

29 - April - 2021

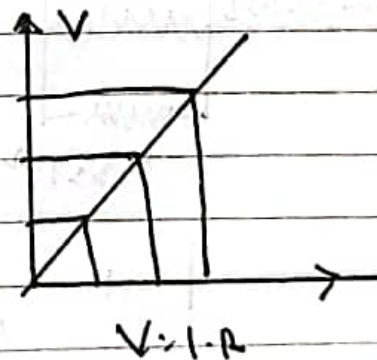
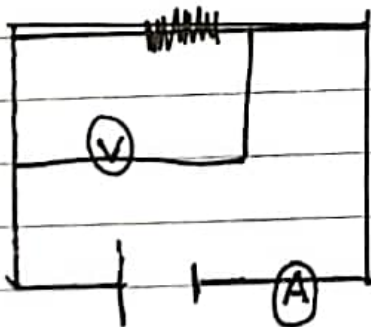
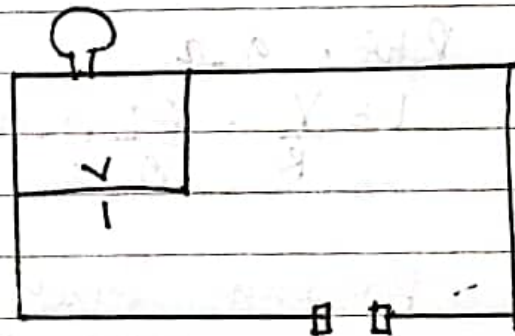
No
Date

ELEKTROMAGNETIK

- Hukum Ohm
- Rangkaian Listrik
- Hukum Kirchhoff

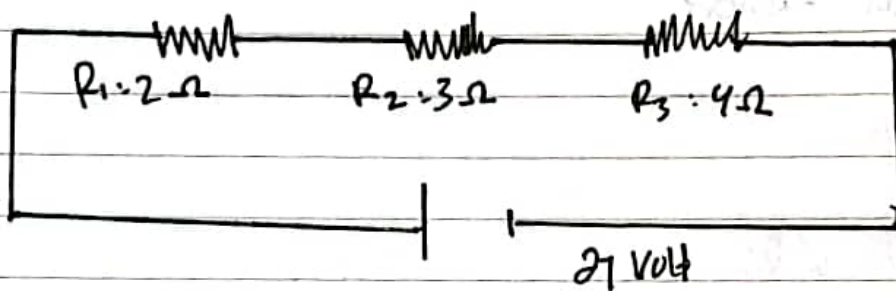
Pembahasan

$$J : OE \checkmark DC$$
$$\rightarrow V = I \cdot R \checkmark AC$$



Example 1

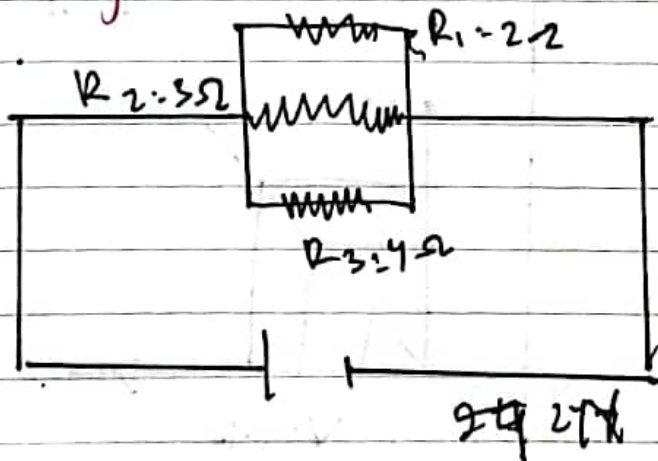
Rangkaian Seri



$$R_{\text{tot}} = 9 \Omega$$

$$I = \frac{V}{R} = \frac{27}{9} = 3 \text{ A}$$

Rangkaian Paralel



$$R_t = \frac{1}{R_1} = \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$$

$$R = \frac{6 + 4 + 3}{12} = \frac{13}{12} : \frac{12}{13} = 0,9 \, \Omega$$

$$I = \frac{V}{R} = \frac{24}{0,9} = 26,6 \, A$$

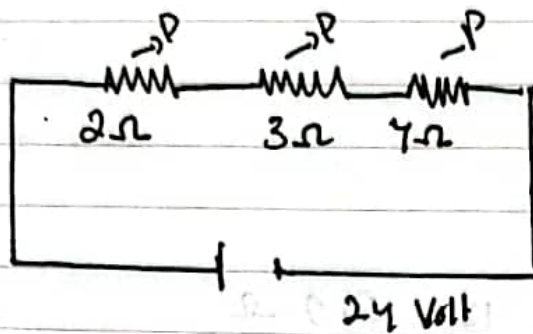
Daya Pada R_1

$$1) \, I \cdot R_1 \cdot P = V \cdot I_1 \\ = 24 \cdot 12 = 288 \, \text{Watt}$$

$$2) \, P = V \cdot I_2 \\ = 24 \cdot 8 = 192 \, \text{Watt}$$

$$3) \, P = V \cdot I_3 \\ = 24 \cdot 6 = 144 \, \text{Watt}$$

Note : - Lampu Paralel lebih boros
- Lampu Seri lebih hemat



$$R_{\text{th}} = 9\Omega$$

$$I = \frac{V}{R} = \frac{24}{9} = 2,67\text{ A}$$

$$V = I \cdot R_1 = 2,67 \cdot 2 = 5,34$$

$$V = I \cdot R_2 = 2,67 \cdot 3 = 8,01$$

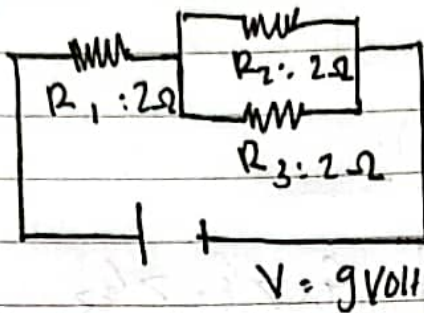
$$V = I \cdot R_3 = 2,67 \cdot 4 = 10,68$$

$$P = V \cdot I = 5,34 \cdot 2,67 = 14,25\text{ Watt}$$

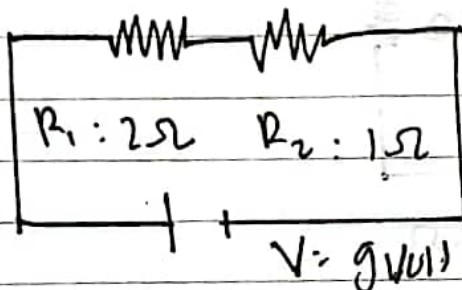
$$P = V \cdot I = 8,01 \cdot 2,67 = 21,38\text{ watt}$$

$$P = V \cdot I = 10,68 \cdot 2,67 = 28,5\text{ Watt}$$

Rangkaian Seri-Paralel



$$R_{p \text{ tot}} = \frac{1}{\frac{1}{2} + \frac{1}{2}} = 1\Omega$$



$$R_{\text{total}} = 2 + 1 = 3\Omega$$

$$I = 3A \rightarrow I = \frac{V}{R} = \frac{9}{3} = 3A$$

$$V_p = I \cdot R_p$$

$$= 3 \cdot 1 = 3 \text{ Volt}$$

$$V_{R_2} = 3 \text{ Volt}$$

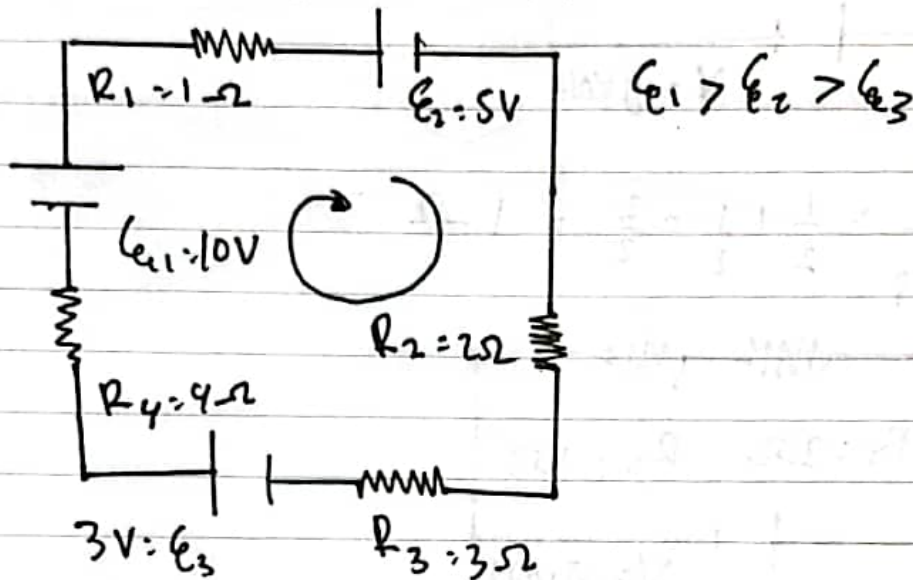
$$V_{R_3} = 3 \text{ Volt}$$

$$P = V \cdot I$$

$$= 9 \cdot 3 = 27 \text{ watt}$$

Hukum Kirchhoff

↳ (Satu loop)



- 1). Gambar arah arus sampai dengan besarnya I
- 2). Gambar arah arus sesuai batuan
- 3). Jika arah arus searah dengan arah loop maka +

$$\rightarrow \sum E + \sum I \cdot R = 0$$

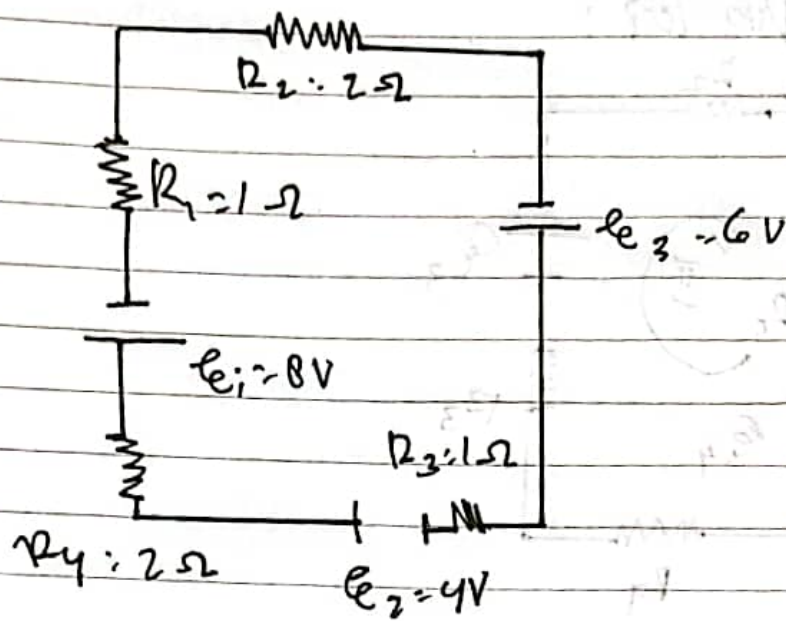
$$E_1 + E_2 + E_3 + I(R_1 + R_2 + R_3 + R_4) = 0$$

$$-10 + 5 + 3 + I(1 + 2 + 3 + 4) = 0$$

$$-2 + I(10) = 0$$

$$I(10) = 2$$

$$I = \frac{2}{10} = \frac{1}{5} //$$



$$\sum E + \sum I \cdot R = 0$$

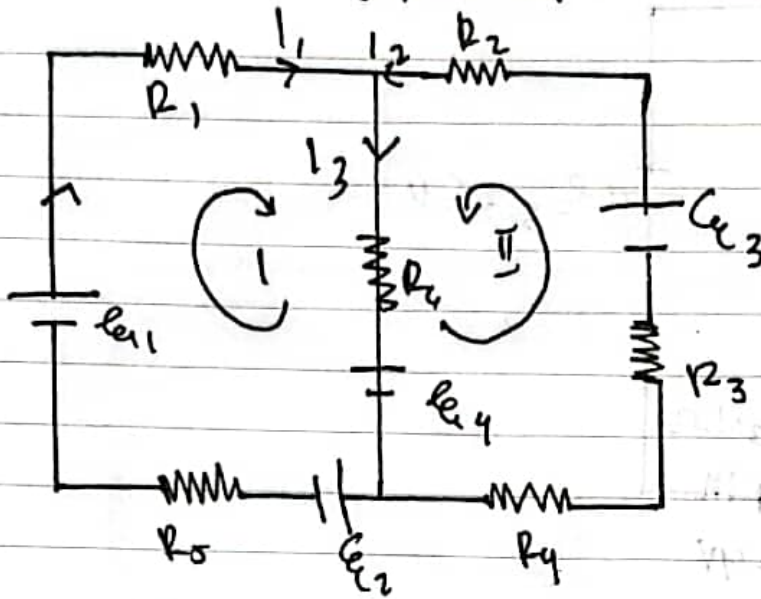
$$- E_1 + E_2 - E_3 + I(R_1 + R_2 + R_3 + R_4) = 0$$

$$- 8 + 4 - 6 + I(1 + 2 + 1 + 2) = 0$$

$$I = 1 \text{ (A)}$$

$$I = \frac{6}{6} = 1 \text{ A}$$

(Dua loop)



loop I

$$\sum E + \sum IR = 0$$

$$- E_1 + E_4 + E_2 + I_1 (R_1 + R_5) + I_3 (R_6) = 0$$

loop II

$$\sum E + \sum IR = 0$$

$$- E_3 + E_4 + I_2 (R_2 + R_3 + R_4) + I_3 R_6 = 0$$