

Senin, 29 April 2024

Pertemuan 10

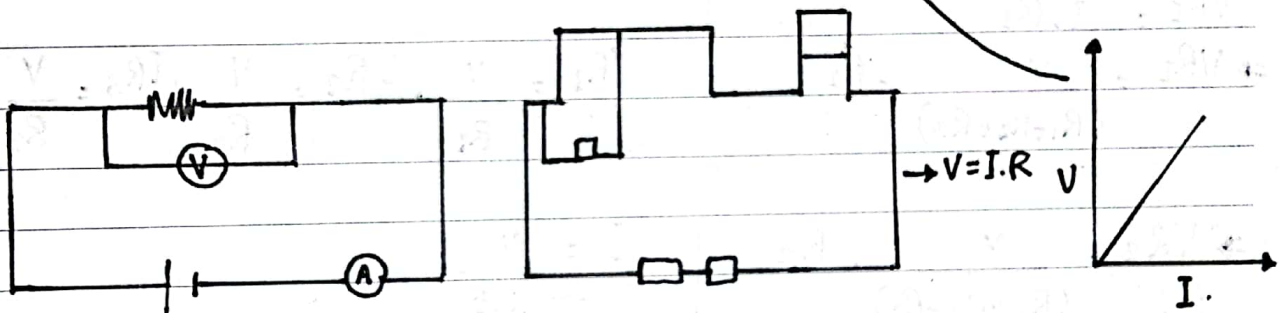
Elektrodinamika

1. Hukum Ohm

2. Rangkaian Listrik

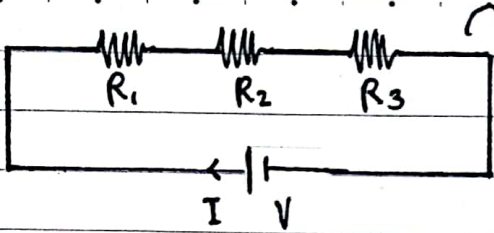
Rumus hukum Ohm

$$V = I \cdot R$$

ket: V : Tegangan I : Kuat arus R : ketahananHubungan antara
tegangan dan kuat
arus.

* Rangkaian hambatan Seri

- Kalau lampunya sama, hambatannya juga sama.
- Kuat arus yang mengalir pada rangkaian seri akan tetap sama walaupun hambatannya berbeda-beda.



$$I_{R1} = \frac{V}{(R_1 + R_2 + R_3)} = \frac{V}{R_t}$$

$$I_{R1} = I_{R2} = I_{R3}$$

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

$I = I_{R1} = I_{R2} = I_{R3}$ Pada Rangkaian Seri

V(tegangan)

$$V_{R1} = I \cdot R_1$$

$$\Rightarrow V_{R1} = \frac{V}{(R_1 + R_2 + R_3)} \cdot R_1$$

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

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

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

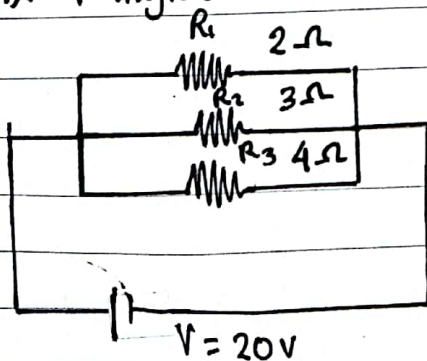
$$I = \frac{V}{R_t}$$

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

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

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

* Rangkaian Paralel



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

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

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

$$13 R_t = 12$$

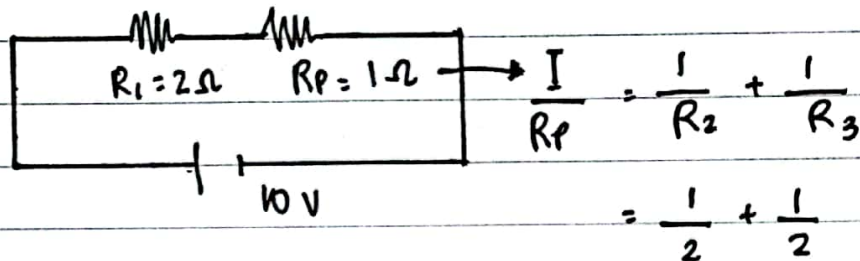
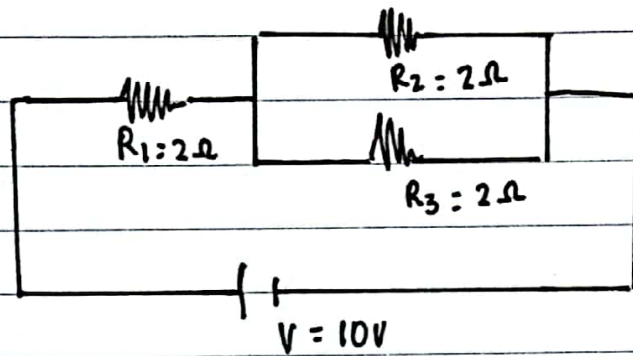
$$R_t = \frac{12}{13}$$

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

$$= \frac{20}{\frac{12}{13}} = \frac{20 \times 13}{12} = 21,7 A$$

$\leftarrow I_{total}$

* Contoh soal



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

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

$$R_p = 1$$

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

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

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

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

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

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

Karena, $I_{R_1} = I_{R_p} = 3,33A$ Maka dari itu,

$$V_{R_p} = 3,3V$$

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

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

$$= 6,6 \cdot 3,33$$

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

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

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

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