

Elektrodinamika

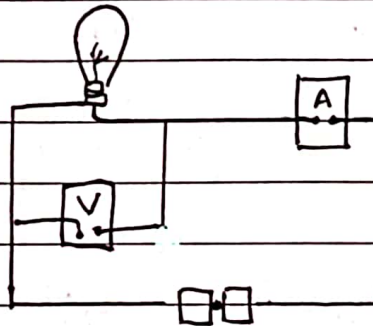
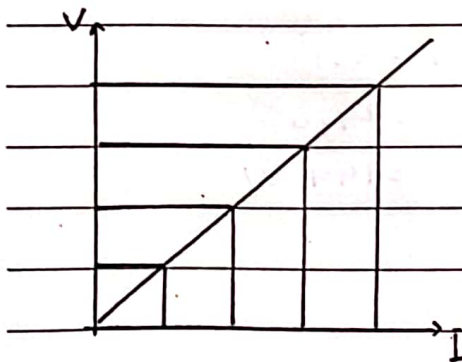
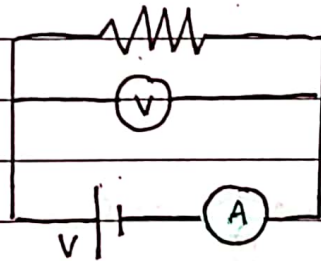
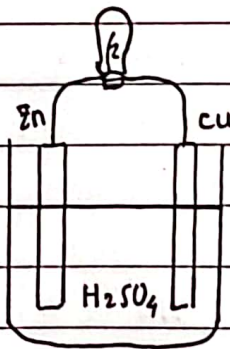
1) Hukum Ohm

2) Rangkaian Listrik

Pembahasan :

1) $J = \sigma E \leftarrow DC$

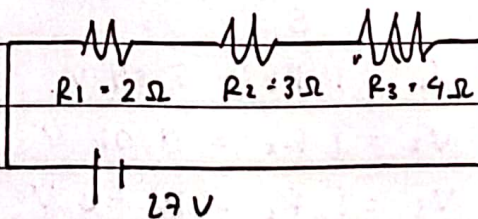
$V = IR \leftarrow AC$



$V = IR$

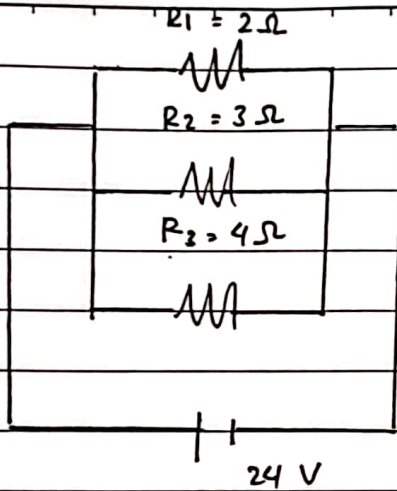
$V_1 = 6V$ $V_2 = 9V$ $V_3 = 12V$
 $I_1 = 3A$ $I_2 = 3A$ $I_3 = 3A$

2)



$R_t = 9\Omega$

$I_{total} = \frac{27}{9} = 3A$



$$V \text{ di } R_1, R_2, R_3 = 24 \text{ V}$$

$$I_1 = 12 \text{ A}$$

$$I_2 = 8 \text{ A}$$

$$I_3 = 6 \text{ A}$$

$$I_{\text{total}} = 26 \text{ A}$$

$$R_{\text{total}} \Rightarrow \frac{1}{R_{\text{total}}} = \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$$

$$\frac{1}{R} = \frac{6 + 4 + 3}{12}$$

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

$$= \frac{24}{12/13} = 24 \times \frac{13}{12} = 26 \text{ A}$$

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

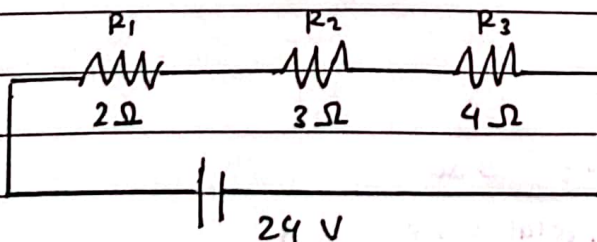
$$R = \frac{12}{13} \Omega$$

$$P_1 = V \cdot I > P_2 = V \cdot I > P_3 = V \cdot I$$

$$= 24 \cdot 12 = 24 \cdot 8 = 24 \cdot 6$$

$$= 288 \text{ W} = 192 \text{ W} = 144 \text{ W}$$

$$P = 14,25 \text{ W} \quad P = 21,38 \text{ W} \quad P = 28,51 \text{ W}$$



$$I_{123} = \frac{24}{9} = 2,67 \text{ A}$$

$$V_1 = I \cdot R_1 = 5,34 \text{ V}$$

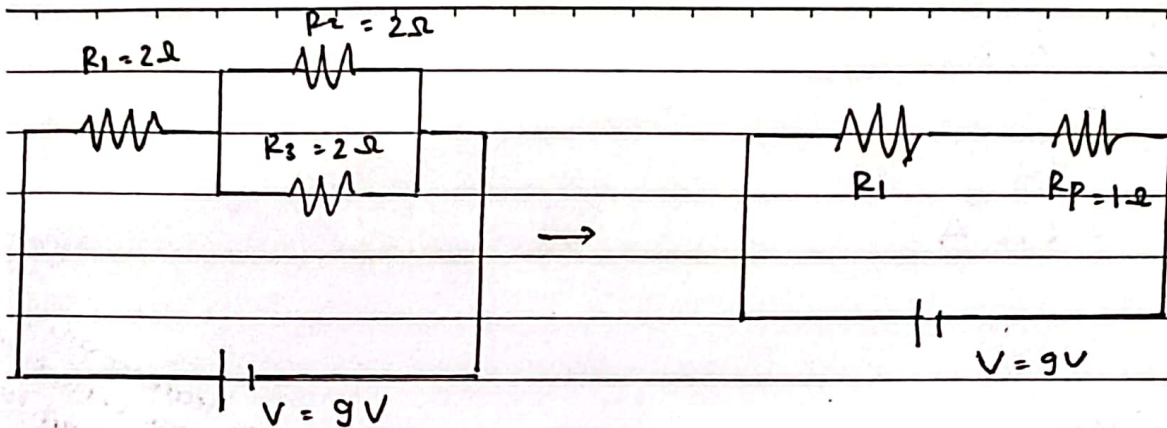
$$V_2 = I \cdot R_2 = 8,01 \text{ V}$$

$$V_3 = I \cdot R_3 = 10,68 \text{ V}$$

$$P_1 = V_1 \cdot I_{\text{total}}$$

$$= 5,34 \times 2,67$$

$$= 14,25 \text{ W}$$



$$R_t = 3 \Omega$$

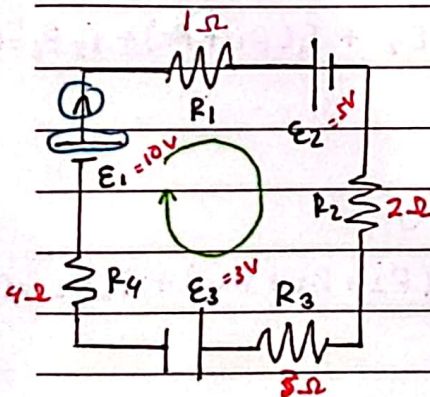
$$I_t = (3A) \rightarrow \frac{V}{R_1 + R_p} = \frac{9}{(2+1)}$$

$$V_{R_p} = I \cdot R_p = 3 \cdot 1 = 3 \text{ V}$$

$$V_{R_2} = I \cdot R_p = 3 \cdot 1 = 3 \text{ V}$$

$$V_{R_3} = I \cdot R_p = 3 \cdot 1 = 3 \text{ V}$$

$$V_{R_1} = I \cdot R_1 = 3 \cdot 2 = 6 \text{ V}$$



• arus bergerak dari potensial tinggi $\rightarrow$ rendah

$$E_1 > E_2 \ E_3$$

1) gambar arah arus sesuai dg besarnya arus

2) gambar loop sesuka hati

3) jika arah arus searah dg arah loop, maka (+)

$$\sum E + \sum iR = 0$$

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

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

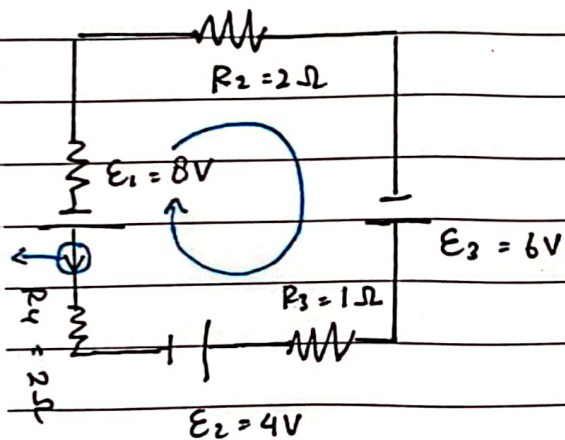
$$-10 + 5 + 3 + I(1 + 2 + 3 + 4) = 0$$

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

$$I(10) = 2$$

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

$$I = 0,2 \text{ A}$$



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

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

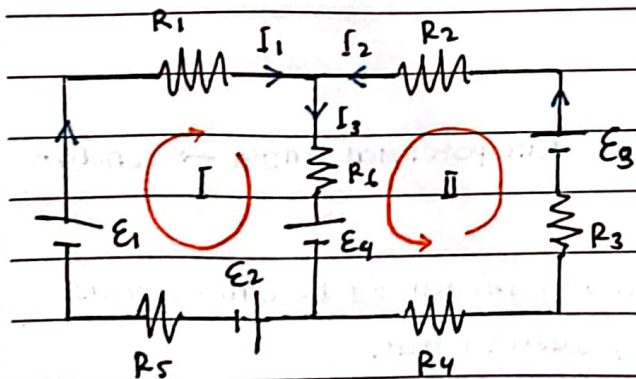
$$8 + 4 - 6 - I(1 + 2 + 1 + 2) = 0$$

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

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

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

negatif karena arah arus berlawanan dgn arah loop



LOOP I

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

$$- \mathcal{E}_1 + \mathcal{E}_4 + \mathcal{E}_2 + I_1(R_1 + R_2) + I_3 R_4 = 0$$

LOOP II

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

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