

NEISSE - ELEKTRO 2000

Name:

1	2	3	4	5	Σ

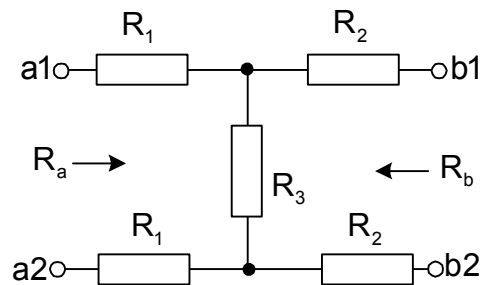
Tasks for the finale
90 min ; with formulary (english edition)

1

The following circuit is given (figure).

A resistance of $R_a = 10,85\Omega$ is measured between the terminal a1 and a2.
The resistance between b1 and b2 is $R_b = 13,02\Omega$.

$$R_1 + R_2 = R_{12} = 9,47\Omega$$



Calculate the values of R_1, R_2, R_3 !

2

For the given circuit the resistor R is

$$R = R_1 + R_2 = 1k\Omega$$

The maximum load of R is $P_{\max} = 40W$

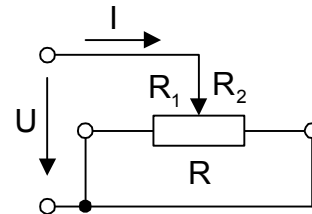
a)

The value of the resistance for parallel connection of R_1 and R_2 is given by 240Ω .

Calculate the values of R_1 and R_2 !

b)

Calculate the maximum values of voltage and current!



3

The circuit is supplied by ac voltage:

$$u = \sqrt{2} \cdot 100V \cdot \cos \omega t$$

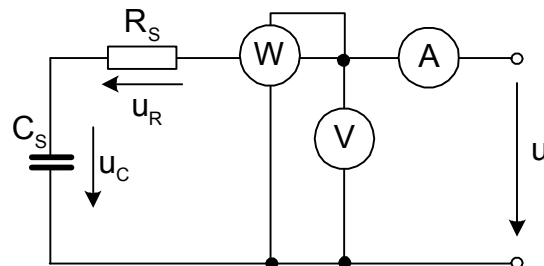
frequency $f = 1000$ Hz.

The instruments shows:

$$U = 100V \quad I = 4,6A \quad P = 347W$$

a) Calculate R_S and C_S !

b) Calculate the root-mean-square values of the voltages u_R and u_C !

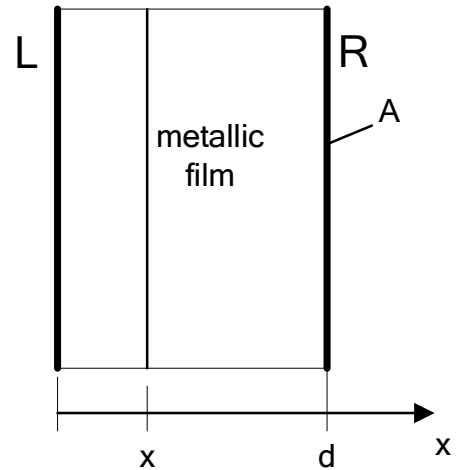


4

The following plate capacitor (A , d , ϵ_0) with a homogeneous field is given (figure). In the dielectric with the charge Q a metallic film of the size A is situated in a distance x from the plate L (left plate). The metallic film is parallel with the area of equipotential.

Calculate the capacitance C of the capacitor as function of the position x of the film!

- The film is metallically contacted with the plate R (right plate).
- The film is metallically contacted with the plate L.
- The film is insulating located.



5

In the given iron core a current i_1 with frequency $f = 50$ Hz is flowing in the coil 1
 $i_1(t) = 20\text{mA} \cdot \sin \omega t$

The magnetic conductance of the core is given by:

$$\Lambda = 0,5\text{mH}$$

The number of windings are:

$$N_1 = 200 \quad N_2 = 33$$

Calculate the function of the time for the voltage $u_2(t)$!

