

# task\_pdkggyexxy1ktu3\_with\_calculation

## Student Group

| First Name | Surname | Matrikel Nr. |
|------------|---------|--------------|
|            |         |              |
|            |         |              |
|            |         |              |

## Table of Contents

Exercise E14 Impedances at different Frequencies (written test, approx. 18 % of a 60-minute  
written test, WS2022) ..... 2

## complex impedance, exam ee1 WS2022

**Exercise E14 Impedances at different Frequencies****(written test, approx. 18 % of a 60-minute written test, WS2022)**

2a) A series circuit consists of a resistor  $R_1 = 1.00 \text{ k}\Omega$ , an inductor  $L_1 = 4.7 \text{ }\mu\text{H}$ , and a capacitor  $C_1 = 40 \text{ nF}$ . The circuit is connected to an AC voltage source  $U = 10 \text{ V}$  at a frequency  $f = 4 \text{ MHz}$ . Calculate the absolute value of the impedance  $|Z|$  of the circuit.

Solution

$$R_1 = 1.00 \text{ k}\Omega$$

$$R_2 = 10.0 \text{ }\Omega$$

A series circuit means that the current is constant on every component.

The equivalent impedance for  $R$  and  $L$  combined is given by

$$Z_{RL} = R + j\omega L$$

$$|Z_{RL}| = \sqrt{R^2 + (\omega L)^2}$$

$$|Z_{RL}| = \sqrt{(1.00 \text{ k}\Omega)^2 + (2\pi \cdot 4 \text{ MHz} \cdot 4.7 \text{ }\mu\text{H})^2} = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

$$|Z_{RL}| = 1.00 \text{ k}\Omega$$

From:  
<https://first.mexle.te.hs-heilbronn.de/> - MEXLE Wiki

Permanent link:  
[https://first.mexle.te.hs-heilbronn.de/electrical\\_engineering\\_and\\_electronics/task\\_pdkgtyexxy1ktu3\\_with\\_calculation](https://first.mexle.te.hs-heilbronn.de/electrical_engineering_and_electronics/task_pdkgtyexxy1ktu3_with_calculation)

Last update: 2023/04/02 00:27

