

Arus Listrik

Elektrodinamika

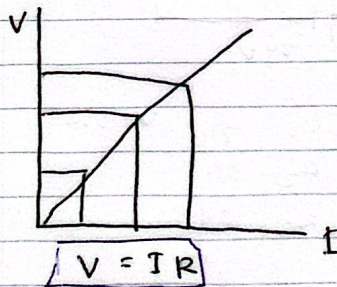
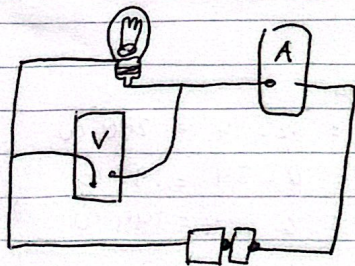
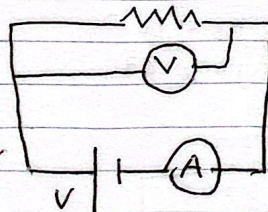
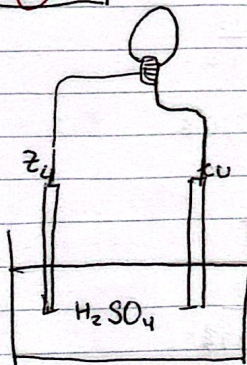
- ① Hukum Ohm
- ② Rangkaian Listrik

Pembahasan

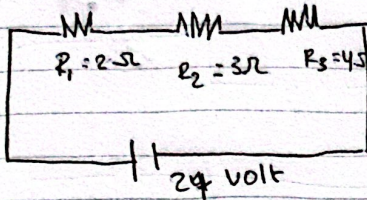
Hukum Ohm

$$J = \sigma E \leftarrow \begin{matrix} DC \\ AC \end{matrix}$$

$$\rightarrow V = IR$$



Rangkaian Listrik



$$R_t = 9\Omega$$

$$I = \frac{24}{9} = 3A$$

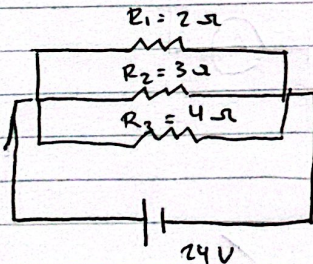
$$\frac{V}{R}$$

$$\text{Tegangan } R_1 = 6\Omega$$

$$R_2 = 9\Omega$$

$$R_3 = 12\Omega$$

$$\text{Total Tegangan} = 27$$



$$\text{Tegangan } R_1 = 24$$

$$R_2 = 24$$

$$R_3 = 24$$

$$V = I \cdot R$$

$$\text{Arus } R_1 = 12 \text{ s/r}$$

$$R_2 = 8$$

$$R_3 = 6$$

$$\text{Total Arus} = 26$$

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

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

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

$$= 0,9$$

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

$$= \frac{24}{0,9}$$

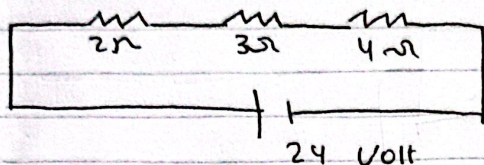
$$= 26,6 \text{ A}$$

Daya

$$P_1 = 12 \cdot 24 = 288 \text{ W}$$

$$P_2 = 8 \cdot 24 = 192 \text{ W}$$

$$P_3 = 6 \cdot 24 = 144 \text{ W}$$



$$I_t = 2,67 \text{ A} \left(\frac{24}{9} = 2,67 \times \right)$$

Tegangan

$$P_1 = 2 \cdot 2,67 = 5,34$$

$$P_2 = 3 \cdot 2,67 = 8,01$$

$$P_3 = 4 \cdot 2,67 = 10,68$$

Daya (V.I)

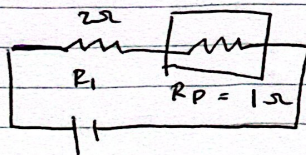
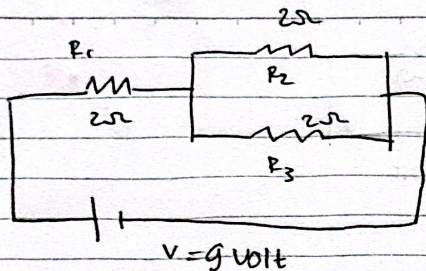
$$P_1 = 5,34 \cdot 2,67 = 14,25 \text{ w}$$

$$P_2 = 8,01 \cdot 2,67 = 21,38 \text{ w}$$

$$P_3 = 10,68 \cdot 2,67 = 28,51 \text{ w}$$

Jadi perbandingan lampu secara paralel dan seri adalah seri lebih kecil dari pada paralel dan bisa membuat listrik hemat dan redup, sedangkan paralel lebih besar dari seri artinya lampu lebih terang dan boros listrik

Campuran



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

$$R_t = 3 \Omega$$

$$I = 9 \text{ V}$$

$$I_t = \frac{9}{3} = 3 \text{ A}$$

Tegangan :

$$R_1 = 2 \cdot 3 = 6$$

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

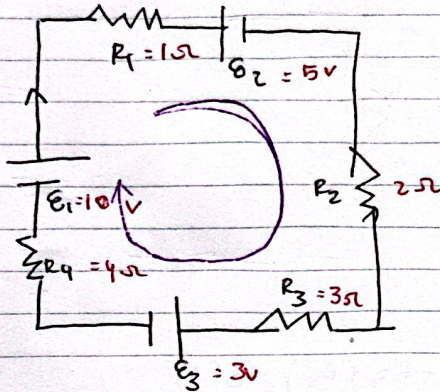
$$R_2 : 3 \text{ Volt}$$

$$R_3 : 3 \text{ Volt}$$

Arus

$$R_1 =$$

Hukum Kirchhoff



$$E_1 > E_2 > E_3$$

- ① gambar asal arus sesuai sampai besarnya E
- ② gambar loop sesuai tatitu
- ③ jika arah arus sesuai dgn arah loop maka +

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

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

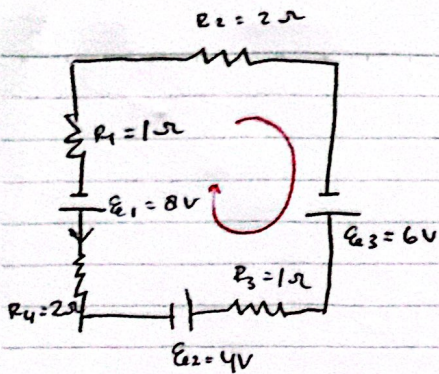
$$-10 + 5 + 3 + I(1 + 2 + 3 + 4) = 0$$

$$-2 \quad I(10) = 0$$

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

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

$$I = 0,2$$



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

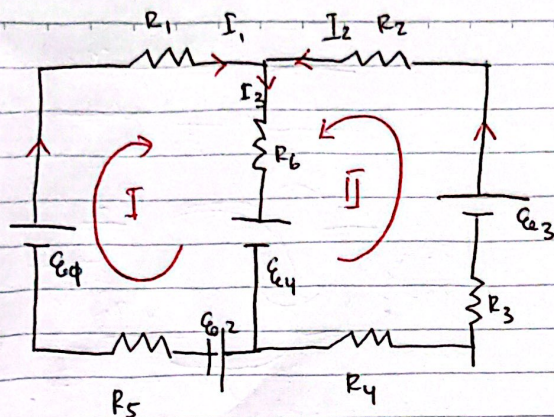
$$\mathcal{E}_1 + \mathcal{E}_2 - \mathcal{E}_3 - I(R_1 + R_2 + R_3 + R_4) = 0$$

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

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

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

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



Loop I

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

$$- \mathcal{E}_1 + \mathcal{E}_2 + \mathcal{E}_3 + I_1 (R_1 + R_5) + I_3 R_6 = 0$$

Loop II

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

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