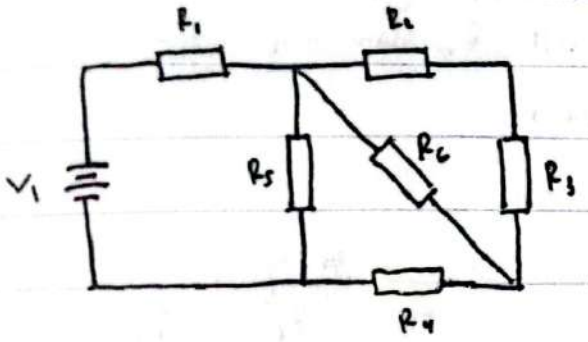
ek ①

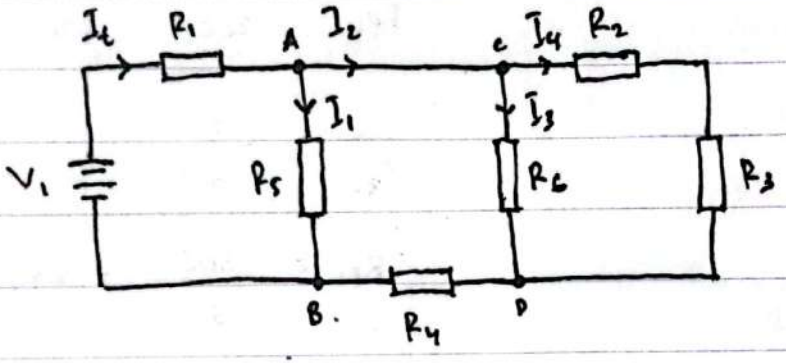


V_1 = 10 Volt

$R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = 100$ ohm

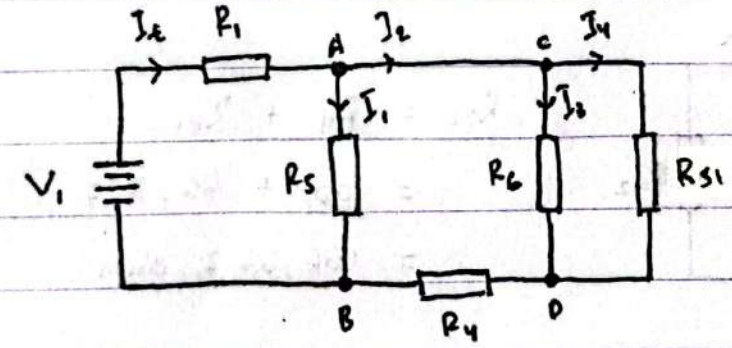
⇓ untuk memudahkan perhitungan, kita gambar ulang biar mudah dipahami

ek ②



⇓ hitung nilai seri dari R_2 dan R_3, sehingga rangkaian menjadi seperti di bawah :

ek ③

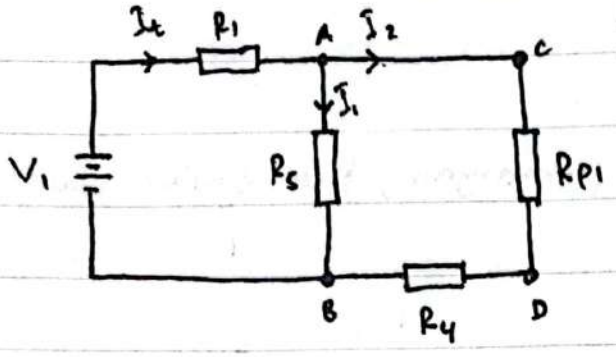


$R_{S1} = R_2 + R_3 = 100 + 100 = 200$ ohm

No.
Date :

⇓ hitung nilai resistor paralel R_6 dan R_{S1} sehingga rangkaian menjadi seperti di bawah :

ek (4)



$$\frac{1}{R_{P1}} = \frac{1}{R_6} + \frac{1}{R_{S1}}$$

$$\frac{1}{R_{P1}} = \frac{1}{100} + \frac{1}{200}$$

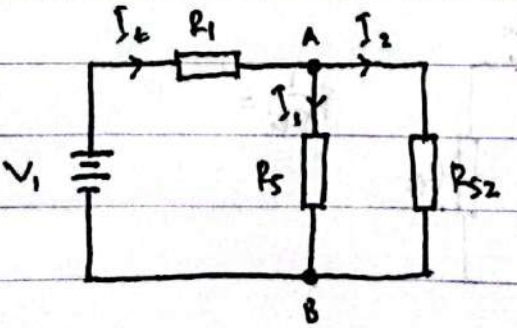
$$\frac{1}{R_{P1}} = \frac{2}{200} + \frac{1}{200}$$

$$\frac{1}{R_{P1}} = \frac{3}{200}$$

$$R_{P1} = \frac{200}{3} = 66,667 \text{ ohm}$$

⇓ hitung nilai resistor seri R_4 dan R_{P1} sehingga rangkaian menjadi seperti di bawah :

ek (5)

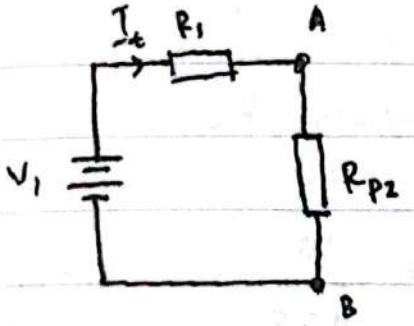


$$R_{S2} = R_4 + R_{P1}$$
$$= 100 + 66,667$$
$$= 166,667 \text{ ohm}.$$

No.

Date :

⇓ hitung nilai paralel R_3 dan R_{S2} sehingga rangkaian menjadi seperti dibawah :



$$\frac{1}{R_{P2}} = \frac{1}{R_3} + \frac{1}{R_{S2}}$$

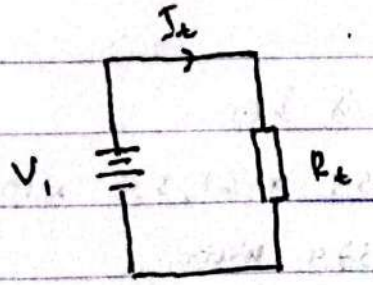
$$\frac{1}{R_{P2}} = \frac{1}{100} + \frac{1}{166,667}$$

$$\frac{1}{R_{P2}} = \frac{166,667}{16666,7} + \frac{100}{16666,7}$$

$$\frac{1}{R_{P2}} = \frac{266,667}{16666,7}$$

$$R_{P2} = \frac{16666,7}{266,667} = 62,500 \text{ ohm}$$

⇓ hitung nilai Resistor seri R_1 dan R_{P2} sehingga rangkaian menjadi seperti dibawah.



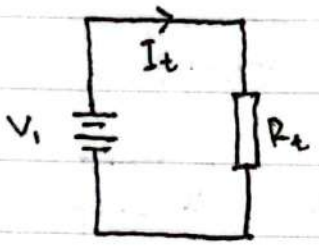
$$R_t = R_1 + R_{P2}$$
$$= 100 + 62,500$$
$$= 162,500 \text{ ohm}$$

No.

Date :

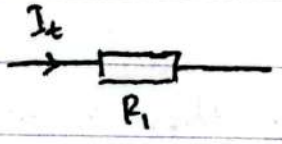
* Setelah mendapatkan masing-masing rangkaian ekuivalen (1-7) selanjutnya kita hitung nilai arus, tegangan dan daya nya.

⇒ menghitung I total dengan menggunakan R_t



$$I_t = \frac{V_1}{R_t} = \frac{10}{162,5} = 0,062 \text{ A} \approx 61,538 \text{ mA}$$

⇒ Dari rangkaian ekuivalen No.2 kita selesaikan nilai pada R_1 dengan nilai $I_t = 61,538$ mA



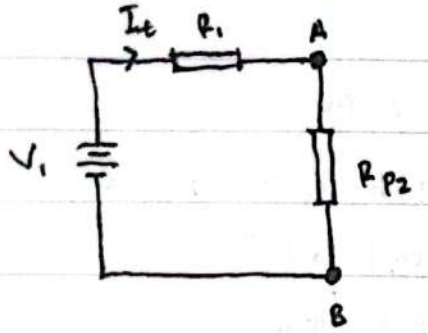
$$V_{R_1} = I_t \times R_1$$
$$= 61,538 \times 10^{-3} \times 100$$
$$= 61,538 \times 10^{-1}$$
$$= 6,154 \text{ Volt}$$

$$I_{R_1} = I_t$$
$$= 61,538 \text{ mA}$$

$$P_{R_1} = V_{R_1} \times I_{R_1}$$
$$= 6,154 \times 61,538 \times 10^{-3}$$
$$= 0,379 \text{ watt}$$

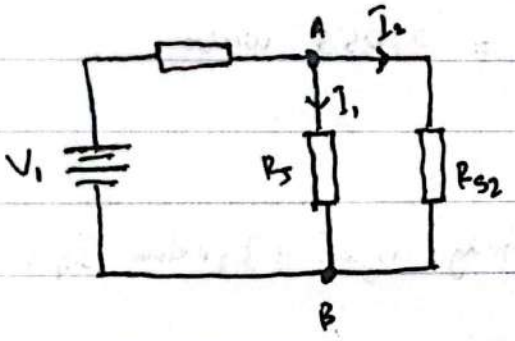
No.
Date :

⇒ Dari rangkaian ekuivalen No.6, kita hitung tegangan di titik A - B



$$V_{AB} = I_t \times R_{P2}$$
$$= 61,538 \times 10^{-3} \times 62,5$$
$$= 3,846 \text{ Volt}$$

⇒ Dari rangkaian ekuivalen No.5 kita hitung nilai I_1 dan I_2



$$I_1 = \frac{V_{AB}}{R_5} = \frac{3,846}{100} = 0,038 \text{ A} \approx 38,460 \text{ mA}$$

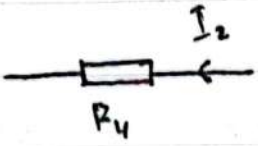
$$I_2 = \frac{V_{AB}}{R_{S2}} = \frac{3,846}{166,667} = 0,023 \text{ A} \approx 23,076 \text{ mA}$$

⇒ hitung nilai - nilai R_5

$$V_{R5} = V_{AB} = 3,846 \text{ Volt}$$
$$I_{R5} = I_1 = 38,460 \text{ mA}$$
$$P_{R5} = V_{R5} \times I_{R5} = 3,846 \times 38,460 \times 10^{-3}$$
$$= 0,148 \text{ watt}$$

No.
Date :

⇒ Dari rangkaian ekvivalen No. 4 hitung nilai - nilai pada R_4 menggunakan I_2



$V_{R4} = I_2 \times R_4$

$= 23,076 \times 10^{-3} \times 100$

$= 23,076 \times 10^{-1}$

$= 2,308$ Volt

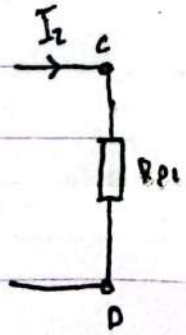
$I_{R4} = I_2 = 23,076$ mA

$P_{R4} = V_{R4} \times I_{R4}$

$= 2,308 \times 23,076 \times 10^{-3}$

$= 0,053$ watt

⇒ Hitung tegangan pada titik C - D dengan menggunakan rangkaian ekvivalen No. 4

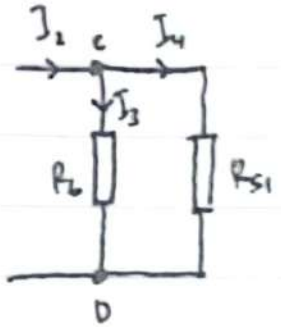


$V_{CD} = I_2 \times R_{P1}$

$= 23,076 \times 10^{-3} \times 66,667$

$= 1,538$ Volt

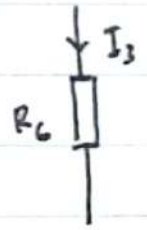
=> Dengan menggunakan rangkaian etrivalen No. 3 kita hitung I_1 dan I_2



$$I_3 = \frac{V_{CD}}{R_6} = \frac{1,538}{100} = 0,015 \text{ A} \approx 15,380 \text{ mA}$$

$$I_4 = \frac{V_{CD}}{R_{S1}} = \frac{1,538}{200} = 0,008 \text{ A} \approx 7,690 \text{ mA}$$

=> Hitung nilai-nilai pada R_6



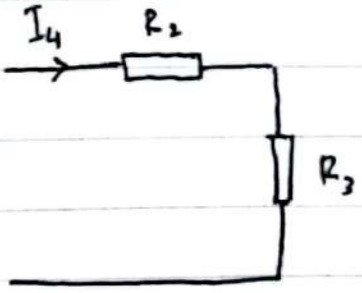
$V_{R6} = V_{CD} = 1,538$ Volt

$I_{R6} = I_3 = 15,380$ mA

$P_{R6} = V_{R6} \times I_{R6} = 1,538 \times 15,380 \times 10^{-3}$

$= 0,024$ Watt

=> Hitung nilai-nilai pada R_2 dan R_3



$V_{R2} = I_4 \times R_2$

$= 7,69 \times 10^{-3} \times 100$

$= 7,69 \times 10^{-1}$

$= 0,769$ Volt

$I_{R2} = I_4 = 7,69$ mA

$P_{R2} = V_{R2} \times I_{R2} = 0,76g \times 7,6g \times 10^{-3}$

$= 0,006$ watt

$V_{R3} = I_4 \times R_3$

$= 7,6g \times 10^{-3} \times 100$

$= 7,6g \times 10^{-1}$

$= 0,76g$ Volt

$I_{R3} = I_4 = 7,6g$ mA

$P_{R3} = V_{R3} \times I_{R3}$

$= 0,76g \times 7,6g \times 10^{-3}$

$= 0,006$ watt .