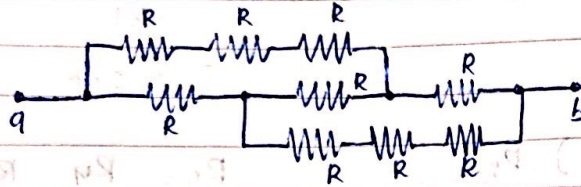


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 Npm : 2013022016
 Pendidikan Fisika B

① Perhatikan Gambar

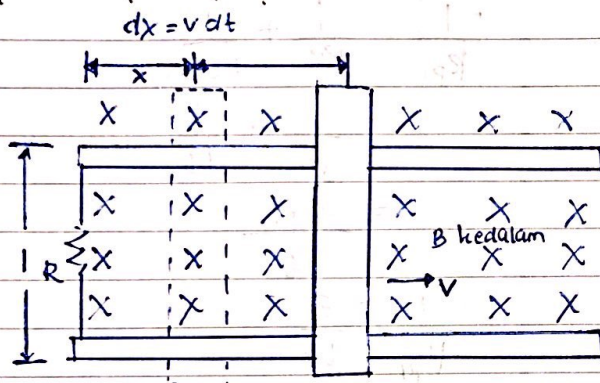


Jika $R = 5 \text{ ohm}$ dan terparang seperti pada Gambar di atas, hitung

a. Hambatan pengganti

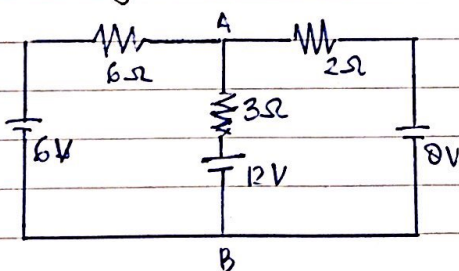
b. Jika $V_{ab} = 10 \text{ volt}$ bagaimana arus pada setiap hambatan pada rangkaian diatas

② Perhatikan Gambar rangkaian multisimpal di bawah ini! Bagaimana arus mengalir pada setiap simpal?



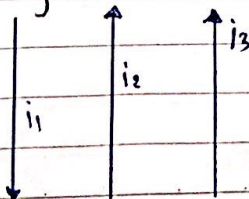
Jelaskan bagaimana arus bisa mengalir pada kumparan? Jika medan magnet 20 Tesla , kecepatan gerakan kawat 10 m/s , jarak gerakan kawat $(l) = 15 \text{ m}$, dan hambatan yang terparang 10 ohm . Berapa besarnya arus dalam kumparan tersebut?

③ Perhatikan gambar



Hitung arus listrik pada setiap hambatan

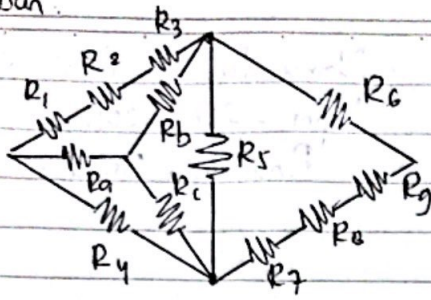
④ Gambar gaya-gaya yang dialami oleh masing-masing kawat berikut ini, jika arus i dan jarak sama besar, kemana arah gerakan kawat 1, 2, dan 3?



Jawaban

(1)

a)



$$R_a = \frac{(R_1 + R_2 + R_3) R_4}{(R_1 + R_2 + R_3) + R_4 + R_5}$$

$$= \frac{(5 + 5 + 5) \cdot 5}{(5 + 5 + 5) + 5 + 5}$$

$$= \frac{75}{25}$$

$$= 3 \text{ ohm}$$

$$R_b = \frac{(R_1 + R_2 + R_3) \cdot R_5}{(R_1 + R_2 + R_3) + R_4 + R_5}$$

$$= \frac{(5 + 5 + 5) \cdot 5}{(5 + 5 + 5) + 5 + 5}$$

$$= \frac{75}{25}$$

$$= 3 \text{ Ohm}$$

$$R_c = \frac{R_4 \cdot R_5}{(R_1 + R_2 + R_3) + R_4 + R_5}$$

$$= \frac{5 \cdot 5}{(5 + 5 + 5) + 5 + 5}$$

$$= \frac{25}{25}$$

$$= 1 \text{ ohm}$$

$$R_{b6} = R_b + R_6$$

$$= 3 + 5$$

$$= 8 \text{ Ohm}$$

$$\frac{1}{R_{p1}} = \frac{1}{R_{b6}} + \frac{1}{R_{c789}}$$

$$= \frac{1}{8} + \frac{1}{16}$$

$$= \frac{2+1}{16}$$

$$R_{c789} = R_c + R_{789}$$

$$= 1 + 15$$

$$= 16 \text{ Ohm}$$

$$\frac{1}{R_{p1}} = \frac{3}{16}$$

$$R_{p1} = \frac{16}{3}$$

$$R_{tot} = R_a + R_{p1}$$

$$= 3 + \frac{16}{3}$$

$$= \frac{9+16}{3}$$

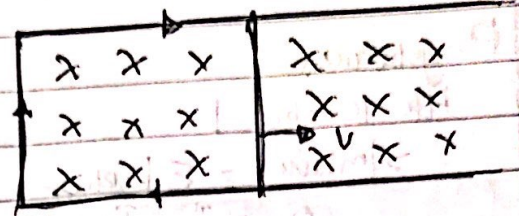
$$= \frac{25}{3} = 8,3 \Omega //$$

$$I = \frac{V}{R_{tot}} = \frac{10}{8,3} = 1,2 \text{ A} //$$

- ② Arah Arus listrik dapat mengalir karena adanya beda potensial antara 2 titik pada suatu rangkaian. Arus yang mengalir dari tempat yang memiliki potensial tinggi ke tempat yang memiliki potensial rendah. Semakin besar hambatannya (R), maka semakin kecil kuat arusnya.

$$\begin{aligned} \mathcal{E} &= B l v \sin \theta \\ &= 20 \cdot 15 \cdot 10 \sin 90^\circ \\ &= 3000 \text{ V} \end{aligned}$$

$$I = \frac{\mathcal{E}}{R} = \frac{3000}{10} = 300 \text{ A}$$



I mengalir dari Q ke P sesuai kaidah Faraday
kapan

$$0 = 8 \cdot 2 + 3 \cdot 1 + 3 \cdot 3 - 3$$

$$0 = (1+1)8 + 12 + 9 - 3$$

$$0 = 8 + 8 + 12 + 9 - 3$$

$$(1+1)8 + 12 + 9 - 3$$

$$0 = 9 \cdot 8 + 3 \cdot 3 + 12 \cdot 9$$

$$0 = 8 \cdot 2 + 3 \cdot 1 + 3 \cdot 3 - 3$$

$$0 = (1+1)8 + 12 + 9 - 3$$

$$0 = 8 + 8 + 12 + 9 - 3$$

$$(1+1)8 + 12 + 9 - 3$$

$$P = 8 + 12 + 9$$

$$P = 8 + 12 + 9$$

$$P = 8 + 12 + 9$$

$$2 \cdot 1 = 12$$

$$2 \cdot 1 = 12$$

$$A \cdot 20 = 12$$

$$P = 12 \text{ watt}$$

$$1 \cdot 8 + 2 = 8 + 12$$

$$8 \cdot 1 + 12 = 8 + 12$$

$$2 = 8 + 12$$

$$+ 8 = 8 + 12 + 12$$

$$2 = 8 + 12$$

$$A \cdot 20 = 12$$

$$2 = 8 + 12$$

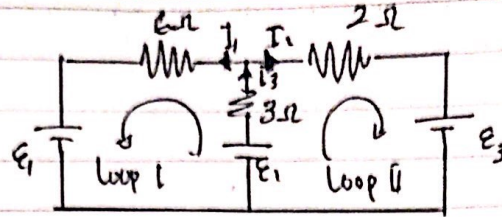
3

Diketahui:

$$R_1 = 6 \Omega$$

$$R_2 = 2 \Omega$$

$$R_3 = 3 \Omega$$



Penyelesaian

Hk. Kirchhoff I

$$\sum I_{\text{masuk}} = \sum I_{\text{keluar}}$$

$$I_3 = I_1 + I_2$$

Hk. Kirchhoff II

$$\text{Loop I} \rightarrow \sum E + \sum IR = 0$$

$$E_1 - E_2 + I_1 \cdot 6 + I_3 \cdot 3 = 0$$

$$6 - 12 + 6I_1 + 3(I_1 + I_2) = 0$$

$$-6 + 6I_1 + 3I_1 + 3I_2 = 0$$

$$9I_1 + 3I_2 = 6 \dots 1)$$

$$\text{Loop II} \rightarrow \sum E + \sum IR = 0$$

$$E_3 - E_2 + I_2 \cdot 2 + I_3 \cdot 3 = 0$$

$$8 - 12 + 2I_2 + 3(I_1 + I_2) = 0$$

$$-4 + 2I_2 + 3I_1 + 3I_2 = 0$$

$$3I_1 + 5I_2 = 4 \dots 2)$$

$$9I_1 + 3I_2 = 6 \quad | \times 1$$

$$3I_1 + 5I_2 = 4 \quad | \times 3$$

$$9I_1 + 3I_2 = 6$$

$$9I_1 + 15I_2 = 12 \quad -$$

$$-12I_2 = -6$$

$$I_2 = 0,5 \text{ A}$$

$$\text{Pada } R_2 = 2 \Omega$$

$$3I_1 + 5I_2 = 4$$

$$3I_1 + 5(0,5) = 4$$

$$3I_1 + 2,5 = 4$$

$$3I_1 = 4 - 2,5$$

$$3I_1 = 1,5$$

$$I_1 = 0,5 \text{ A}$$

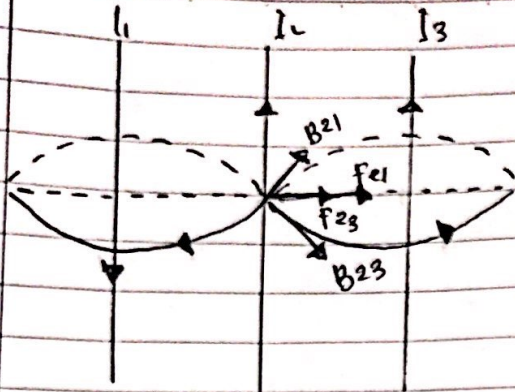
$$\text{Pada } R_1 = 6 \Omega$$

$$I_3 = I_1 + I_2$$

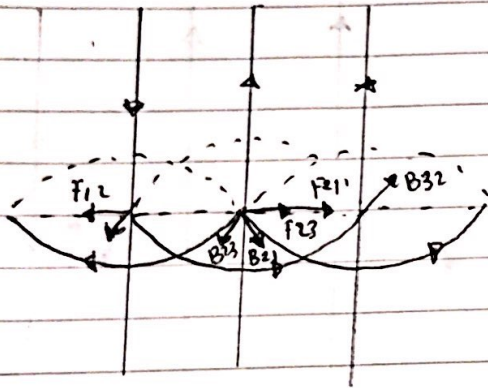
$$= 0,5 + 0,5$$

$$= 1 \text{ A pada } R_3 = 3 \Omega$$

(4)



Arah gerakan kawat 2
ke arah kawat 3



Arah kawat 2 ke arah kawat 3
Arah kawat 1 menjauhi kawat 2 dan 3