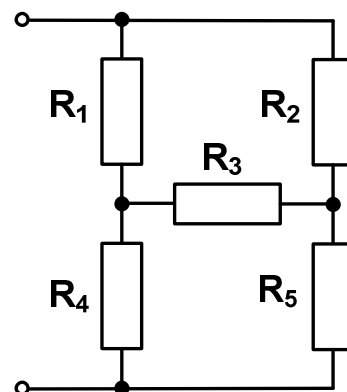


Module name: **Electrical Circuits 1**
 Module ID: **IS-FEE-10070W**
 Module type: **Specialization Workshop**
 Semester: **winter 2024/2025**
 Instructor: **Jarosław Forenc, j.forenc@pb.edu.pl**

Workshop 01 (14.10.2024)

1. Using the PSpice program, determine the equivalent resistance of the circuit. Supply the circuit shown in the figure with a DC voltage. Measure the current drawn by the circuit. Then, using Ohm's Law, calculate the circuit resistance. Compare the result with the calculations performed during classes.

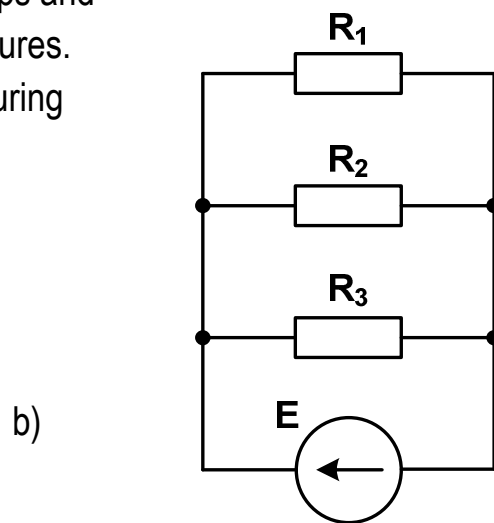
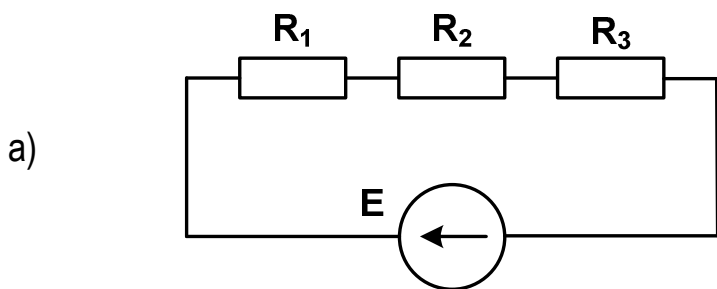


$$R_1 = R_2 = R_3 = R_4 = R_5 = R$$

Assume any value for the resistance, R .

2. Using the PSpice program, determine the voltage drops and currents in the branches of the circuit shown in the figures. Compare the result with the calculations performed during classes.

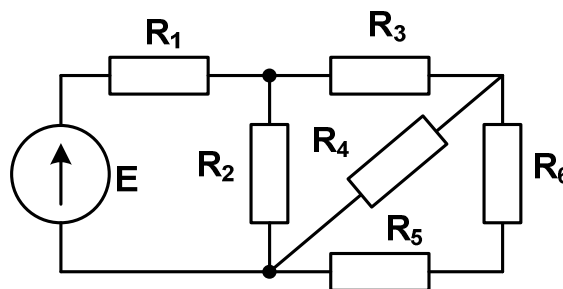
$$E = 12 \text{ V}, R_1 = 1 \text{ k}\Omega, R_2 = 5 \text{ k}\Omega, R_3 = 10 \text{ k}\Omega.$$



3. Using the voltage value E calculated during classes and the PSpice program, check that the voltage drop across R_6 is 30 V. Measure the current through the voltage source, and determine the equivalent resistance of the circuit.

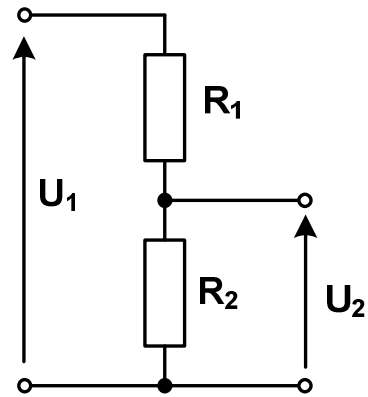
$$R_1 = 2.4 \text{ }\Omega, R_2 = 4 \text{ }\Omega, R_3 = 1 \text{ }\Omega,$$

$$R_4 = 2.5 \text{ }\Omega, R_5 = 2 \text{ }\Omega, R_6 = 3 \text{ }\Omega.$$



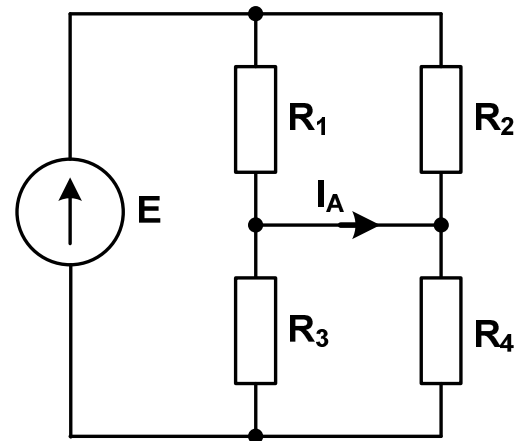
4. Using the PSpice program, determine the voltage U_2 for the circuit shown in the figure. Compare the result with the calculations performed during classes.

$$U_1 = 100 \text{ V}, R_1 = 70 \ \Omega, R_2 = 30 \ \Omega.$$



5. Using the PSpice program, determine the current I_A in the circuit presented in the figure. Compare the result with the calculations performed during classes

$$E = 120 \text{ V}, R_1 = 10 \ \Omega, R_2 = 15 \ \Omega, R_3 = 60 \ \Omega, R_4 = 40 \ \Omega$$



6. There are 4 bulbs installed in the rear lamp of a car:

- indicator - type: P21W, rated power: $P_1 = 21 \text{ W}$, rated voltage: $U_n = 12 \text{ V}$,
- break light - type: W16W, rated power: $P_2 = 16 \text{ W}$, rated voltage: $U_n = 12 \text{ V}$,
- parking light - type: W5W, rated power: $P_3 = 5 \text{ W}$, rated voltage: $U_n = 12 \text{ V}$,
- reversing light - type: W16W, rated power: $P_4 = 16 \text{ W}$, rated voltage: $U_n = 12 \text{ V}$.

Using the PSpice program, determine the current drawn by the circuit. What should be the nominal current of the fuse protecting the car's lamp circuit? Standard automotive fuses have the nominal currents of $I_n = 1 \text{ A}; 2 \text{ A}; 3 \text{ A}; 4 \text{ A}; 5 \text{ A}; 7.5 \text{ A}; 10 \text{ A}; 15 \text{ A}; 20 \text{ A}; 30 \text{ A}; 40 \text{ A}$.

