

Nama : Duri Pratiwi
NPM : 2213022029
Kelas : 22A

No.

Date

Elektrodinamika

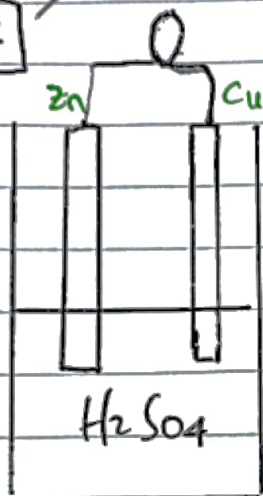
- ① Hukum Ohm
- ② Rangkaian Listrik

Pembahasan :

$$J = D \cdot E$$

DC
AC

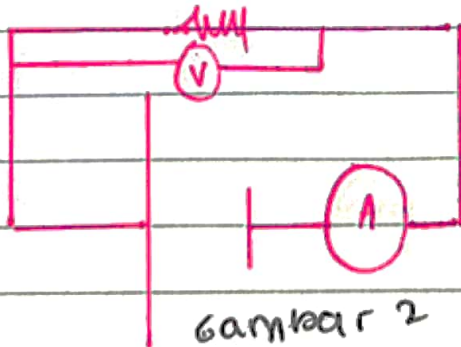
$$V = I \cdot R$$



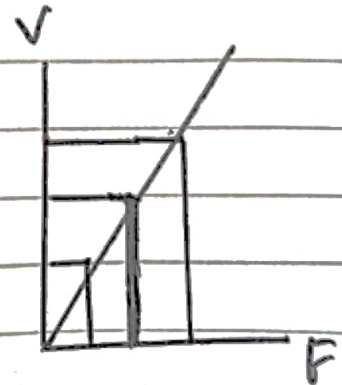
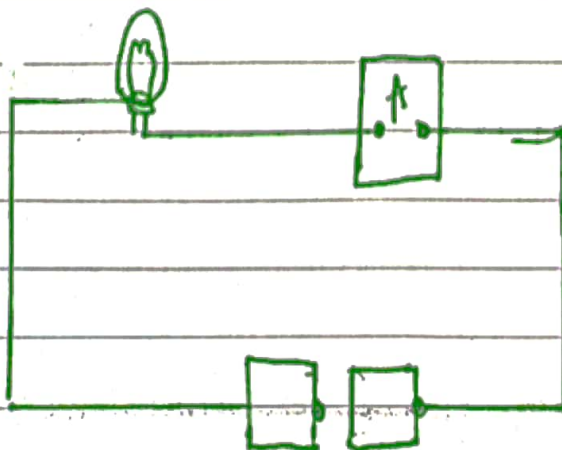
→ Dari gambar 1 dapat
dituliskan

1. H_2 berupa gas
2. Jadi SO_4 bergerak menuju
Cu lalu meniadakan
lampu lalu ke Zn

Gambar 1

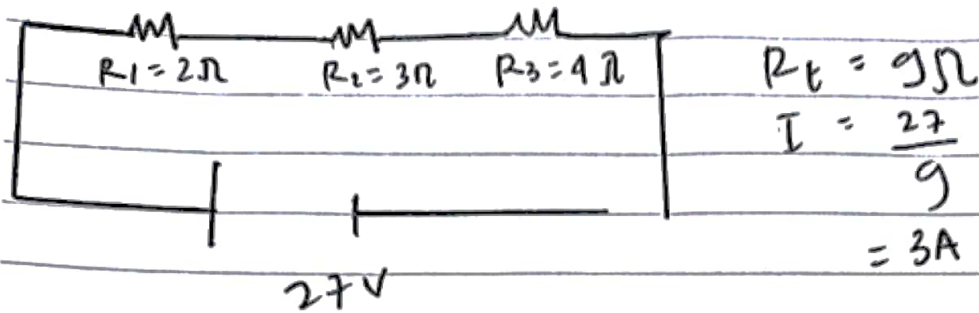


Gambar 2



$$V = I \cdot R$$

→ Rangkaian Seri



$$R_t = 2 + 3 + 4 = 9\Omega$$

$$I_t = \frac{V}{R}$$

$$= \frac{27}{9}$$

$$= 3A$$

Pada rangkaian seri : $I_{\text{total}} = I_1 = I_2 = I_3$

Mencari Tegangan (V)

→ $R_1 = 2\Omega$

$$\begin{aligned}
 V_1 &= R_1 \times I \\
 &= 2\Omega \times 3A \\
 &= 6V
 \end{aligned}$$

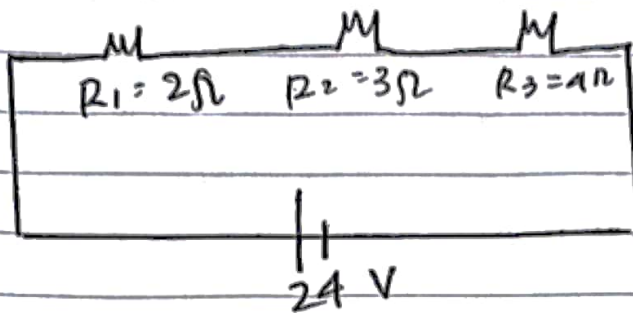
→ Pada R_3

$$\begin{aligned}
 V &= R_3 \times I \\
 &= 4 \times 3 \\
 &= 12V
 \end{aligned}$$

→ R_2

$$\begin{aligned}
 V_2 &= R_2 \times I \\
 &= 3\Omega \times 3A \\
 &= 9V
 \end{aligned}$$

→ Rangkaian Listrik Seri



$$\begin{aligned}
 R_t &= R_1 + R_2 + R_3 \\
 &= 2 + 3 + 4 \\
 &= 9\Omega
 \end{aligned}$$

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

$$= \frac{24}{9}$$

$$= 2,67\text{ A}$$

$$\begin{aligned}
 V_1 &= R_1 \cdot I \\
 &= 2 \cdot 2,67 \\
 &= 5,34
 \end{aligned}$$

$$\begin{aligned}
 V_2 &= R_2 \cdot I \\
 &= 3 \cdot 2,67 \\
 &= 8,01\text{ V}
 \end{aligned}$$

$$\begin{aligned}
 V_3 &= R_3 \cdot I \\
 &= 4 \cdot 2,67 \\
 &= 10,68\text{ V}
 \end{aligned}$$

$$\begin{aligned}
 P_1 &= I \cdot V_1 \\
 &= 2,67 \times 5,34 \\
 &= 14,25\text{ W}
 \end{aligned}$$

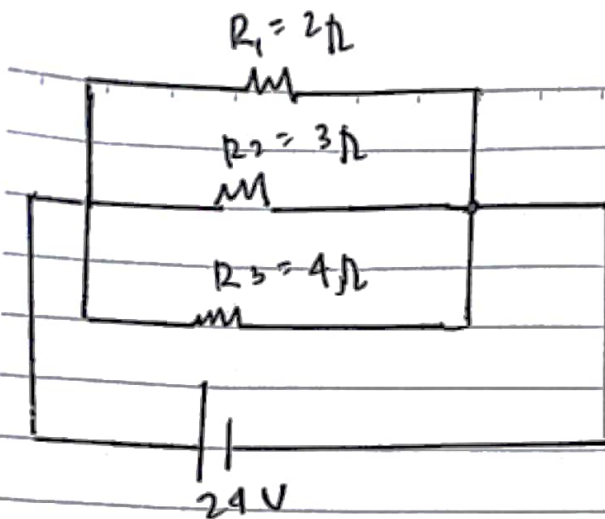
$$\begin{aligned}
 P_2 &= I \cdot V_2 \\
 &= 2,67 \times 8,01 \\
 &= 21,38
 \end{aligned}$$

$$\begin{aligned}
 P_3 &= I \cdot V_3 \\
 &= 2,67 \times 10,68 \\
 &= 28,51\text{ W}
 \end{aligned}$$

→ Rangkaian Paralel

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$$\rightarrow \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$
$$= \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$$

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

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

$$R_{\text{total}} = \frac{12}{13}$$

$$= 0,92 \Omega$$

→ Mencari kuat arus ($I_{\text{total}} = I_1 + I_2 + I_3$)

→ R_{total}

$$I_{\text{total}} = \frac{V}{R_{\text{total}}}$$

$$= \frac{24}{0,92}$$

$$= 26,08 \text{ A}$$

Mencari I disetrap hambaran pada paralel

• R_1

$$\begin{aligned} I_1 &= \frac{V}{R_1} \\ &= \frac{24}{2} \\ &= 12 \text{ A} \end{aligned}$$

• R_3

$$\begin{aligned} I_3 &= \frac{V}{R_3} \\ &= \frac{24}{4} \\ &= 6 \text{ A} \end{aligned}$$

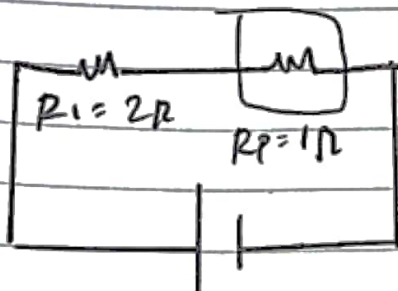
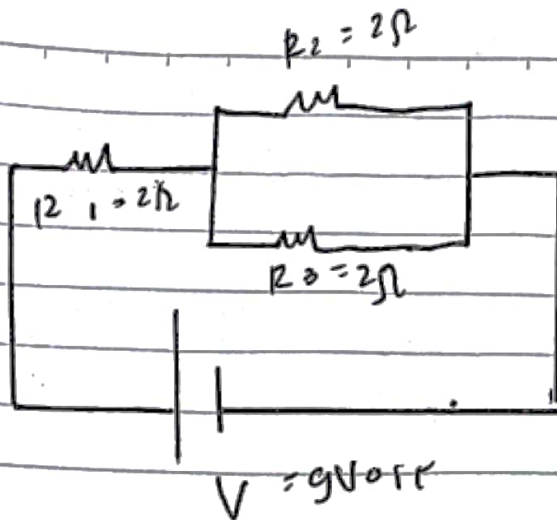
• R_2

$$\begin{aligned} I_2 &= \frac{V}{R_2} \\ &= \frac{24}{3} \\ &= 8 \text{ A} \end{aligned}$$

→ Rangkaian Campuran seri dan paralel

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$$\begin{aligned} R_{total} &= R_1 + R_P \\ &= 2\Omega + 1\Omega \\ &= 3\Omega \end{aligned}$$

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

$$\begin{aligned} I_{total} &= \frac{V}{R} \\ &= \frac{9}{3} \end{aligned}$$

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

$$= 3A$$

$$R_P = \frac{2}{2}$$

$$= 1\Omega$$

$$\begin{aligned} V_P &= R_P \times I \\ &= 1 \times 3 \\ &= 3V \end{aligned}$$

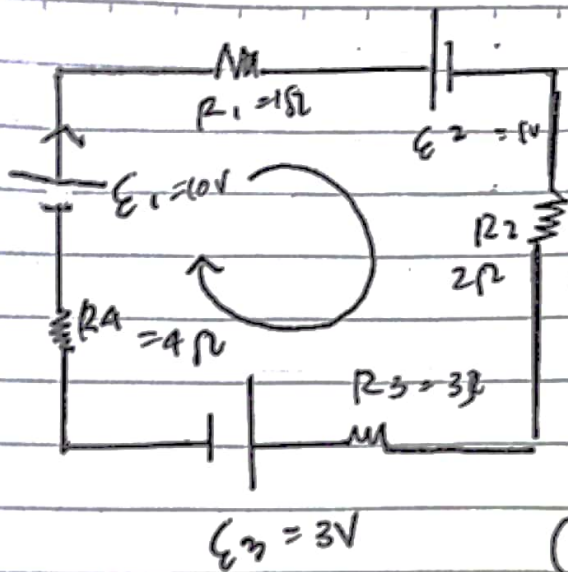
→ I di R_2

$$I_2 = \frac{V}{R_1}$$

$$= \frac{3}{2}$$

$$= 1.5A$$

→ Hukum Kirchhoff 1 loop



$$\mathcal{E}_1 > \mathcal{E}_2 > \mathcal{E}_3$$

- ① Gambar arah arus sesuai besarnya $\mathcal{E}$
- ② Gambar loop sesuai harkat
- ③ Jika arah arus searah dengan arah loop maka (+)

$$\sum \mathcal{E} + \sum iR = 0$$

$$-\mathcal{E}_1 + \mathcal{E}_2 + \mathcal{E}_3 + I(R_1 + R_2 + R_3 + R_4) = 0$$

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

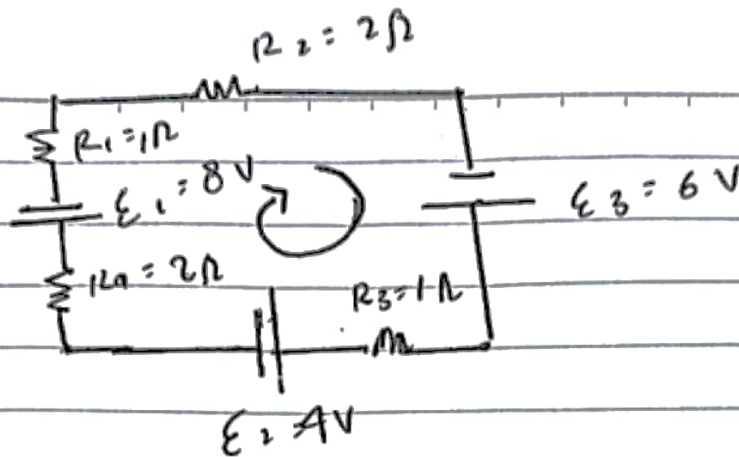
$$-2 + I(10) = 0$$

$$I(10) = 2$$

$$10I = 2$$

$$I = \frac{2}{10}$$

$$I = \frac{1}{5} \text{ A}$$



$$\sum \mathcal{E} + \sum IR = 0$$

$$\mathcal{E}_1 + \mathcal{E}_2 - \mathcal{E}_3 - I(R_1 + R_2 + R_3 + R_4) = 0$$

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

$$6 - I(6) = 0$$

$$6 - 6I = 0$$

$$6I = 6$$

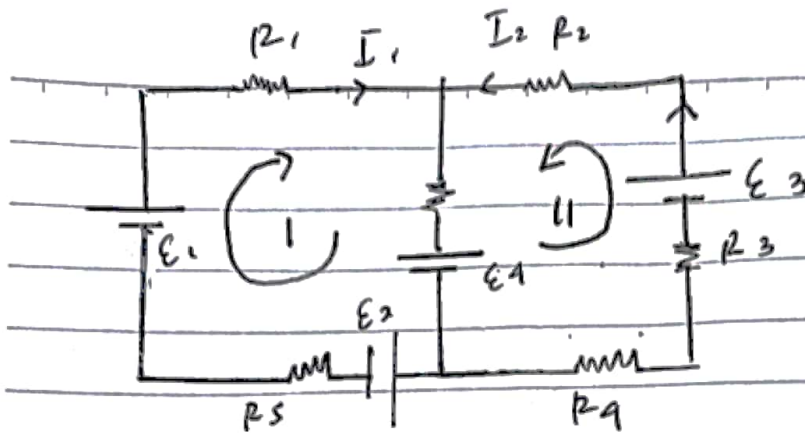
$$I = \frac{6}{6}$$

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

→ Hukum Kirchhoff 2 loop

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→ Loop I

$$\sum \mathcal{E} + \sum IR + 0$$

$$- \mathcal{E}_1 + \mathcal{E}_4 + \mathcal{E}_2 + I \cdot (R_1 + R_5) + I_3 R_6 = 0$$

→ Loop II

$$\sum \mathcal{E} + \sum I \cdot R = 0$$

$$- \mathcal{E}_3 + \mathcal{E}_4 + I_2 (R_2 + R_3 + R_4) + I_3 \cdot R_6 = 0$$