

task_uzbbnoz8abe6201d_with_calculation

Student Group

First Name	Surname	Matrikel Nr.

Table of Contents

Exercise E5 Impedances at Frequencies (written test, approx. 14 % of a 60-minute written test, SS2023)	2
--	---

exam ee1 SS2023

Exercise E5 Impedances at Frequencies (written test, approx. 14 % of a 60-minute written test, SS2023)

At an inductor with $X_{L1} = 60 \text{ m}\Omega$ and a capacitor with $X_{C2} = 15.9 \text{ }\mu\Omega$ at a value V of the result as a measure of I with $I_0 = A$.

1. An inductor with $X_{L1} = 60 \text{ m}\Omega$ and $L_1 = 15.9 \text{ }\mu\text{H}$.

Solution
Solution

$$f_0 = 500 \text{ kHz} \quad \omega = 2\pi \cdot 500 \text{ kHz} = 3141592.65 \text{ rad/s}$$

$$X_{L1} = \omega L_1 = 3141592.65 \text{ rad/s} \cdot 15.9 \text{ }\mu\text{H} = 50 \text{ m}\Omega$$

$$X_{C2} = \frac{1}{\omega C_2} = \frac{1}{3141592.65 \text{ rad/s} \cdot 10.6 \text{ nF}} = 15.9 \text{ }\mu\Omega$$

$$X_{\text{total}} = X_{L1} - X_{C2} = 50 \text{ m}\Omega - 15.9 \text{ }\mu\Omega = 49.841 \text{ m}\Omega$$

$$I = \frac{V}{X_{\text{total}}} = \frac{1 \text{ V}}{49.841 \text{ m}\Omega} = 20.06 \text{ A}$$

From:

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

Permanent link:

https://mexle.te.hs-heilbronn.de/electrical_engineering_and_electronics/task_uzbbnoz8abe6201d_with_calculation

Last update: 2023/08/17 06:46

