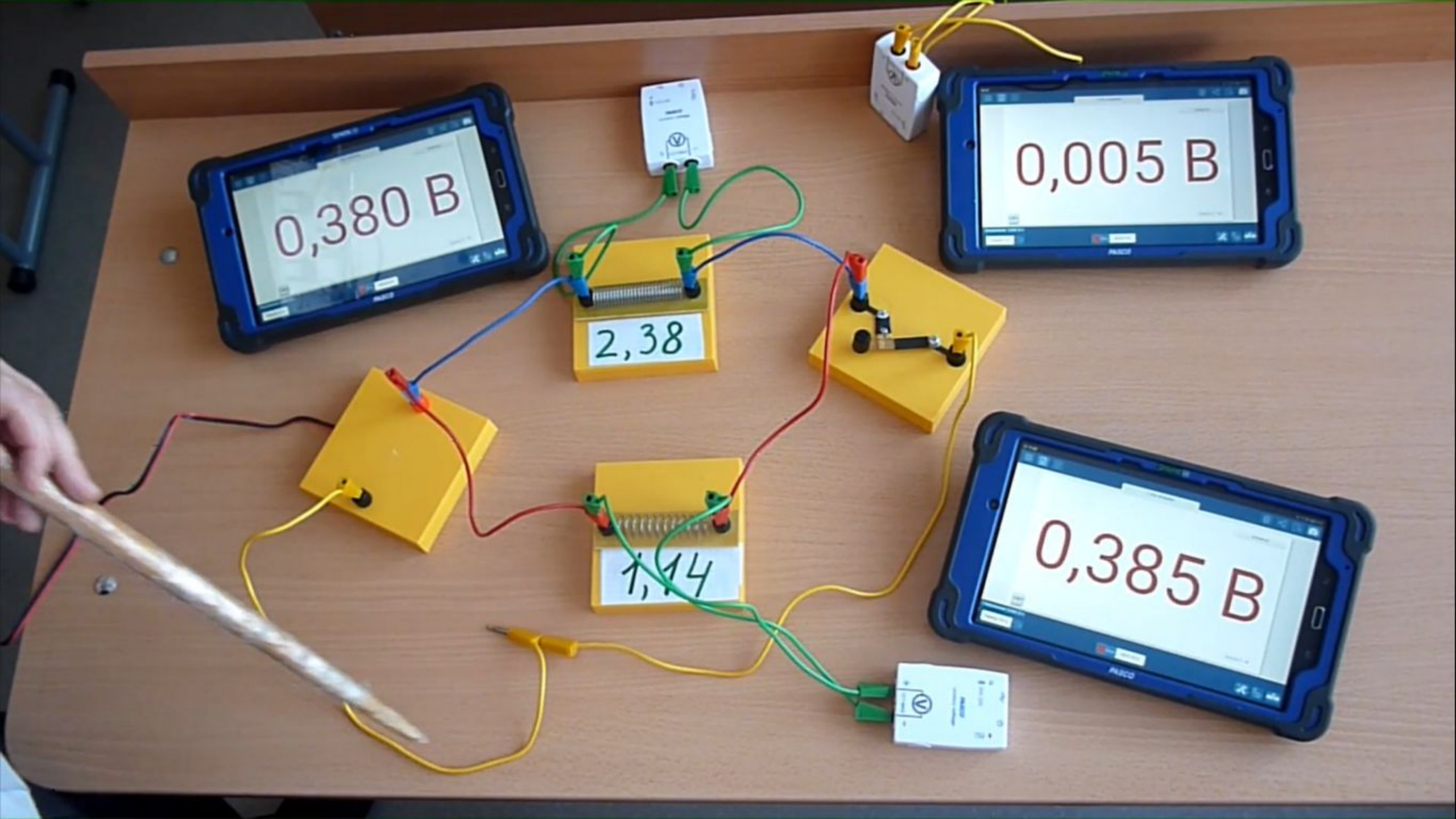
, $\boxed{R = \frac{R_1 \cdot R_2}{R_1 + R_2}}$ — для двух проводников

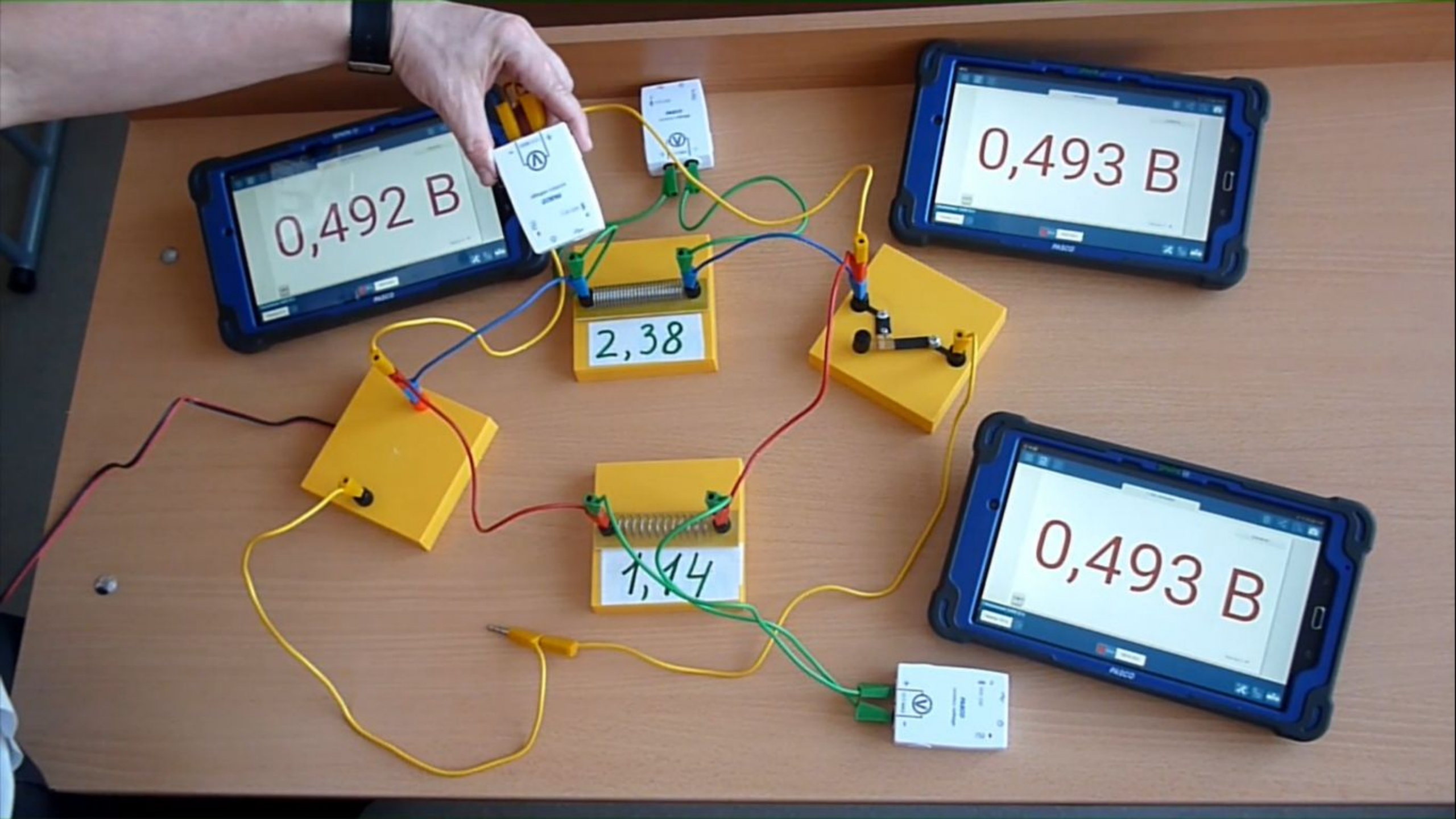
если $R_1 = R_2$, то $\boxed{R = \frac{R_1}{2}}$

если $R_1 = R_2 = R_3$, то $R = \frac{R_1}{3}$

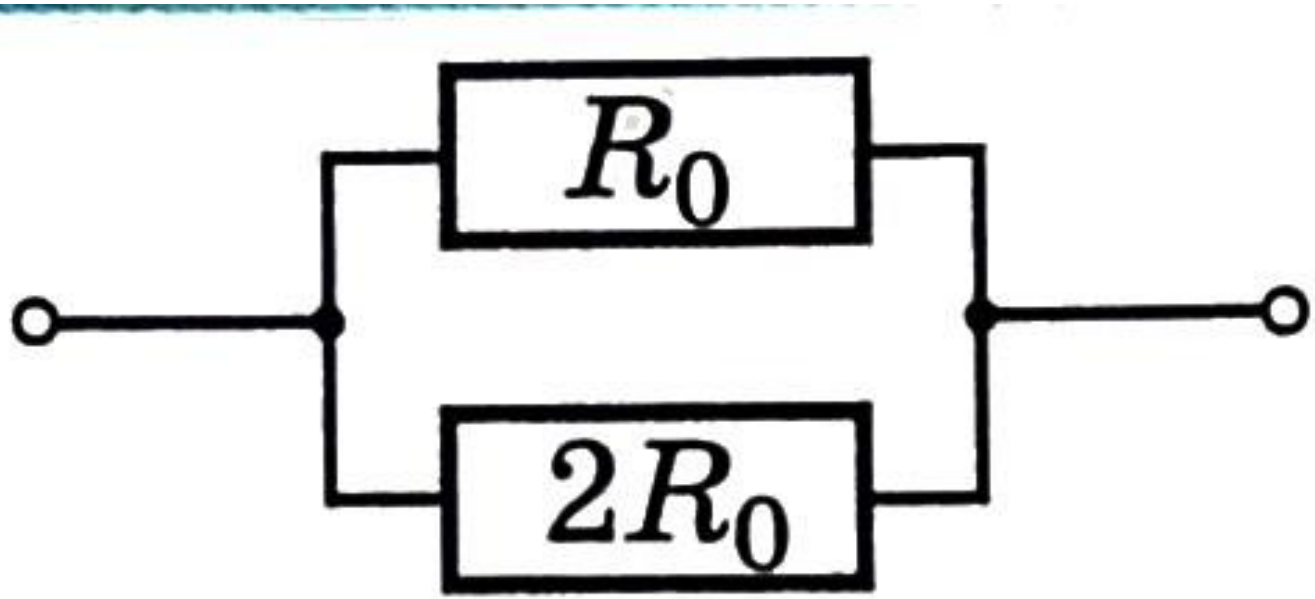
если $R_1 = R_2 = \ldots = R_n$, $\boxed{R = \frac{R_1}{n}}$


0,156 A
2,38
0,468 A
0,310 A
1,14

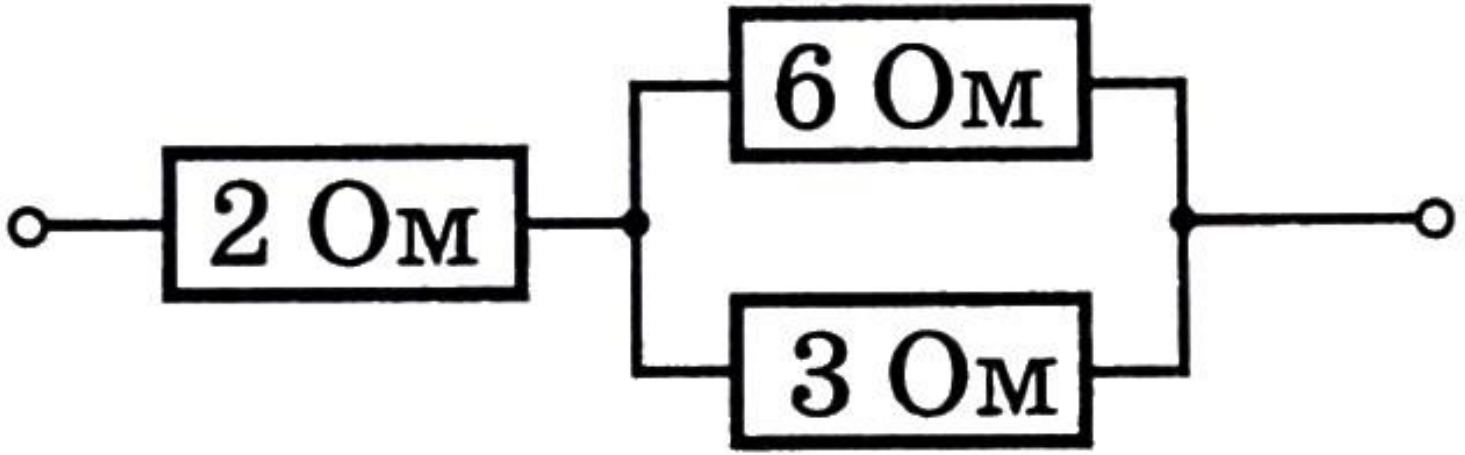

0,380 В
0,005 В
2,38
1,14
0,385 В


0,492 В
0,493 В
2,38
1,14
0,493 В

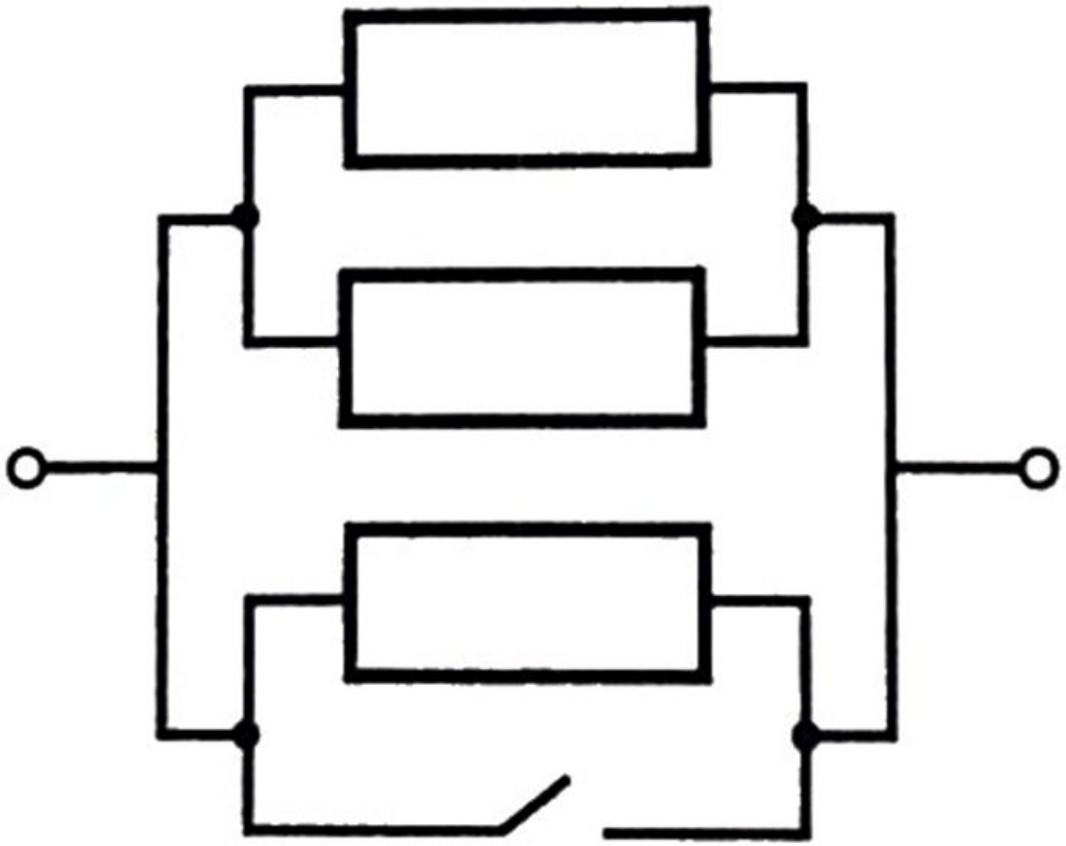
A1

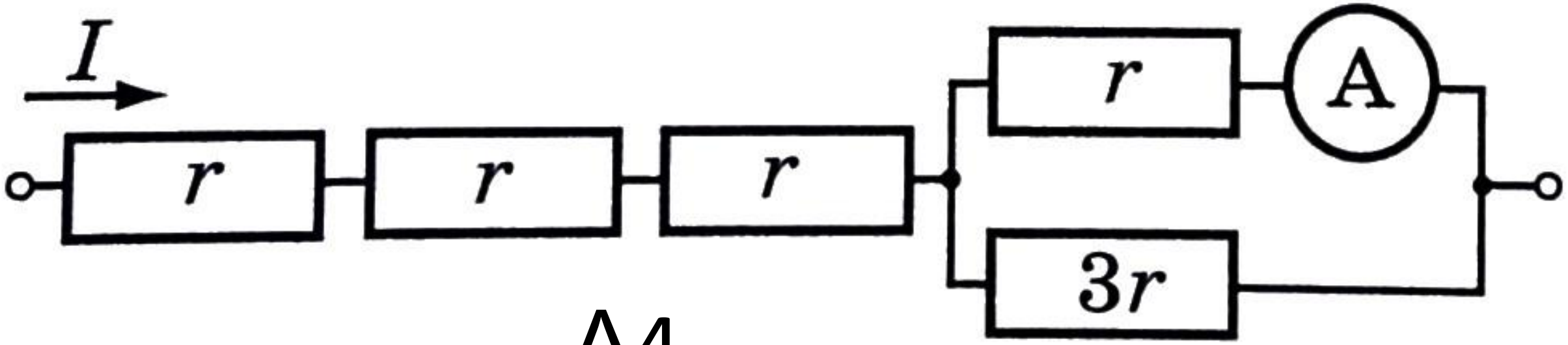


A2

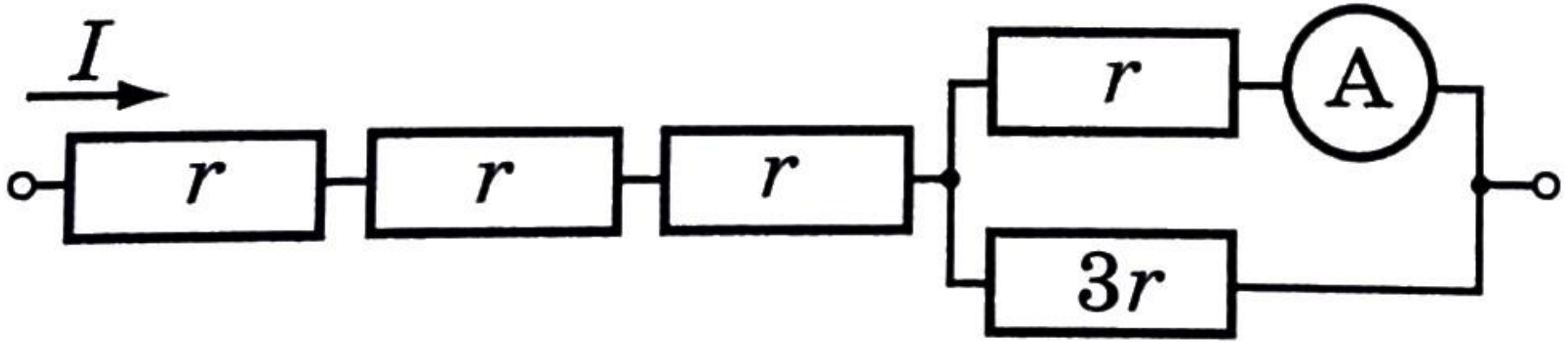


A3





A4



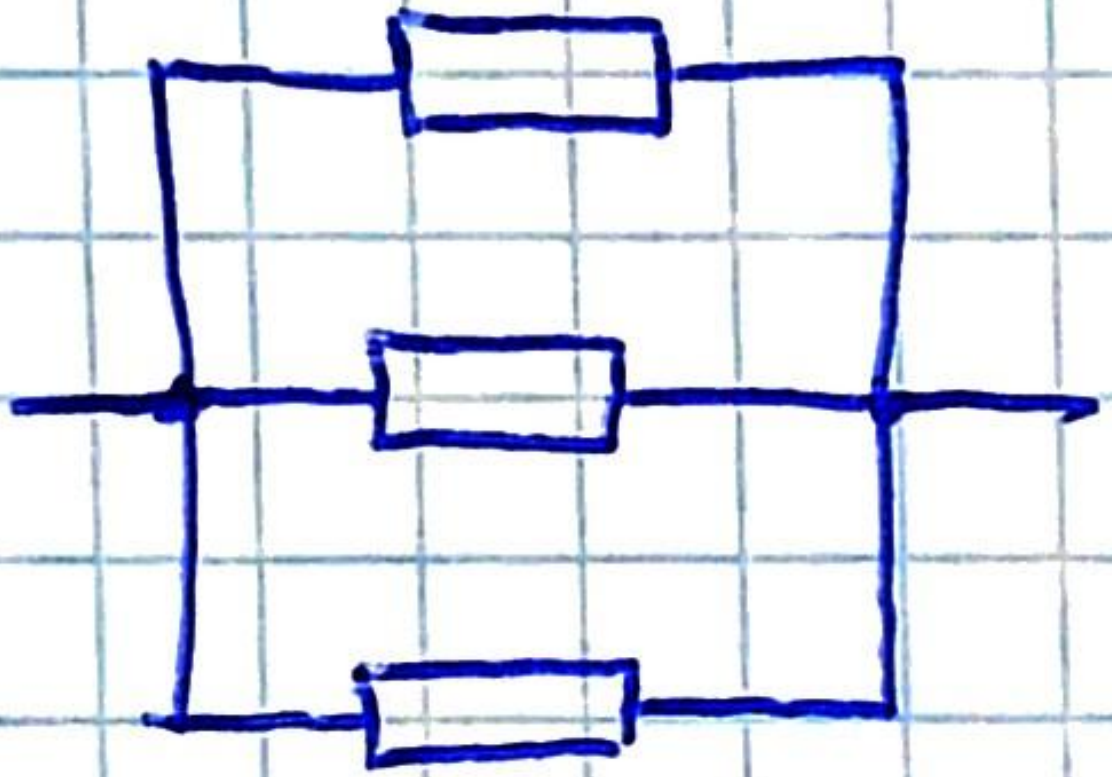
$$\begin{cases} I_1 = 3I_2 \\ I_1 + I_2 = 8 \end{cases}$$

$$I_2 = 8 - I_1$$

$$I_1 = 3 \cdot (8 - I_1)$$

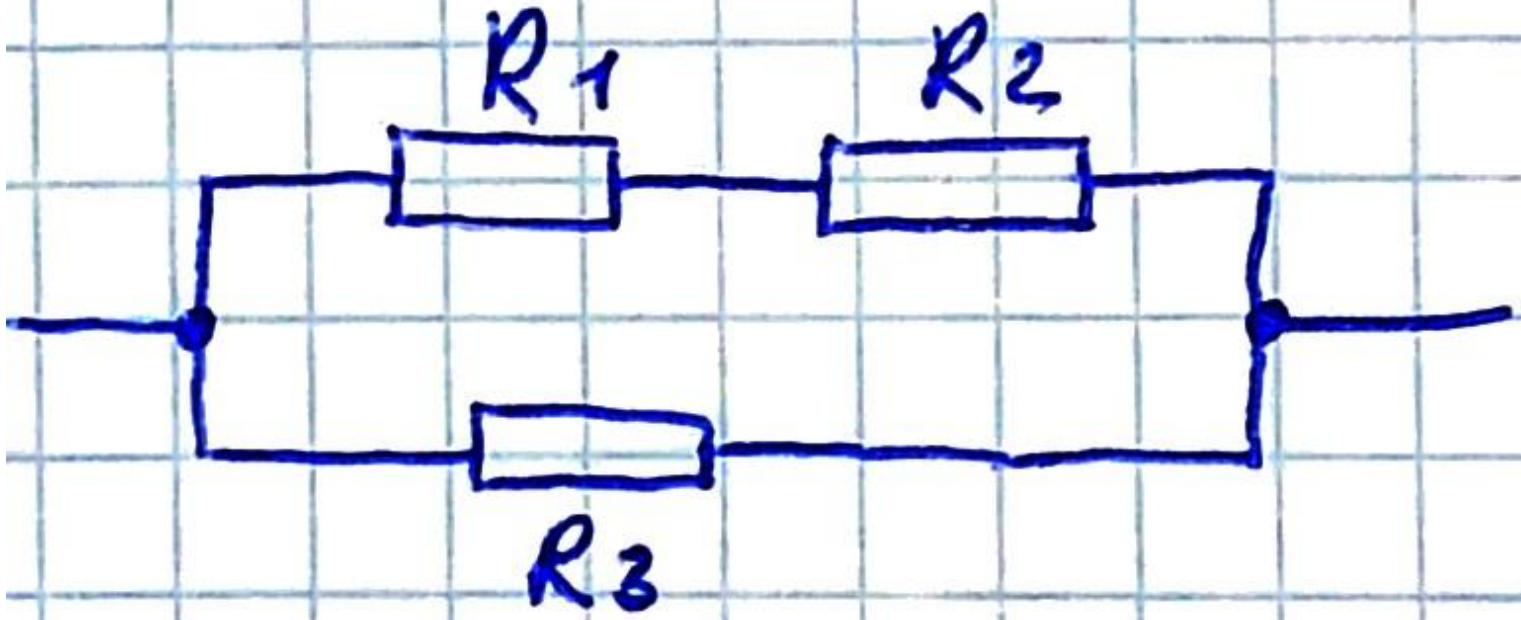
Какие можно получить значения сопротивлений, соединяя всеми возможными способами три резистора, если сопротивление каждого равно 6 Ом?

$$R = R_1 \cdot 3 = 6 \cdot 3 = 18 \text{ Ом}$$



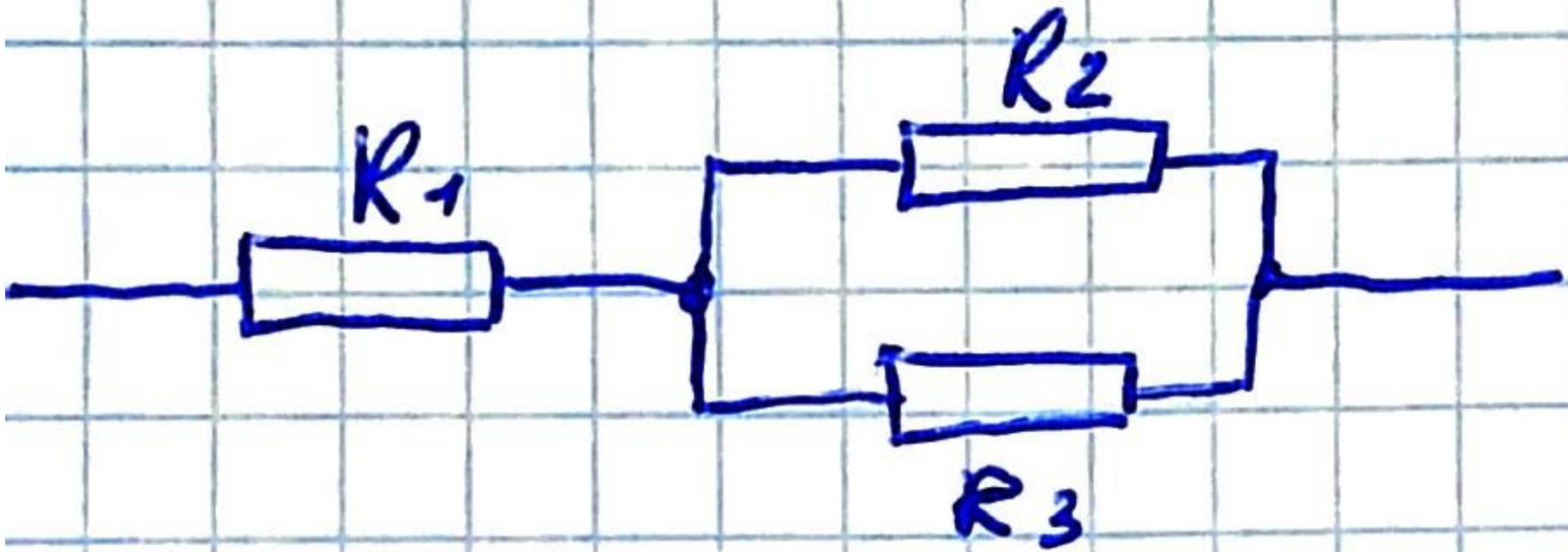
$$R = \frac{R_1}{3} =$$

$$= \frac{6}{3} = 2 \text{ Ом}$$



$$R_{1,2} = 2R_1 = 12 \text{ Ом}$$

$$R = \frac{R_{1,2} \cdot R_3}{R_{1,2} + R_3} = \frac{12 \cdot 6}{12 + 6} = 4 \text{ Ом}$$



$$R = R_1 + R_{2,3} = R_1 + \frac{R_2}{2} =$$

$$= 6 + \frac{6}{2} = 9 \text{ Ом}$$