

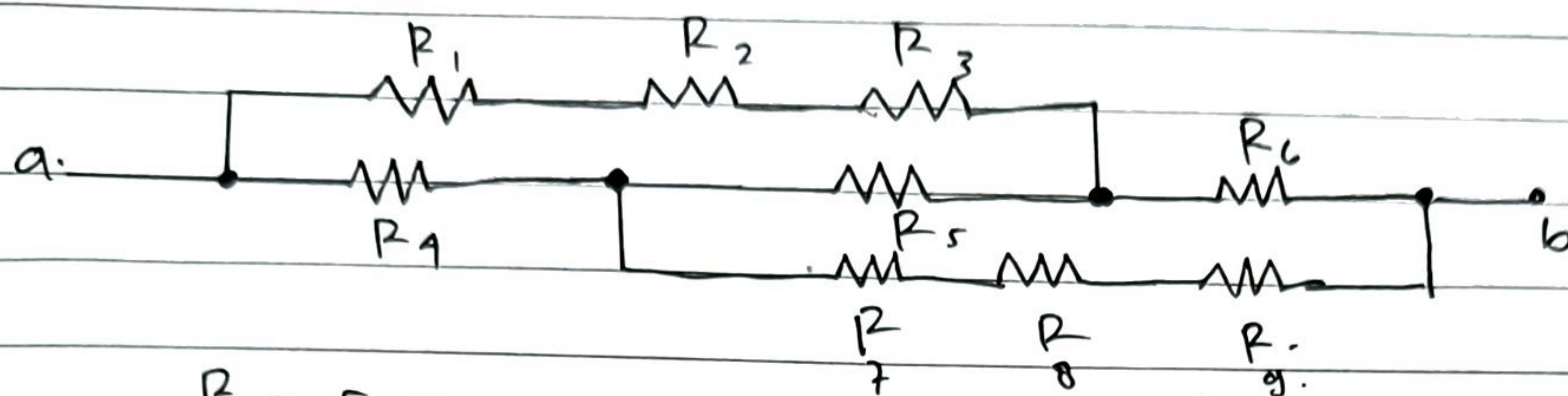
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08 Juli 2024.

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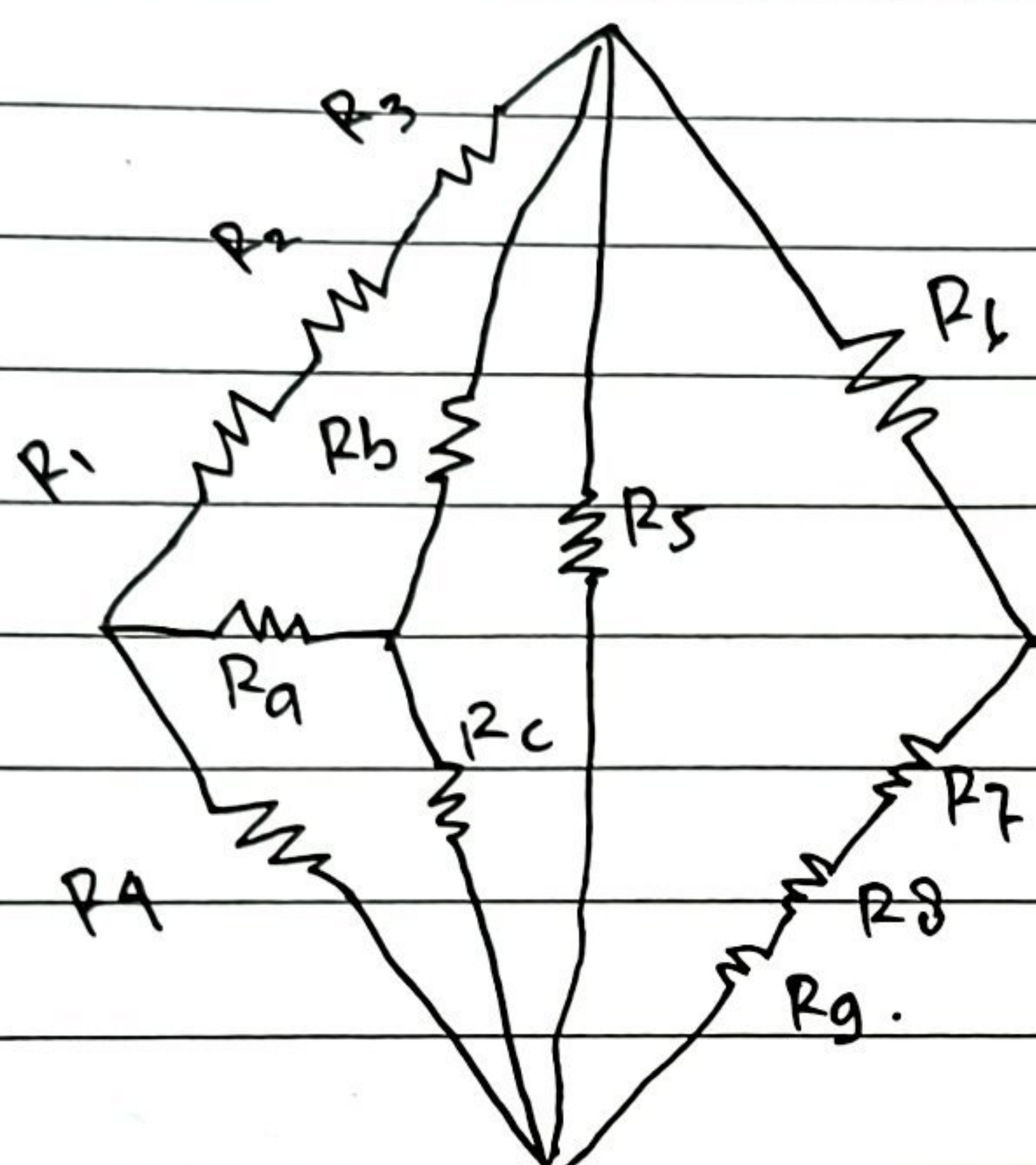
Mata Kuliah : Elektrodinamika

1.



$$R = 5 \Omega$$

a. Hambatan Pengganti

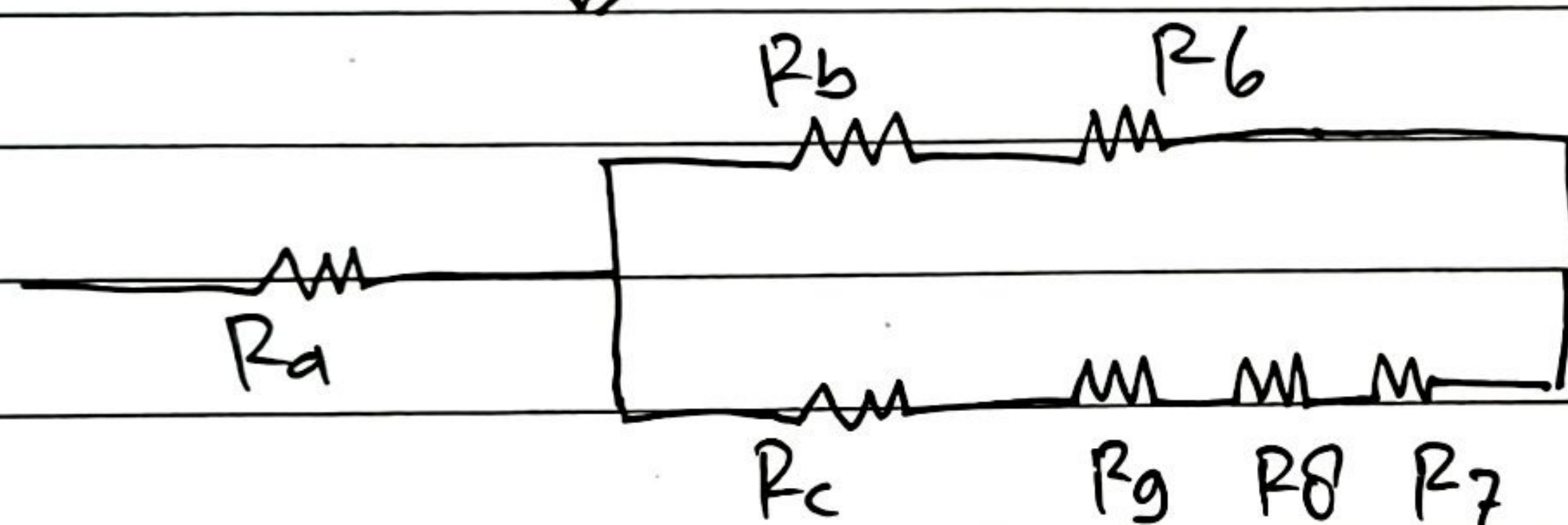


$$R_s = R_1 + R_2 + R_3 = 5 + 5 + 5 = 15 \Omega$$

$$R_a = \frac{R_s \cdot R_4}{R_1 + R_2 + R_3 + R_4} = \frac{15 \cdot 5}{5 + 5 + 5 + 5} = \frac{75}{20} = 3.75 \Omega$$

$$R_b = \frac{15 \cdot 5}{5 + 5 + 5 + 5} = \frac{75}{20} = 3.75 \Omega$$

$$R_c = \frac{5 \cdot 5}{5 + 5} = \frac{25}{10} = 2.5 \Omega$$



$$R_{s1} = R_b + R_6 = 3.75 + 5 = 8.75 \Omega$$

$$R_{s2} = R_c + R_7 + R_8 + R_9 = 2.5 + 5 + 5 + 5 = 17.5 \Omega$$

$$\frac{1}{R_p} = \frac{1}{R_{s1}} + \frac{1}{R_{s2}} = \frac{1}{8.75} + \frac{1}{17.5}$$

$$\frac{1}{R_p} = \frac{1}{8.75} + \frac{1}{17.5}$$

$$\frac{1}{R_p} = \frac{17.5 + 8.75}{153.125} = \frac{26.25}{153.125}$$

$$R_p = \frac{153.125}{26.25} = 5.83 \Omega$$

$$R_{tot} = R_a + R_p = 3.75 + 5.83 = 9.58 \Omega$$

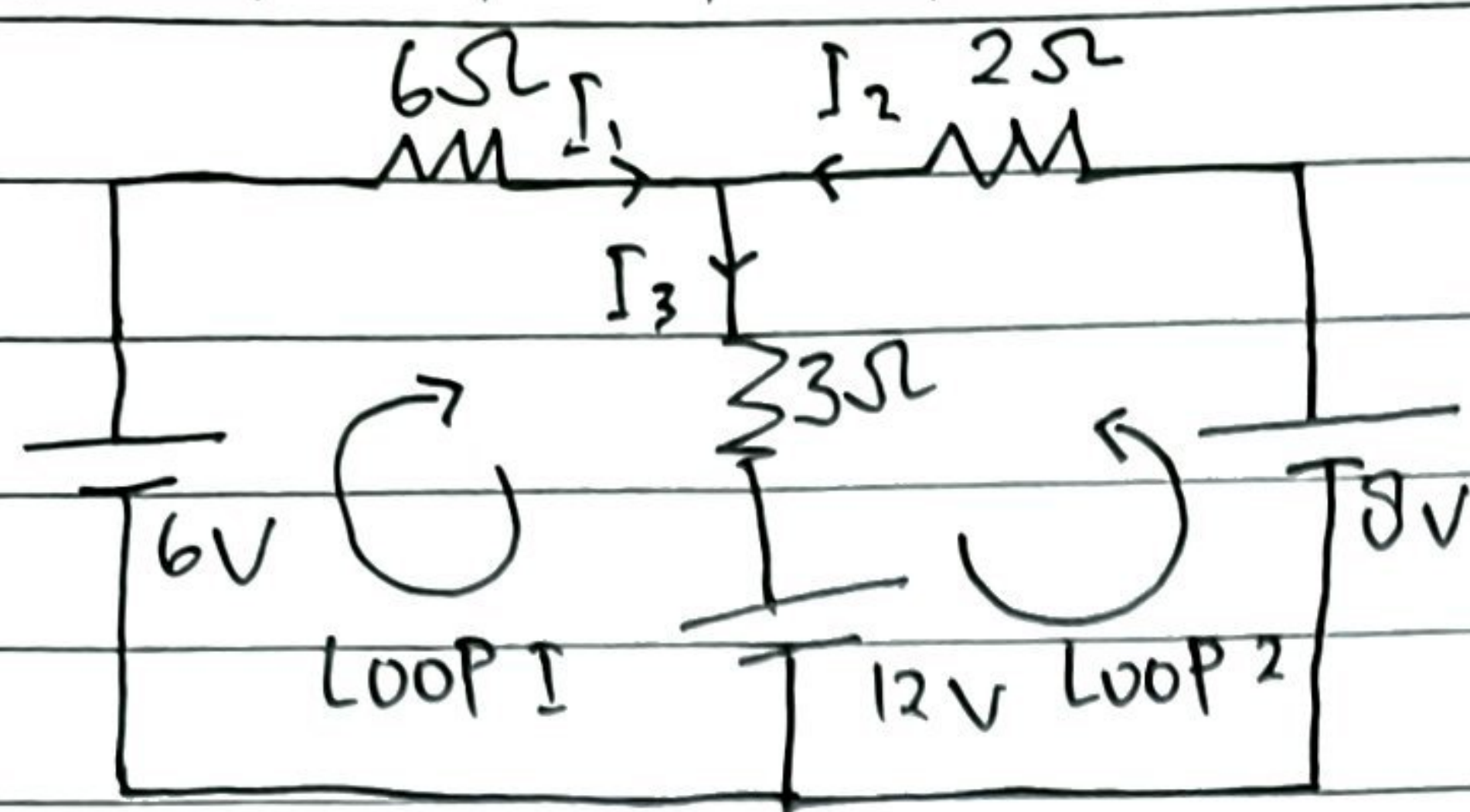
b) $V_{ab} : 10 \text{ Volt}$

$$I : V / R$$

$$= \frac{10}{9.58} = 1.04 \text{ A}$$

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3.)



$$I_3 = I_1 + I_2$$

$$I_1 = I_3 - I_2 \dots$$

Ditanya ? $I \dots ?$

loop I

$$\sum V + \sum IR = 0$$

$$(-6 + 12) + (I_1 \cdot 6) + (I_3 \cdot 3) = 0$$

$$6 + 6I_1 + 3I_3 = 0$$

$$6I_1 + 3I_3 = -6$$

$$6(I_3 - I_2) + 3I_3 = -6$$

$$6I_3 - 6I_2 + 3I_3 = -6$$

$$9I_3 - 6I_2 = -6$$

loop II

$$\sum V + \sum IR = 0$$

$$(-8 + 12) + (I_2 \cdot 2) + (I_3 \cdot 3) = 0$$

$$4 + 2I_2 + 3I_3 = 0$$

$$2I_2 + 3I_3 = -4$$

$$9I_3 - 6I_2 = -6 \quad | \times 1 | \quad 9I_3 - 6I_2 = -6$$

$$3I_3 + 2I_2 = -4 \quad | \times 3 | \quad 9I_3 + 6I_2 = -12$$

$$-12I_2 = 6$$

$$I_2 = 6 / -12 = -\frac{1}{2} = -0.5 \text{ A}$$

$$2I_2 + 3I_3 = -4$$

$$2(-0.5) + 3I_3 = -4$$

$$-1 + 3I_3 = -4$$

$$3I_3 = -4 + 1$$

$$3I_3 = -3$$

$$I_3 = -3 / 3 = -1 \text{ A}$$

$$I_3 = I_1 + I_2$$

$$-1 = I_1 + (-0.5)$$

$$-1 + 0.5 = I_1$$

$$-0.5 \text{ A} = I_1$$

$$I_1 = -0.5 \text{ Amper}$$

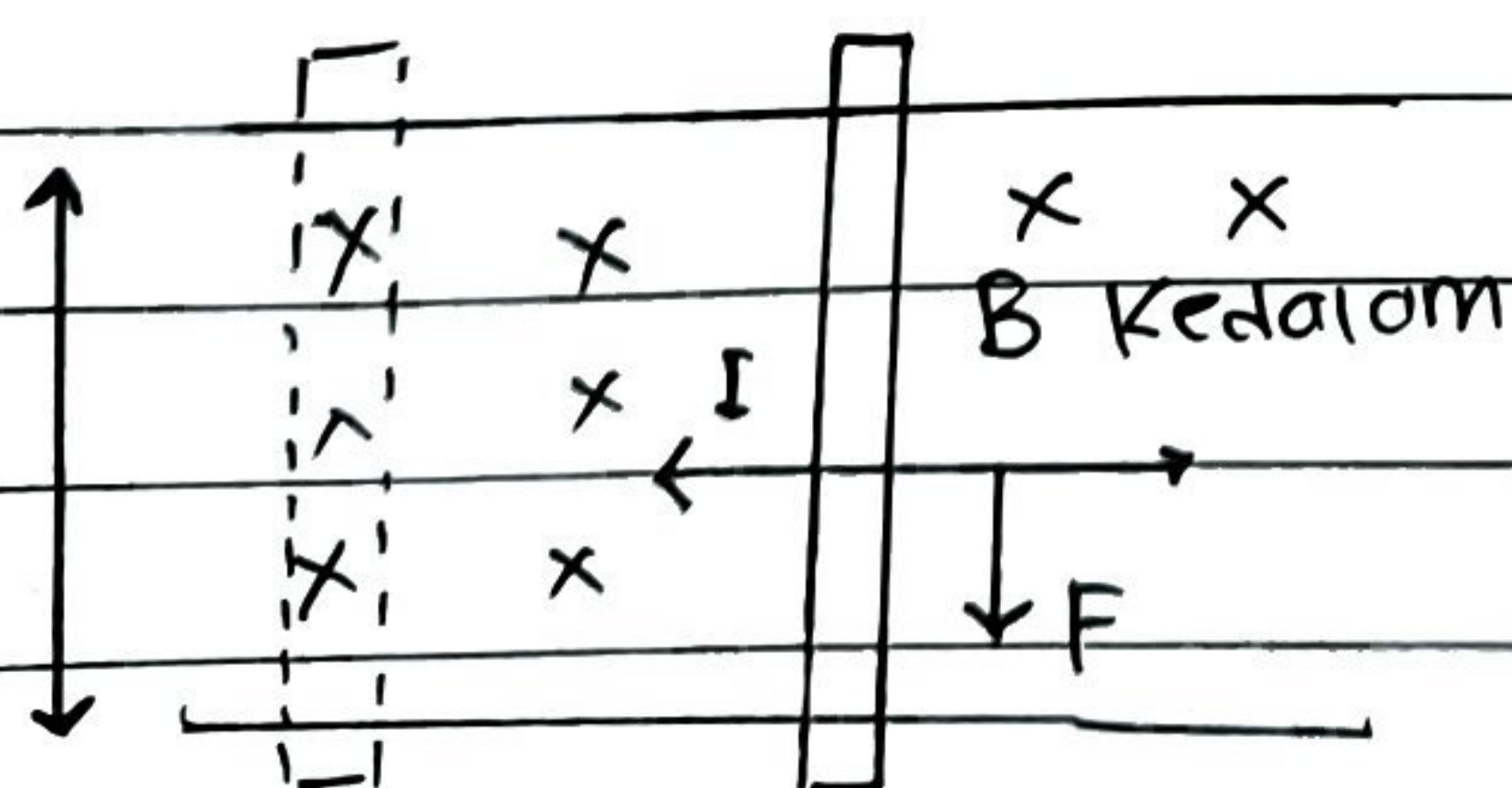
Maka nilai arus di setiap hambatan adalah.

$$I_1 = -0.5 \text{ A}$$

$$I_2 = -0.5 \text{ A}$$

$$I_3 = -1 \text{ A}$$

2.)



(arah arus ke kiri atau berlawanan dengan arah gerakan batang konduktor (v)).

Diketahui : $B = 20 \text{ Tesla}$

$$l = 15 \text{ m}$$

$$v = 10 \text{ m/s}$$

$$R = 10 \Omega$$

Malca, Tegangan yang diinduksi :

$$V = B \cdot l \cdot v$$
$$= 20 \text{ T} \cdot 15 \text{ m} \cdot 10 \text{ m/s}$$

$$V = 3000 \text{ Volt}$$

Besar arus

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

4.

