



Aalto University
School of Electrical
Engineering

ELEC-C9610

Basics in Electronics

Arrangements of Calculation Exercises

How to Get Exercise Points?

1. Solve exercise problems whenever/wherever possible.

- The solution can be on a paper with hand writing or electronic using, e.g., Microsoft word.

2. Once solutions are ready, show them to a teacher in online discussions.

- You can submit answers problem-by-problem, or multiple problems at once.
- **Your discussion time is booked in “Appointment of online discussions” section of the course page.** Append your answers to the appointment.
- Teacher will take a glance at the answers before the appointment.
- **We discuss about your answers during appointment.** If answers are incorrect or unclear, a teacher will ask explanations to your answers and questions for clarifications,.
- Teachers will give you one of the following points as a result of discussions.
 - **2 (full-point)** = all answers are correct **with clear explanation.**
 - **1** = some answers are incorrect **or explanations are insufficient.**
 - **0** = some answers are incorrect **and** explanations are insufficient.
- If you are not happy with a point, you can improve your answers in the supplement box. You can also book an extra time with a teacher during the online discussions, if slots are vacant.

Write good answers!

... so that you can get 2 points easily

2-point answer

Using circuit transforms

$$R_{12} = \frac{R_1 \cdot R_2}{R_1 + R_2} = \frac{3 \cdot 6}{3+6} = 2 \text{ (R)}$$

• Using Kirchoff for nodes A and B:

$$\begin{cases} \text{A: } I_{12} - I_3 = J_1 & (1) \\ \text{B: } I_3 + I_4 = J & (2) \end{cases}$$

• Using Kirchoff for current, we have:

$$I_3 R_3 + I_{12} R_{12} - I_4 R_4 = 0$$

$$\Rightarrow 2I_3 + 2I_{12} - 8I_4 = 0 \quad (3)$$

• Solving system (1) (2) (3), we have

Teachers do not have to ask extra questions, questions or modifications.

1-point answer

$H(s) = \frac{\text{Vaste}}{\text{Helfe}}$

$$\frac{1}{Z} = sC + \frac{1}{R_2} \Rightarrow \frac{sCR_2 + 1}{R_2}$$

$$Z = \frac{R_2}{sCR_2 + 1}$$

$$Z_{in} = R_1 + \frac{R_2}{sCR_2 + 1}$$

$$Z_{in} = R_1(sCR_2 + 1) + R_2$$

$$R_2 + \frac{1}{sC} \quad -\frac{1}{sC}$$

$$-\frac{1}{sC} \quad \frac{1}{sC} + R_1$$

$$I_A = \frac{g_{ur}}{U}$$

$$I_D = \frac{R_1 sCR_2 + R_1 + R_2}{sCR_2 + 1} = \frac{40s + 10}{20s + 1}$$

$$I_A = U \frac{40g_x + 10g_t}{4 \cdot (10x + 3)}$$

$$\frac{U}{I_A} = \frac{4 \cdot (10x + 3)}{40 \cdot g \cdot s + 10g + 1}$$

$$40 \cdot g \cdot s + 10g + 1 = 0$$

Answers need to be improved and teachers need to ask questions for clarification.



- ☺ Symbols are adequately defined
- ☺ Derivation of equations is logical
- ☺ There are sufficient explanations

- ☹ Not all symbols are clearly defined
- ☹ Hard to recognize logic
- ☹ There is no explanation