11. Internationale Elektrotechnik-Olympiade der Schulen der Euroregion Neisse

NEISSE - ELEKTRO 2000

Name:.....

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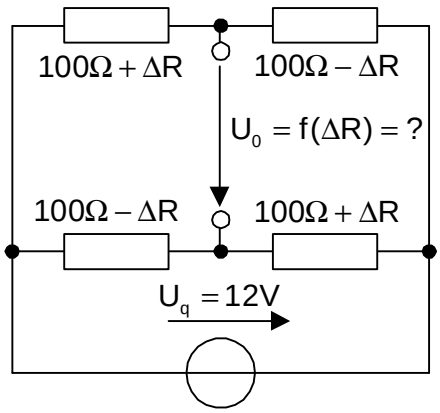
Tasks fort the finale
90min ; with formulary (english edition)

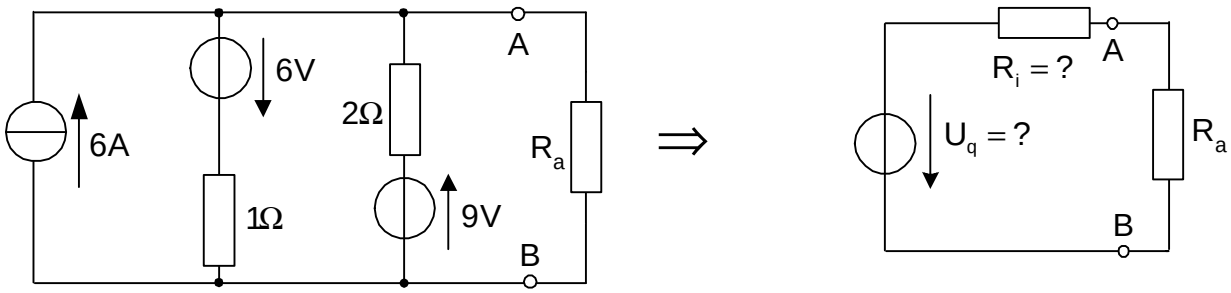
1

Calculate $U_o = f(\Delta R)$!



2

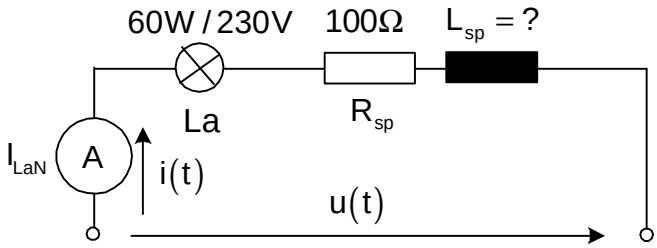
The left circuit is given. Transform it in the right circuit and calculate U_q and R_i!



3

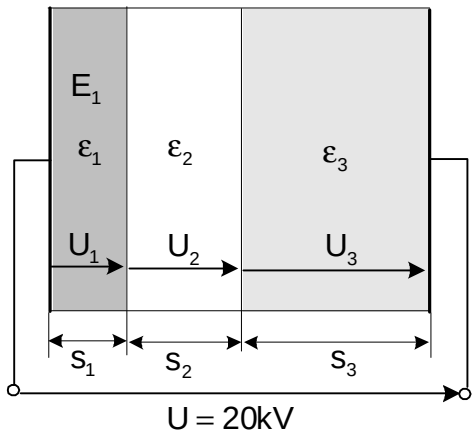
A filament lamp P_N = 60W; U_N = 230V is connected in series with a coil (resistance $R_{sp} = 100\Omega$, inductivity L) and supplied by ac voltage

$$u(t) = \sqrt{2} \cdot 400V \cdot \cos\left(2\pi \cdot 50Hz \cdot t + 45^o\right)$$



Calculate the nessesary value of the inductivity L of the coil, for operation the filament lamp with its nominal values!

4



The following plate capacitor is given

$s_1 = 1{,}5cm \quad \varepsilon_{r1} = 6{,}5$

$s_2 = 2.0cm \quad \varepsilon_{r2} = 1$

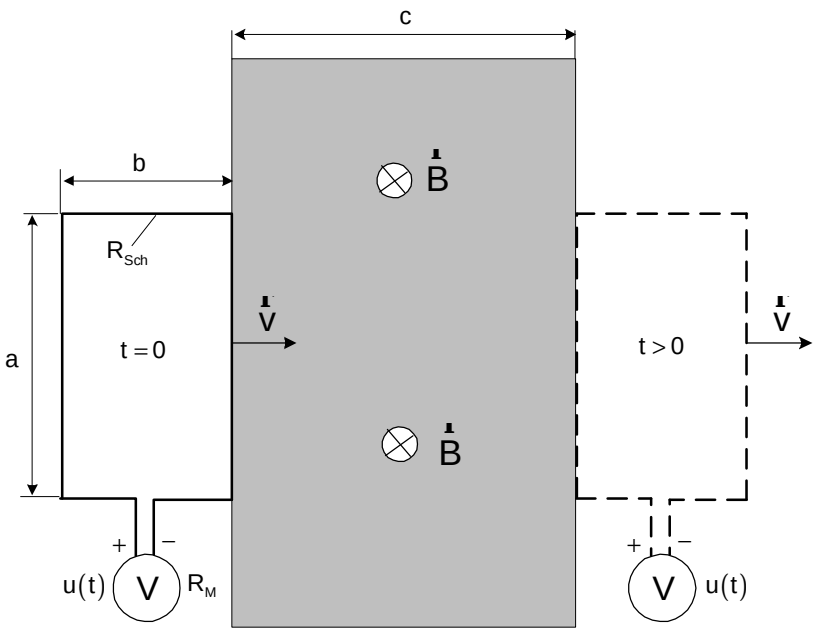
$s_3 = 2{,}5cm \quad \varepsilon_{r3} = 4$

$\varepsilon_0 = 8{,}85 \cdot 10^{-12} As/Vm$

a) Calculate the electrical strength of the field E_1 in the dielectric 1!

b) Calculate the voltages U_1, U_2, U_3!

5



The wire-loop ($a = 50mm$, $b = 30mm$) is moved with a speed of $v = 0{,}2m/s$ through the homogeneous magnetic field ($B = 1T$, $c = 60mm$).

Calculate the variation in time of the voltage $u(t)$, displayed on the voltmeter!

(R_M **?** R_{Sch})