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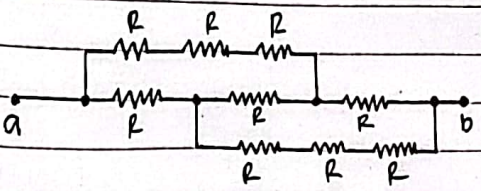
Kelas : B

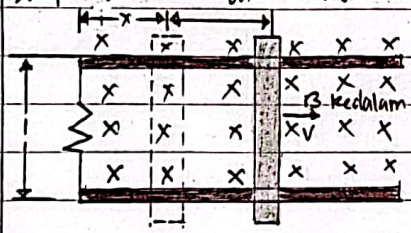
1. Perhatikan Gambar



Jika R = 15 ohm dan terpasang seperti pada Gambar diatas, hitung
a. Hambatan Penggantinya
b. Jika Vab = 10 Volt bagaimana arus pada setiap hambatan pada rangkaian diatas ?

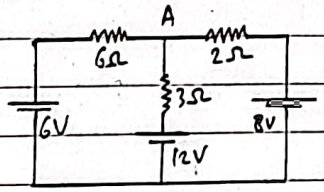
2. Perhatikan Gambar rangkaian multisimpal dibawah ini ! Bagaimana arus mengalir pada setiap simpal ?

$dx = vdt$



Jelaskan bagaimana arus bisa mengalir pada kumparan ? Gambarkan arah arus pada kumparan tersebut ! Jika medan magnet 20 tesla, kecepatan gerakan kawat 10 m/s, Jauh gerakan kawat (L) = 15 m, dan hambatan yang terpasang 10 ohm. Berapa besarnya arus dalam kumparan tersebut.

3. Perhatikan Gambar

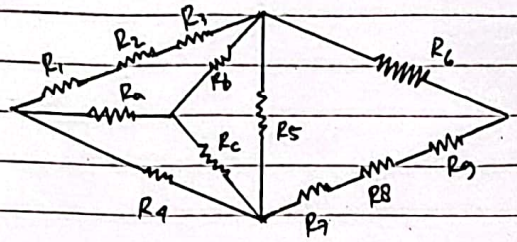


Hitung arus listrik pada setiap hambatan

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 ?

Penyelesaian :

1. Bentuk sederhana :



$\rightarrow R_a = \frac{(R_1 + R_2 + R_3) R_4}{(R_1 + R_2 + R_3) + R_4 + R_5} = \frac{75}{25} = 3 \text{ ohm}$

$\rightarrow R_b = \frac{(R_1 + R_2 + R_3) \cdot R_5}{(R_1 + R_2 + R_3) + R_4 + R_5} = \frac{75}{25} = 3 \text{ ohm}$

$\rightarrow R_c = \frac{R_4 \cdot R_5}{(R_1 + R_2 + R_3) R_4 + R_5} = \frac{25}{25} = 1 \text{ ohm}$

$R_{b6} = R_b + R_6 = 3 + 5 = 8 \Omega$

$R_{c789} = R_c + R_{789} = 1 + 15 = 16 \Omega$

$\frac{1}{R_{p1}} = \frac{1}{R_{b6}} + \frac{1}{R_{c789}} = \frac{1}{8} + \frac{1}{16} = \frac{2+1}{16}$

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

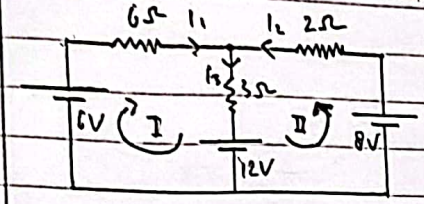
$R_{p1} = \frac{16}{3}$

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

$= 3 + \frac{16}{3} = \frac{9+16}{3} = \frac{25}{3} = 8,3 \Omega$

b. $I = \frac{V}{R_{total}} = \frac{10}{8,3} = 2,1 \text{ A}$

3.



Jawab :

$I_3 = I_1 + I_2$

loop I

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

$-\mathcal{E}_1 + \mathcal{E}_2 + 6I_1 + 3I_3 = 0$

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

$9I_1 + 3I_2 + 6 = 0$ ... Pers (1)

loop II

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

$-\mathcal{E}_3 + \mathcal{E}_2 + 2I_2 + 3I_3 = 0$

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

$4 + 5I_2 + 3I_1 = 0$ ... Pers (2)

→ elim pers (1) dan pers (2)

$9I_1 + 3I_2 + 6 = 0 \mid \times 1 \mid 9I_1 + 3I_2 + 6 = 0$

$3I_1 + 5I_2 + 4 = 0 \mid \times 3 \mid 9I_1 + 15I_2 + 12 = 0$ −

$-12I_2 - 6 = 0$

$-12I_2 = 6$

$I_2 = \frac{6}{-12} = -0,5\ A$

→ Subhitusi

$3I_1 + 5I_2 + 4 = 0$

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

$3I_1 + (-2,5) + 4 = 0$

$3I_1 = -1,5$

$I_1 = \frac{-1,5}{3} = -0,5A$

→ Subhitusi

$I_3 = I_1 + I_2$

$= -0,5 + (-0,5)$

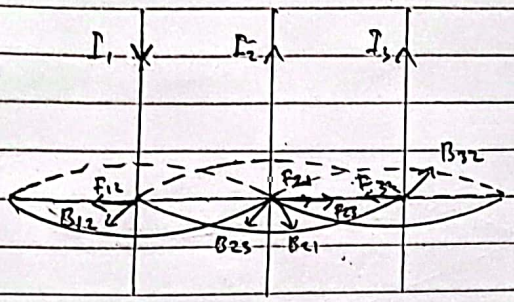
$= -1\ A$

$\therefore I_1 = 0,5\ A$

$I_2 = 0,5\ A$

$I_3 = 1\ A$

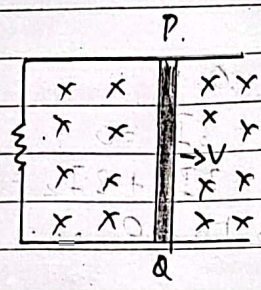
4.



2. $\Sigma = BLv \sin\theta$

$= 20 . 15 . 10 \sin 90^\circ$

$= 3000$ V



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

I mengalir dari Q ke P sesuai kaidah tangan kanan