

Antwoorden

Serieschakelingen

1) $U = 12 \text{ V}, R = 4 \Omega$

$$I = \frac{U}{R} = \frac{12}{4} = 3 \text{ A}$$

2) $U = 12 \text{ V}, R_1 = 2 \Omega, R_2 = 4 \Omega$

$$R_v = R_1 + R_2 = 2 + 4 = 6 \Omega$$

$$I = \frac{U}{R} = \frac{12}{6} = 2 \text{ A}$$

$$U_1 = R_1 \times I = 2 \times 2 = 4 \text{ V}, U_2 = R_2 \times I = 4 \times 2 = 8 \text{ V}$$

3) $I = 3 \text{ A}, R_1 = 4 \Omega, R_2 = 5 \Omega$

Het is een serieschakeling dus de stroom is overal gelijk = 3 A

$$U_1 = R_1 \times I = 4 \times 3 = 12 \text{ V}, U_2 = R_2 \times I = 5 \times 3 = 15 \text{ V}$$

$$U_{\text{accu}} = U_1 + U_2 = 12 + 15 = 27 \text{ V}$$

Parallelschakelingen

1) $R_1 = 15 \Omega, R_2 = 30 \Omega, R_3 = 60 \Omega, U = 12 \text{ V}$

$$\frac{1}{R_v} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{15} + \frac{1}{30} + \frac{1}{60} = \frac{7}{60} \quad R_v = \frac{60}{7} = 8,57 \Omega$$

$$I = \frac{U}{R} = \frac{12}{8,57} = 1,4 \text{ A}$$

2) $R_1 = 60 \Omega, R_2 = 100 \Omega, R_3 = 120 \Omega$

$$I_1 = \frac{U}{R_1} = \frac{12}{60} = 0,2 \text{ A}$$

$$I_2 = \frac{U}{R_2} = \frac{12}{100} = 0,12 \text{ A}$$

$$I_3 = \frac{U}{R_3} = \frac{12}{120} = 0,1 \text{ A}$$

3) $R_1 = 3 \Omega, R_2 = 6 \Omega$

$$I_1 = \frac{U}{R_1} = \frac{12}{3} = 4 \text{ A}$$

$$I_2 = \frac{U}{R_2} = \frac{12}{6} = 2 \text{ A}$$

$$I_3 = I_{\text{totaal}} - (I_1 + I_2) = 7,5 - (4 + 2) = 1,5 \text{ A}$$

$$R_3 = \frac{U}{I} = \frac{12}{1,5} = 8 \Omega$$

Gecombineerde schakelingen

1) $R_1 = 1,6 \Omega$, $R_2 = 6 \Omega$, $R_3 = 4 \Omega$, $U = 12 \text{ V}$

$$\frac{1}{R_{2,3}} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{6} + \frac{1}{4} = \frac{2}{12} + \frac{3}{12} = \frac{5}{12} \quad R_{2,3} = \frac{12}{5} = 2,4 \Omega$$

$$R_v = R_1 + R_{2,3} = 1,6 + 2,4 = 4 \Omega$$

$$I = \frac{U}{R} = \frac{12}{4} = 3 \text{ A}$$

$$U = I \times R = 3 \times 1,6 = 4,8 \text{ V}$$

2) $R_2 = 4 \Omega$, $R_3 = 12 \Omega$, $I = 3 \text{ A}$

$$\frac{1}{R_{2,3}} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{4} + \frac{1}{12} = \frac{3}{12} + \frac{1}{12} = \frac{4}{12} \quad R_{2,3} = \frac{12}{4} = 3 \Omega$$

$$R_v = \frac{U}{I} = \frac{12}{3} = 4 \Omega, R_1 = R_v - R_{2,3} = 4 - 3 = 1 \Omega$$

$$U_1 = I \times R_1 = 3 \times 1 = 3 \text{ V}$$

$$U_{2,3} = I \times R_{2,3} = 3 \times 3 = 9 \text{ V}$$

$$I_2 = \frac{U_{2,3}}{R_2} = \frac{9}{4} = 2,25 \text{ A}$$

$$I_3 = \frac{U_{2,3}}{R_3} = \frac{9}{12} = 0,75 \text{ A}$$