Examination: **Electric Circuits Rezekne** 17.06.2019
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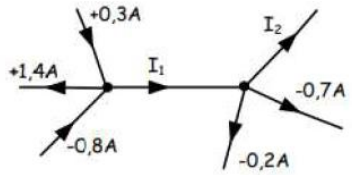
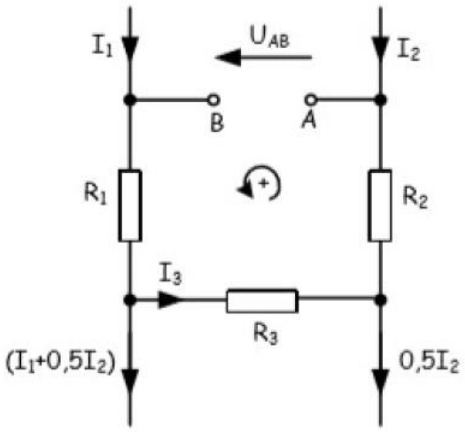
Question 1 (10 P)

a) Calculate the currents I_1 and I_2
b) For the right node change if neccessary the directions of the currents, so that in the circuit diagram only positive numbers (currents) appear, and sketch the circuit diagram.



Question 2 (10 P)

The current I_3 and the voltage U_{AB} have to be calculated. There is no current flowing through terminals AB. $I_1 = 14$ A; $I_2 = 6.4$ A; $R_1 = 20\ \Omega$; $R_2 = 17\ \Omega$; $R_3 = 6\ \Omega$



Question 3 (15 P)

You have four resistors of 20 kΩ each.

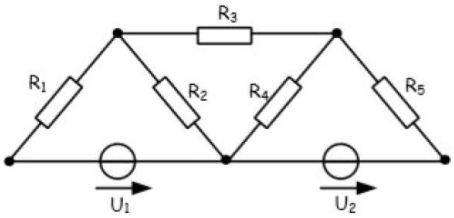
A) Calculate the equivalent resistance, if all resistors are connected in parallel.

b) Calculate the equivalent resistance, if all resistors are connected in series.

c) How should the four resistors be connected (draw the circuit), so that the total resistance is 20 kΩ?

Question 4 (25 P)

Calculate the unknown currents. To do this, set up the linear equation system in matrix form (with numerical values)

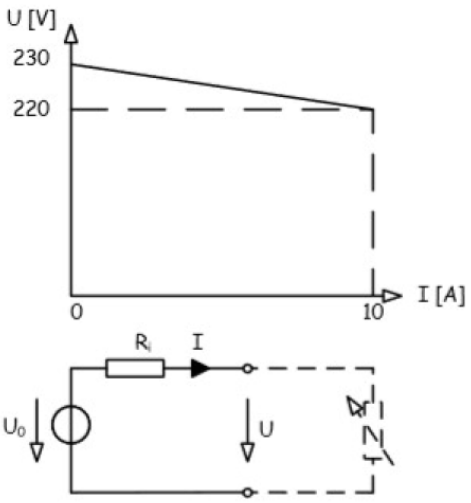


Question 5 (10 P)

a) The resistor R, the resistors 2 R, 4 R and 8 R are connected in parallel. How big must R be chosen, so that the total resistance R_t = 1 kOhm.
b) Sketch a circuit diagram first.

Question 6 (20 P)

The figure below shows the characteristic of a voltage source.



A)

a) Calculate the internal resistance R_i.

b) Calculate the short-circuit current I_s.

B)

a) How does the terminal voltage U depend on the current I? U (I) =? (Formula)

b) Draw the curve of your calculated formula in Ba). Then label the points of intersection.

Question 7 (25 P)

A winding is rotating in homogen magnetic field, see the sketch right.

a) Calculate the magnetix flux through the winding, depending from the angle α of the winding area to the magnetic field strength
b) Show, that the voltage at the ends of the winding is sinusoidal (mathematical).