

# NEISSE - ELEKTRO 2019

Name: .....

1	2	3	4	5	$\Sigma$

Tasks for the finale  
90 min ; with formulary (english edition)

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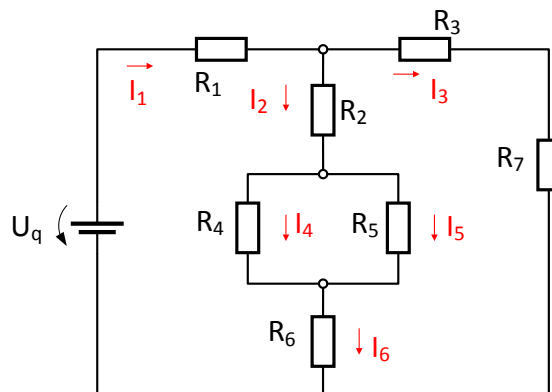
**1**

A fully charged 28 V accumulator of an Airbus A320 can deliver a usable charge of 23 Ah.

- After which time it is discharged to 90% when it initially supplies a constant current of 4 A for 3 hours, and then a current of 3 A?
- What charging time is necessary after that, when the charging current is 2 A?
- What energy (in Joules) is included in the fully charged battery?
- The electric systems of an Airbus can be operated in reduced mode for 30 minutes in the event of engine failure with two existing, full accumulators. Which current can be obtained in this case and what power can be implemented there?

**2**

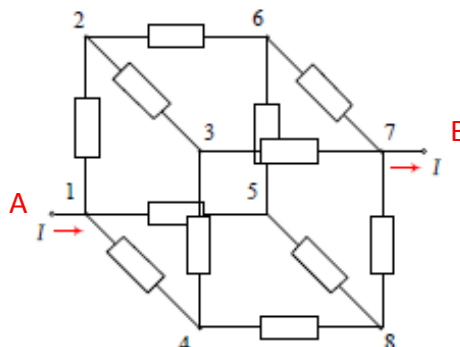
Given is the following circuit with  $I_1 = 2$  A and  $U_q = 12$  V.



- Calculate the value of the resistors  $R_1$  to  $R_7$  if they are all the same size.
- Calculate all currents and voltages of the circuit.

**3**

Calculate the resistance between the terminals A and B. if any partial resistance is 1 k $\Omega$ .



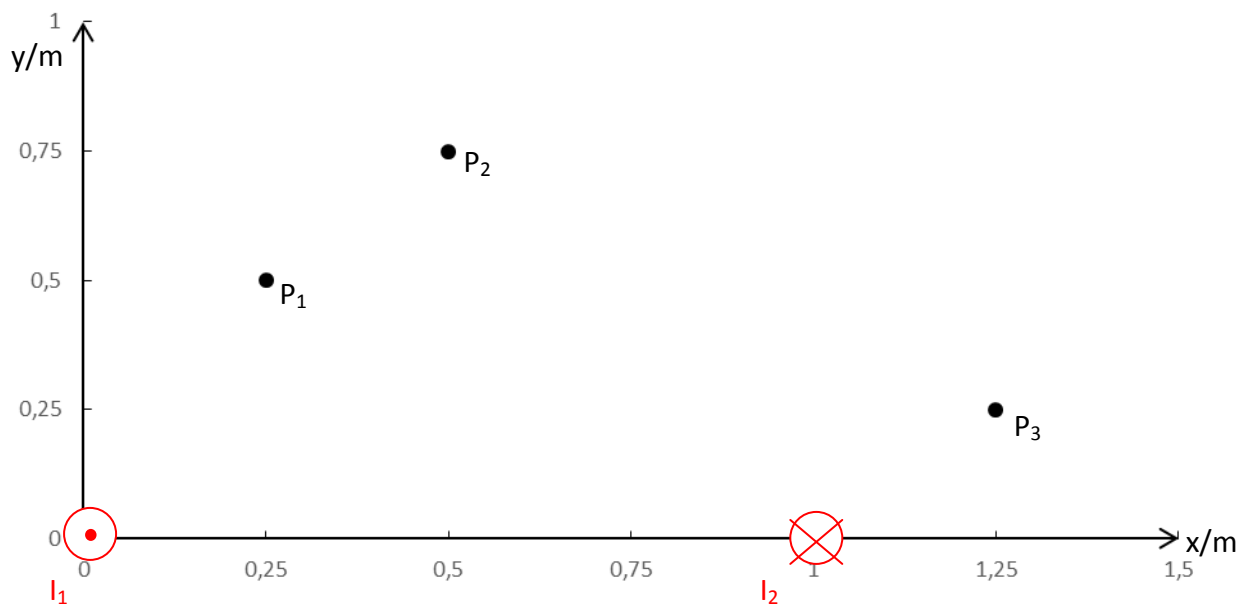
4

A wound capacitor is wound from two single-sided metallic coated plastic films. The plastic film is 0.1 mm thick, with  $\epsilon_r = 3$  and a dielectric strength of 500kV / cm. The area of each foil is 3 m<sup>2</sup>.

- What is the permissible voltage?
- Calculate the capacitance of the capacitor.
- Which charge and which energy are stored at 100 V in the capacitor?
- What is the electric field strength in the foil at 100 V?

5

Two parallel, long thin conductors are arranged at a distance of 1 m and each carry 1 A current in the opposite direction:



Calculate the following values for the points (x; y): (0.25; 0.5), (0.5; 0.75) and (1.25; 0.25):

- the amount of the magnetic field  $B_1$  caused by the current  $I_1$
- the amount of the magnetic field  $B_2$  caused by the current  $I_2$
- the amount of the magnetic field  $B$  (total magnetic field in the considered points)