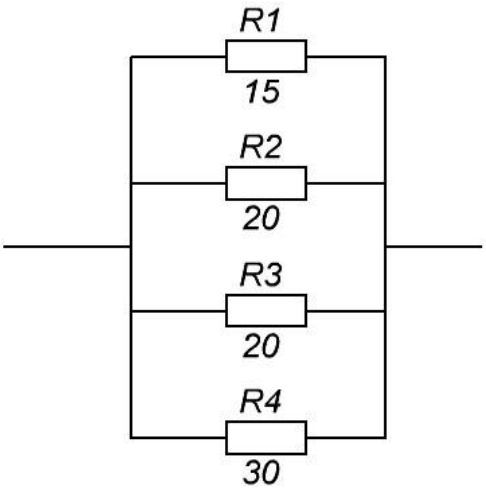
It's known that smallest resistance we can reach when using parallel connection, as on the circuit below.



Using parallel connection rule:

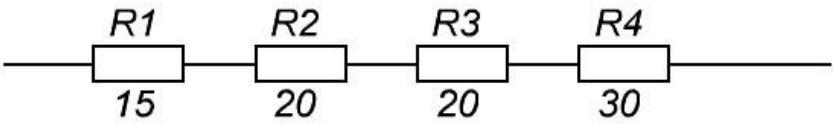
$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$$

$$\frac{1}{R} = \frac{1}{15} + \frac{1}{20} + \frac{1}{20} + \frac{1}{30} = \frac{4+6+2}{60} = \frac{12}{60} = \frac{1}{5}\ \left(\frac{1}{\Omega}\right)$$

So,

$$\boldsymbol{R = 5\ \Omega}$$

It's known that smallest resistance we can reach when using series connection, as on the circuit below.



Using series connection rule:

$$R = R_1 + R_2 + R_3 + R_4$$

$$\boldsymbol{R = 15 + 20 + 20 + 30 = 85\ (\Omega)}$$

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