

# task\_yh4srwxu1bo1rdy4\_with\_calculation

## Student Group

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Exercise E16 Magnetic Circuit (written test, approx. 10 % of a 120-minute written test, SS2024) ..... 2



$$C \} \ \&= \ 2\pi \cdot 44 \cdot 10^6 \ \{\sim\text{MHz}\} \cdot 1.6 \cdot 10^{-9} \ \{\sim\text{H}\} - \frac{1}{2\pi \cdot 10^6 \ \{\sim\text{MHz}\} \cdot 10 \cdot 10^{-9} \ \{\sim\text{F}\}} \ \&= +0.08062... \ \sim\Omega \ \&\end{align*}$$

To get the magnitude of the impedance  $|\underline{Z}_{RLC}|$  one can use the Pythagorean Theorem: 
$$|\underline{Z}_{RLC}| \ \&= \ \sqrt{R^2 + X_{LC}^2} \ \&= \ \sqrt{(0.020 \ \sim\Omega)^2 + (0.08062... \ \sim\Omega)^2} \ \&= 0.0830... \ \sim\Omega \ \&\end{align*}$$

For the phase  $\varphi$  the  $\arctan$  can be applied: 
$$\varphi \ \&= \ \arctan \left( \frac{X_{LC}}{R} \right) \ \&= \ \arctan \left( \frac{0.08062... \ \sim\Omega}{0.020 \ \sim\Omega} \right) \ \&= 1.3276... \ \hat{=} +76^\circ \ \&\end{align*}$$

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