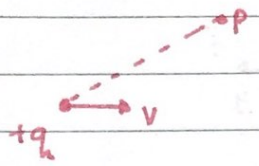
No 27 - Maret - 2024
Date

Medan Magnet

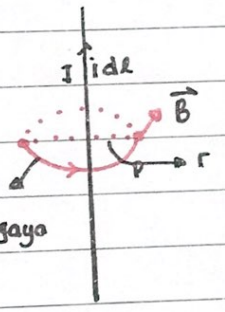
1. Medan oleh Muatan bergerak



$$\vec{B} = \frac{\mu_0}{4\pi} \frac{qV \cdot r_0}{r^2}$$

$$= \frac{\mu_0 qV}{4\pi r^2} \sin\theta$$

2. $\vec{B}$ oleh arus listrik



$$\vec{B} = \frac{\mu_0}{4\pi} \frac{i\vec{dl} \times r_0}{r^2}$$

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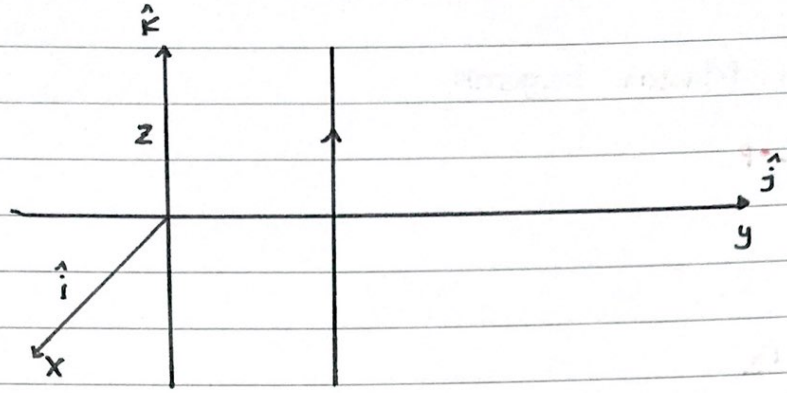
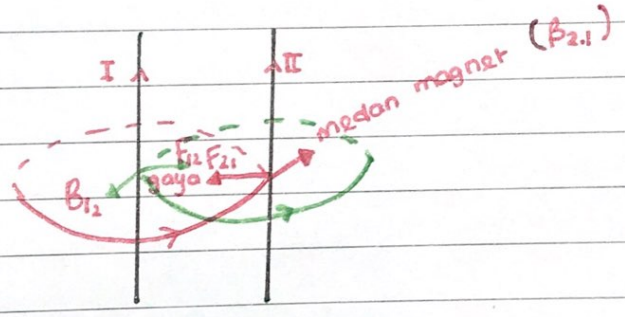
* Pada Kawat 1



$$\vec{B} = \frac{\mu_0}{4\pi} \frac{i\,d\ell\,\hat{k} \times \hat{j}}{r^2}$$

$$= \frac{\mu_0}{4\pi} \frac{i\,d\ell}{r^2} \sin\theta\,(-\hat{i})$$

* Pada Kawat 2



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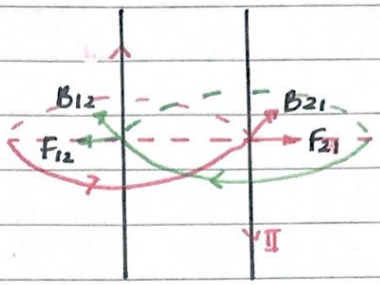
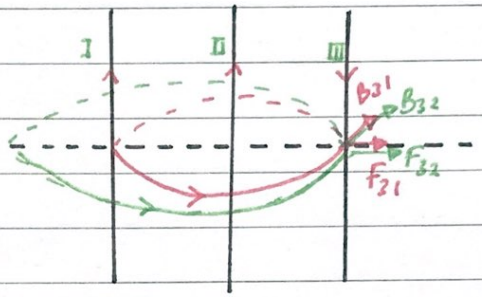


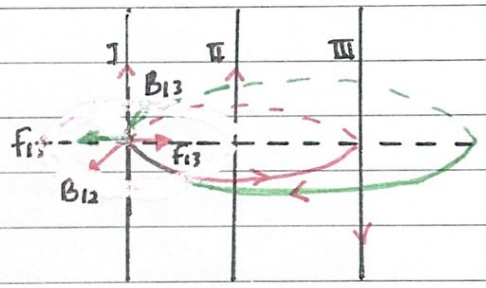
* Pada Kawat 3

→ Kawat 1 dan 2 terhadap kawat 3



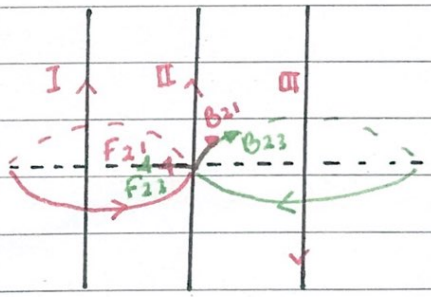
* Pada Kawat 3

→ Kawat 2 dan 3 terhadap Kawat 1



* Pada Kawat 3

→ Kawat 1 dan 3 terhadap Kawat 2



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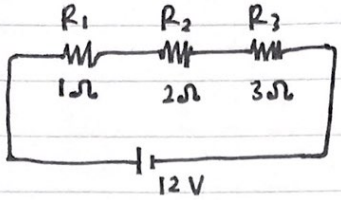
Npm : 2213022012

1.



a) Hitung arus pada R_3 25

b) Hitung tegangan pada R_2

Jawab :

a). $R_t = R_1 + R_2 + R_3$

$= 1\Omega + 2\Omega + 3\Omega$

$= 6\Omega$

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

$= \frac{12}{6} = 2$ Ampere

b). $V_2 = R \cdot I$

$= 2 \cdot 2$

$V_2 = 4$ Volt

Jadi arus pada R_3 adalah 2 Ampere dan tegangan pada R_2 adalah 4 Volt

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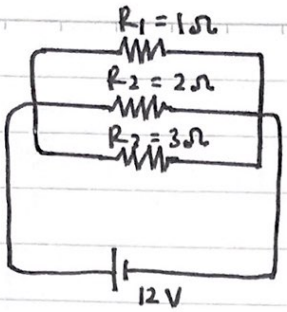
2.



a) Hitung arus pada R_3

b) Hitung tegangan pada R_2 25

Jawab

a) arus pada R_3

$$I_3 = \frac{V}{R_3}$$

$$= \frac{12}{3}$$

$$= 4 \text{ Ampere}$$

b) Tegangan pada R_2

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$\frac{1}{R} = \frac{1}{1} + \frac{1}{2} + \frac{1}{3}$$

$$\frac{1}{R} = \frac{3}{6}$$

$$R = \frac{6}{3}$$

$$R = 2\ \Omega$$

$$V = I \times R$$

$$I_t = \frac{V}{R_{total}}$$

$$= \frac{12}{2}$$

$$I_{total} = 6 \text{ Ampere}$$

$$V_2 = 1.R$$

$$= 6.2$$

$$= 12 \text{ Volt}$$

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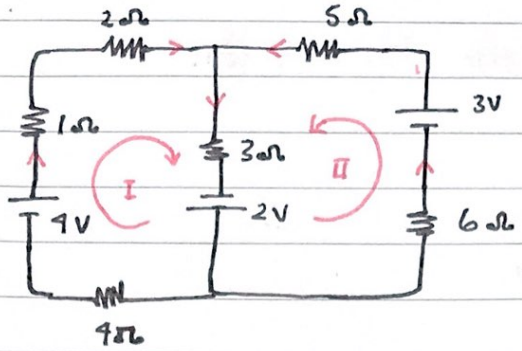
3.



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Hitung arus tiap loop (I_1, I_2, I_3)

→ Pada loop 1

$\Sigma\mathcal{E} + \Sigma I.R = 0$

$-9 - 2 + (1+2+4)I_1 + 3I_3 = 0$

$-6 + I_1(7) + I_2(3) = 0$

$7I_1 + 3I_3 = 6$

→ Pada loop 2

$\Sigma\mathcal{E} + \Sigma I.R = 0$

$-3V - 2V . I_2(6+5) . I_3(3) = 0$

$-5V . I_2(11) . I_3(3) = 0$

$11 I_2 + 3 I_3 = 5V$

* $7I_1 = 6 - 3I_3$

$I_1 = 6 - 3(I - 5I_2)$

$I_1 = 6 - 3(15I_2)$

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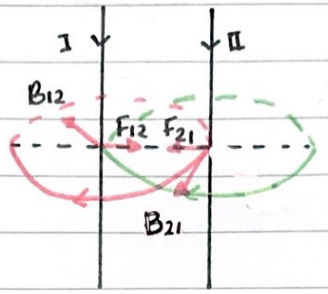
4. Gambarkan medan magnet, garis gaya dan arah arus!



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