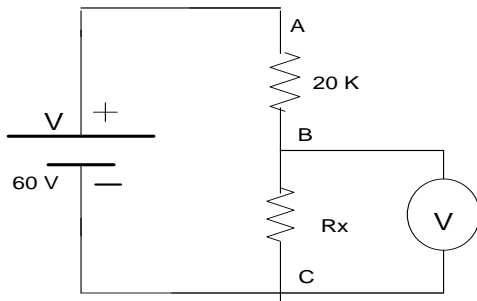


SOLUSI BAGIAN B (SOAL ESSAY)

No.1



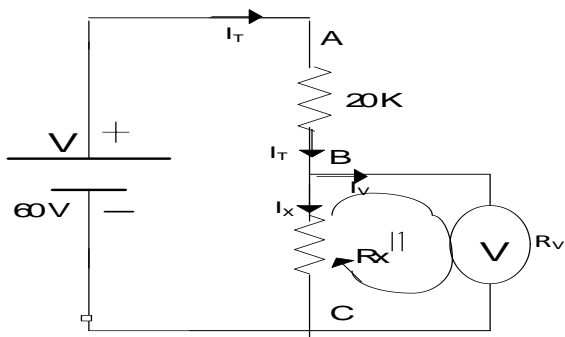
$$a.) V_{AB} = 60 \text{ V} - 20 \text{ V} = 40 \text{ V} \rightarrow I_{AB} = \frac{V_{AB}}{R} = \frac{40 \text{ V}}{20 \text{ K}} = 2 \text{ mA}$$

$$V_{BC} = I_{AB} (R_x // R_V)$$

$$20 \text{ V} = 2 \text{ mA} \left(\frac{R_x \times R_V}{R_x + R_V} \right)$$

$$20 \text{ V} = 2 \text{ mA} \left(\frac{R_x \times 20 \text{ K}}{R_x + 20 \text{ K}} \right) \rightarrow R_x = 1.5 \text{ K}$$

b.) Daya pada $R_x \rightarrow P$



$$I_T = \frac{V}{R + (R_X // R_V)} = \frac{60 \text{ V}}{1,5 \text{ K} + \frac{6}{7} \text{ K}} = \frac{60 \text{ V}}{2,4 \text{ K}} = 25 \text{ mA}$$

Sedangkan pada loop II $\sum \epsilon = \sum I R$ dan $I_T = I_X + I_V$

$$0 = I_X R_X - I_V R_V$$

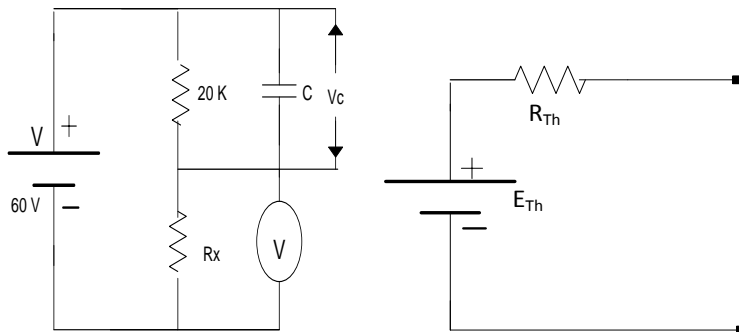
$$1,5 \text{ K } I_X = 20 \text{ K } I_V$$

$$I_V = 0,08 I_X$$

$$I_X = I_T - I_V = 25 \text{ mA} - 0,08 I_X$$

$$I_X = 23 \text{ mA} \text{ jadi daya pada } R_X, \quad P = I_X^2 R_X = 793,5 \text{ Watt}$$

. C).



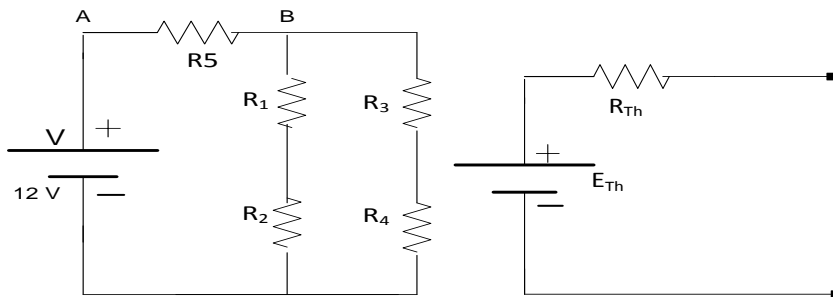
$$R_{Th} = R // R_X = 20 \text{ K} // 1,5 \text{ K} = 1,4 \text{ K}$$

$$V_C = V_{AB} (1 - e^{-t/R_{Th} C})$$

$$V_C = 56 \text{ V} (1 - e^{-2/(1,4 \text{ K} \cdot 0,0001 \text{ F})})$$

$$V_C = 56 \text{ V}$$

NO 2.



a.) Dengan $R_5 = 4 \text{ K}$, $R_1 = 3 \text{ K}$, $R_2 = 2 \text{ K}$ dan $R_3 = R_4 = 10 \text{ K}$

Maka $R_{Th} = (R_5 // ((R_1 + R_2) // (R_3 + R_4))) = 2 \text{ K}$

$R_X = R_1 + R_2 = 5 \text{ K}$ dan $R_Y = R_3 + R_4 = 20 \text{ K}$

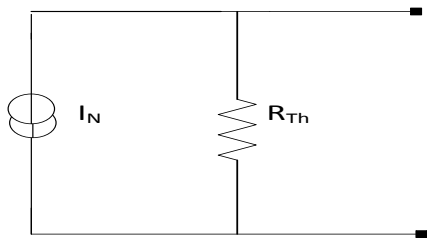
$$I_T = \frac{12 \text{ V}}{4 \text{ K} + (R_X \text{ Paralel } R_Y)} = 1,6 \text{ mA}$$

$$E_{Th} = I_T \times R_5 = 6,4$$

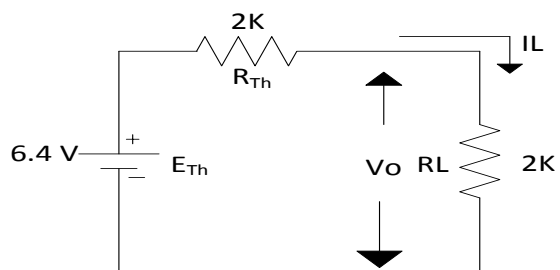
2b)

$$I_N = \frac{E_{Th}}{R_{Th}} = 3,1 \text{ mA}$$

Rangkaian pengganti Norton sbb:



2c.)



$$R_{Th} = 2K \text{ dan } R_L = 2K \text{ maka } I_L = \frac{6,4 V}{2K + 2K} = 1,68 \text{ mA}$$

NO3. Transformator ideal ($P_1 = P_2$)

a.)

$$E_1 = N_1 \frac{d\phi}{dt} \text{ dan } E_2 = N_2 \frac{d\phi}{dt}$$

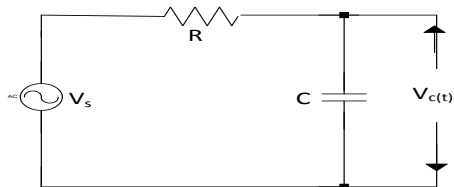
$$E_2 = \frac{N_2}{N_1} E_1 \text{ atau } E_2 = n E_1$$

Diketahui $V_p = 110 \text{ V}$, $V_s = 10 \text{ V}$, $R_s = 5 \text{ K}$ dan $N_1 = 200$ maka

$$N_2 = 18,8 \text{ dan } I_s = \frac{V_s}{R_s} = 2 \text{ mA}$$

b.) Daya pada bagian sekunderr, $P_s = I_p^2 R_s = 20 \text{ V}$

NO 4),



Diketahui $R = 4K$, $X_c = 3K$, $V_s = 12V$, $\phi_s = 0$ dan $f = 1KHz$

a.) $Z = |Z| e^{\phi_z}$

$$Z = R - j X_c = 4K - j 3K \text{ maka } |Z| = 5K$$

$$\phi_z = \tan^{-1} \left(\frac{-3}{4} \right) = -36,86^\circ$$

$$Z = |5| e^{-36,86}$$

b) Kuat arus dan beda potensial yang terbaca pada alat ukur

$$I = V_s / |z| = 2,4 \text{ mA} \quad \text{dan} \quad V = I \times X_c = 7,2 \text{ V.}$$

c) Fungsi $I(t)$ dan fungsi $V(t)$ pada kapasitor

$$I(t) = I \sqrt{2} \cos(\omega t + \phi_i) \quad \text{dengan} \quad I = \frac{|V| e^{\phi_s}}{|Z| e^{\phi_z}}$$

$$I = |2,4| e^{+36,86} \quad \text{jadi} \quad I(t) = 2,4 \sqrt{2} \cos(\omega t + 36,86) \text{ (mA)}$$

$$X_c = |X_c| e^{-90} = |3| e^{-90} \quad \text{dan} \quad I = |2,4| e^{+36,86}$$

$$V_c = I \times X_c = (|2,4| e^{+36,86}) \times (|3| e^{-90}) = (|7,2| e^{-53,14})$$

$$V_c(t) = 7,2 \sqrt{2} \cos(\omega t - 53,14) \text{ (Volt)}$$

SOLUSI BAGIAN A

1. NTC (Negatif Temperatur Coefisien)
2. Tegangan thevenin
3. Arus , beda potensial dan hambatan listrik
4. Rangkaian RC, dan Rangkaian Pendifferensial
5. Oscilloskop
6. Reaktansi kapasitif
7. Watt dan Ampere
8. Lebih besar
9. Kuning, Ungu, Hitam, Emas (47×10^0) Ohm , Emas toleransi 10 %,($R = R \pm 10\%$)
- 10 $V_{AC} = \frac{V_m}{\sqrt{2}} = 2 \times 0,707 = 1.414 \text{ Volt}$ dengan $V_m = 2 \text{ Volt} = \frac{1}{2}$ dari V_{pp} (Diketahui)