

Senin, 29 April 2024

Pert. 10

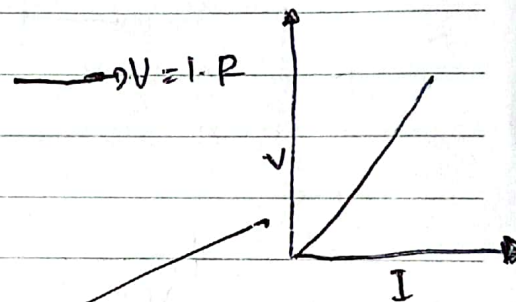
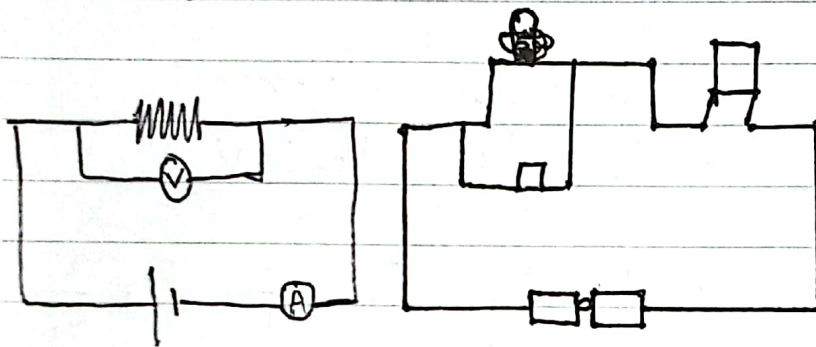
No.

Date

Risnawati Hutapea (2213022079) Kalisma

Elektrodinamika

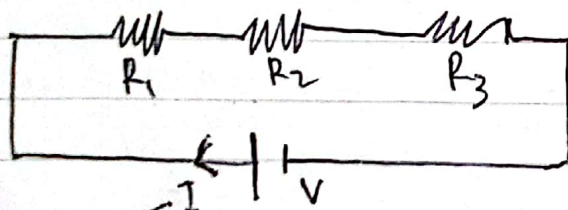
1. Hukum Ohm
2. Rangkaian listrik



→ hubungan antara tegangan dan kuat arus

Rangkaian Seri

- * kalau lampu sama maka hambatan sama
- * arus pada rangkaian seri akan tetap sama walaupun hambatannya berbeda-beda



$$I_{R_1} = \frac{V}{(R_1 + R_2 + R_3)} = \frac{V}{R_t} \quad \text{Arus}$$
$$I_{R_1} = I_{R_2} = I_{R_3}$$

$$I = \frac{V}{(R_1 + R_2 + R_3)}$$

→ maka $I = I_{R_1} = I_{R_2} = I_{R_3}$ → pada rangkaian seri

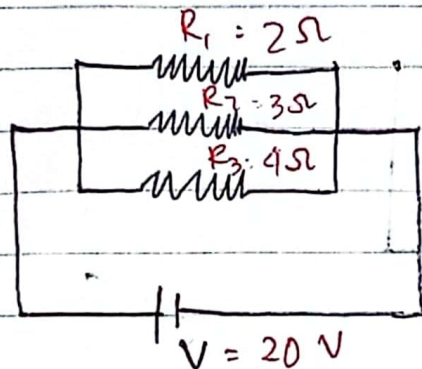
$$V (\text{tegangan}) \rightarrow V_{R_1} = I \cdot R_1$$

$$V_{R_1} = \frac{V}{(R_1 + R_2 + R_3)} \cdot R_1$$

$$\rightarrow V_{R2} = \frac{V}{(R_1 + R_2 + R_3)} \cdot R_2$$

$$\rightarrow V_{R3} = \frac{V}{(R_1 + R_2 + R_3)} \cdot R_3$$

Rangkaian Paralel



$$\sim V_{R1} = V_{R2} = V_{R3} = V$$

$$\sim I_{R1} = \frac{V}{R_1}, I_{R2} = \frac{V}{R_2}, I_{R3} = \frac{V}{R_3}$$

$$\sim I = \frac{V}{R_t}$$

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$R_t = \frac{1}{\frac{1}{2} + \frac{1}{3} + \frac{1}{4}}$$

$$= \frac{6}{12} + \frac{4}{12} + \frac{3}{12}$$

$$\frac{1}{R_t} = \frac{13}{12}$$

$$13R_t = 12$$

$$R_t = \frac{12}{13}$$

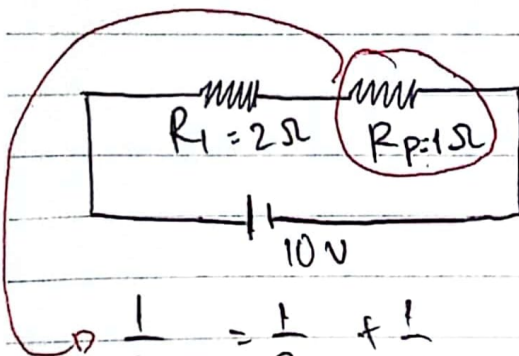
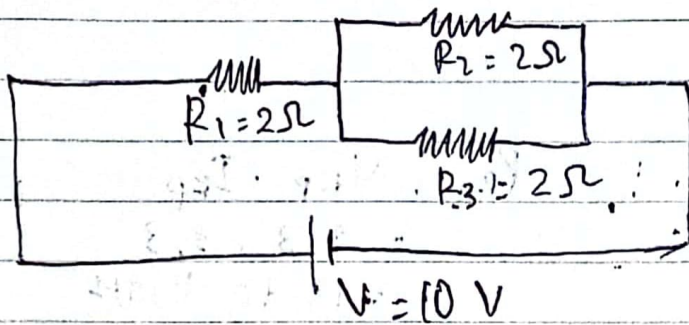
$$\rightarrow I = \frac{V}{R_t} = \frac{20}{\frac{12}{13}} = \frac{20 \times 13}{12} = 21,7 \text{ A} \sim I_{\text{total}}$$

$$I_1 = \frac{V}{R_1} = \frac{20}{2} = 10 \text{ A}$$

$$I_2 = \frac{V}{R_2} = \frac{20}{3} = 6,666 = 6,7 \text{ A}$$

$$I_3 = \frac{V}{R_3} = \frac{20}{5} = 4 \text{ A}$$

Contoh soal



$$\frac{1}{R_p} = \frac{1}{R_2} + \frac{1}{R_3}$$

$$= \frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{R_p} = \frac{2}{2}$$

$$R_p = 1$$

$$R_t = R_1 + R_p = 2 + 1 = 3 \Omega$$

$$I_t = \frac{V}{R_t} = \frac{10}{3} = 3,33 \text{ A}$$

$$I_{R_1} = I_{R_p} = 3,33 \text{ A}$$

$$V_{R_p} = R_p \cdot I = 1 \cdot 3,33$$

$$I_{R_2} = I_{R_3} = \frac{V_{R_p}}{R_2} = \frac{3,33}{2} = 1,6 \text{ A}$$

$$V_{R_1} = \frac{V}{R_t} \cdot R_1 = \frac{10}{3} \cdot 2 = 3,33 \cdot 2 = 6,66 \text{ V}$$

karena, $I_{R_1} = I_{R_P} = 3,3 \text{ A}$

$$V_{R_P} = 3 \cdot 3 \text{ V}$$

$$V_{R_1} = 6,6 \text{ V}$$

maka,

$$P_{R_1} = V_{R_1} \cdot I_{R_1}$$

$$= 6,6 \cdot 3,3$$

$$= 21,78 \text{ Watt}$$

$$P_{R_P} = V_{R_P} \cdot I_{R_P}$$

$$= 3,3 \cdot 3,3$$

$$= 10,89 \text{ Watt}$$