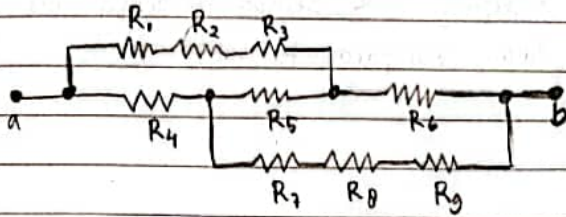


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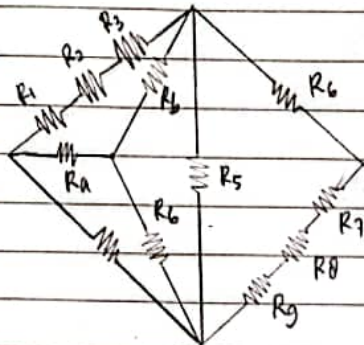
UAS Genap Elektrodinamika

1.



Jika $R = 5\Omega$ dan terpasang seperti Gambar di samping, hitunglah:

a. Hambatan pengganti

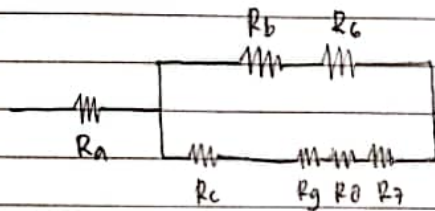


$$R_s = R_1 + R_2 + R_3 = 5 + 5 + 5 = 15\Omega$$

$$R_a = \frac{R_s \cdot R_4}{R_s + R_4} = \frac{15\Omega \cdot 5}{15 + 5} = \frac{75}{20} = 3,75\Omega$$

$$R_b = \frac{15\Omega \cdot 5\Omega}{5 + 5 + 5 + 5} = \frac{75}{20} = 3,75$$

$$R_c = \frac{5 \cdot 5}{5 + 5} = \frac{25}{10} = 2,5\Omega$$



$$R_{s1} = R_b + R_c = 3,75\Omega + 5\Omega = 8,75\Omega$$

$$R_{s2} = R_c + R_g + R_8 + R_7 = 2,5\Omega + 5\Omega + 5\Omega + 5\Omega = 17,5\Omega$$

$$\begin{aligned} \frac{1}{R_p} &= \frac{1}{R_{s1}} + \frac{1}{R_{s2}} \\ &= \frac{1}{8,75\Omega} + \frac{1}{17,5\Omega} \\ &= \frac{17,5\Omega + 8,75\Omega}{153,125\Omega} = \frac{26,25}{153,125} \end{aligned}$$

$$R_p = \frac{153,125}{26,25} = 5,83\Omega$$

$$R_{tot} = R_a + R_p = 3,75\Omega + 5,83\Omega = 9,58\Omega$$

b. $V_{ab} = 10 \text{ Volt}$

$$I = V/R$$

$$= \frac{10}{9,58} = 1,04 \text{ A}$$



$$dx = v dt$$

2.



Jika medan magnet 20 Tesla, kecepatan gerakan kawat 10 m/s, jauh gerakan kawat (l) = 15 m dan hambatan yang terpasang 10 Ω . Berapa besarnya arus dalam kumparan tersebut?

diketahui :

B : 20 Tesla

l : 15 m

v : 10 m/s

R : 10 Ω

ditanya : I = ?

Solusi

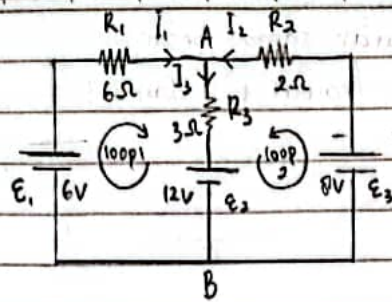
$$V = B \cdot l \cdot v$$

$$= 20 \text{ T} \cdot 15 \text{ m} \cdot 10 \text{ m/s}$$

$$= 3000 \text{ Volt}$$

Besar arus

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



Hitunglah arus listrik pada setiap hambatan!

Diketahui:

Ditanya: I pada R_1 , R_2 dan R_3

$$\begin{aligned} E_1 &= 6V & R_1 &= 6\Omega \\ E_2 &= 12V & R_2 &= 2\Omega \\ E_3 &= 8V & R_3 &= 3\Omega \end{aligned}$$

Solusi:

* Hukum kirchoff arus dan tegangan

$$I_3 = I_1 + I_2$$

$$3I_1 + 5I_2 = -4$$

$$3\left(\frac{1}{2}\right) + 5I_2 = -4$$

$$\frac{3}{2} + 5I_2 = -4$$

$$5I_2 = -4 - \frac{3}{2}$$

$$5I_2 = -\frac{15}{2} \times \frac{1}{5}$$

$$I_2 = -\frac{3}{2} A$$

* Tinjau loop 1

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

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

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

$$9I_1 + 3I_2 + 6 = 0$$

* Tinjau loop 2

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

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

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

$$3I_1 + 5I_2 + 4 = 0$$

$$I_3 = I_1 + I_2$$

$$I_3 = -\frac{1}{2} + \left(-\frac{3}{2}\right)$$

$$I_3 = -\frac{4}{2}$$

$$I_3 = -2 A.$$

$$9I_1 + 3I_2 = -6 \quad \times 5$$

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

$$45I_1 + 15I_2 = -30$$

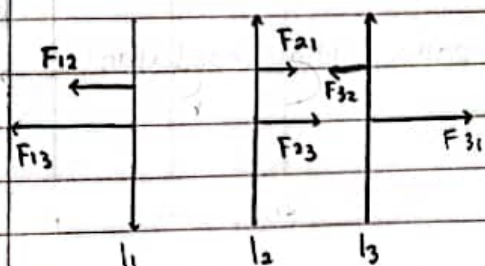
$$9I_1 + 15I_2 = -12$$

$$36I_1 = -18$$

$$I_1 = \frac{-18}{36}$$

$$I_1 = -\frac{1}{2} A$$

4.



Jika arus i dan jarak sama besar,
kemana arah gerakan kawat 1, 2 dan 3?