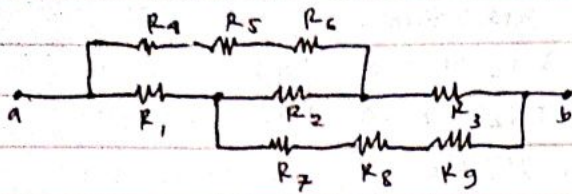


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1. Perhatikan gambar



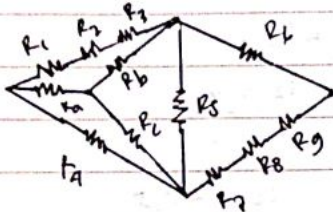
Jika $R = 5 \Omega$ dan terpasang seperti gambar diatas,
hitung :

a). Hambatan pengganti

b). jika $V_{ab} = 10 \text{ Volt}$, bagaimana arus pada setiap hambatan pada rangkaian diatas!

Jawab :

a).



$$a). R_a = \frac{(R_1 + R_2 + R_3) \cdot R_4}{(R_1 + R_2 + R_3) + R_4 + R_5} = \frac{75}{25} = 3 \Omega$$

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

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

$$R_{bb} = R_b + R_c \\ = 3 + 1 \\ = 4 \Omega$$

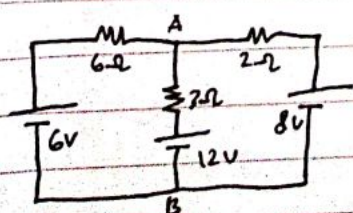
$$R_{c789} = R_c + R_{789} \\ = 1 + 15 \\ = 16 \Omega$$

$$R_{tot} = R_a + R_{bb} \\ = 3 + \frac{16}{3} \\ = \frac{9 + 16}{3} \\ = \frac{25}{3} = 8,3 \Omega$$

$$\frac{1}{R_{p1}} = \frac{1}{R_{bb}} + \frac{1}{R_{c789}} \\ = \frac{1}{8} + \frac{1}{16} \\ = \frac{2 + 1}{16} \\ \frac{1}{R_{p1}} = \frac{3}{16} \\ R_{p1} = \frac{16}{3}$$

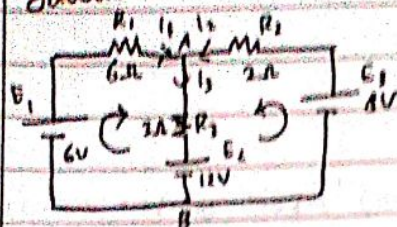
$$b). I = \frac{V}{R_{tot}} = \frac{10}{8,3} = 1,2 \text{ A}$$

3. Perhatikan gambar



Hitung arus listrik pada setiap hambatan

Jawab:



$$I_2 = I_1 + I_3$$

loop 1

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

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

$$8I_1 + 3I_2 + 6 = 0 \quad \text{Pers 1}$$

Substitusi

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

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

$$3I_2 - 2,5 + 4 = 0$$

$$I_2 = \frac{-1,5}{3} = -0,5$$

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

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

$I_3 = 1 \text{ A}$

loop 2

$$-E_2 + E_2 + 2I_2 + 3I_1 = 0$$

$$-6 + 12 + 2I_2 + 3I_1 + 3I_2 = 0$$

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

Eliminasi pers 1 dan 2

$$8I_1 + 3I_2 + 6 = 0 \quad \times 1$$

$$2I_1 + 5I_2 + 4 = 0 \quad \times 3$$

$$8I_1 + 3I_2 + 6 = 0$$

$$9I_1 + 15I_2 + 12 = 0$$

$$-12I_2 - 6 = 0$$

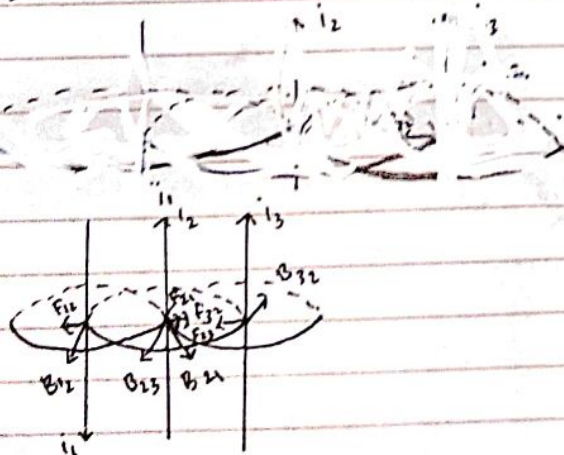
$$-12I_2 = 6$$

$$I_2 = \frac{6}{-12}$$

$$I_2 = -0,5$$

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

Jawab:

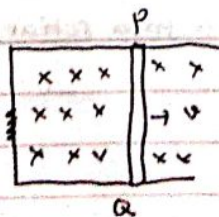


$$2. \mathcal{E} = B l v \sin \theta$$

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

$$= 3000 \text{ V}$$

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



I mengalir dari Q ke P sesuai kaidah tangan kanan