

### Задача 1

$$R_{\text{ЭКВ}} = R1 + \frac{1}{\frac{1}{R2} + \frac{1}{R3} + \frac{1}{R4}} + \frac{1}{\frac{1}{R5} + \frac{1}{R6+R7}} = 55 + \frac{1}{\frac{1}{46} + \frac{1}{20} + \frac{1}{33}} + \frac{1}{\frac{1}{2.5} + \frac{1}{15.4+3}} = 55 + 9,83 + 2,2 = 67,03 \text{ Ом}$$

$$I_{\text{AB}} = \frac{E}{R_{\text{ЭКВ}}} = \frac{6}{67,03} = 89,5 \text{ мА}$$

### Задача 2

$$R_{\text{ЭКВ}} = R1 + \frac{1}{\frac{1}{R2} + \frac{1}{R4 + \frac{1}{\frac{1}{R7} + \frac{1}{R5+R6}}}} + R3 = 20 + \frac{1}{\frac{1}{8} + \frac{1}{2 + \frac{1}{\frac{1}{12} + \frac{1}{1+9}}}} + 6 = 20 + 3,85 + 6 = 29,846 \text{ Ом}$$

$$I_1 = \frac{E}{R_{\text{ЭКВ}}} = \frac{12}{29,846} = 402 \text{ мА}$$

$$U_{R1} = I_1 * R1 = 0,402 * 20 = 8,04 \text{ В}$$

$$U_{R3} = I_1 * R3 = 0,402 * 6 = 2,412 \text{ В}$$

$$U_{R2} = E - U_{R1} - U_{R3} = 12 - 8,04 - 2,412 = 1,548 \text{ В}$$

$$I_2 = \frac{U_{R2}}{R2} = \frac{1,548}{8} = 194 \text{ мА}$$

$$I_3 = I_1 - I_2 = 402 - 194 = 208 \text{ мА}$$

$$U_{R4} = I_3 * R4 = 0,208 * 2 = 0,416 \text{ В}$$

$$U_{R7} = U_{R2} - U_{R4} = 1,548 - 0,416 = 1,132 \text{ В}$$

$$I_5 = \frac{U_{R7}}{R7} = \frac{1,132}{12} = 94 \text{ мА}$$

$$I_4 = \frac{U_{R7}}{R5+R6} = \frac{1,132}{1+9} = 0,113 \text{ мА}$$

$$U_{R5} = I_4 * R5 = 0,113 * 1 = 0,113 \text{ В}$$

$$U_{R6} = I_4 * R6 = 0,113 * 9 = 1,017 \text{ В}$$

### Задача 3

$$R = \frac{U}{I} = \frac{125}{2,7} = \mathbf{46,3 \text{ Ом}}$$

### Задача 4

$$R_2 = R_3 = 3 * R_1 = 3 * 6,3 = 18,9 \text{ Ом}$$

$$R_{\text{ЭКВ}} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = \frac{1}{\frac{1}{6,3} + \frac{1}{18,9} + \frac{1}{18,9}} = \frac{1}{0,2645} = 3,78 \text{ Ом}$$

$$R_{\text{ЭКВ}} + R_{\text{ВНУТР}} = \frac{E}{I}$$

$$R_{\text{ВНУТР}} = \frac{E}{I} - R_{\text{ЭКВ}} = \frac{42}{0,972} - 3,78 = \mathbf{39,43 \text{ Ом}}$$

### Задача 5

$$R_{\text{ЭКВ}} = R_1 + R_X/7 = 2,7 + 6,5/7 = 3,63 \text{ Ом}$$

$$I = \frac{U}{R_{\text{ЭКВ}}} = \frac{14,2}{3,63} = 3,91 \text{ А}$$

$$U_{x1} = U_{x2} = U_{x3} = U_{x4} = U_{x5} = U_{x6} = U_{x7} = R_X/7 * I = 6,5/7 * 3,91 = \mathbf{3,63 \text{ В}}$$

### Задача 6

$$I_1 = \frac{E}{R_1} = \frac{13,7}{4,7} = \mathbf{2,915 \text{ А}}$$

$$I_2 = \frac{E}{R_2} = \frac{13,7}{22} = \mathbf{623 \text{ мА}}$$

$$I_3 = \frac{E}{R_3} = \frac{13,7}{6,8} = \mathbf{2,015 \text{ А}}$$

$$I = I_1 + I_2 + I_3 = 2,915 + 0,623 + 2,015 = \mathbf{5,552 \text{ А}}$$