Barış Ayyıldız
1901041252
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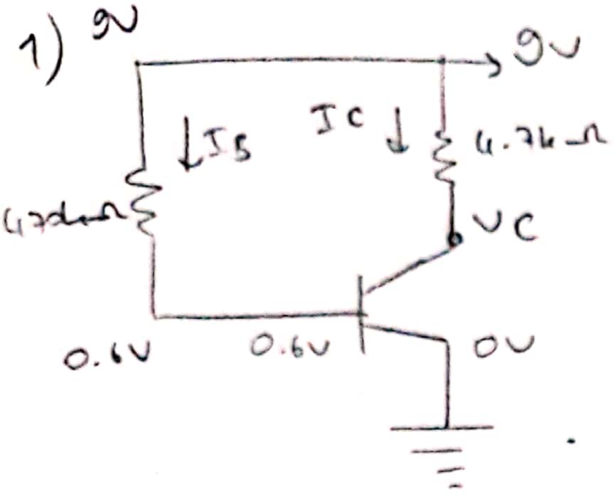
1)



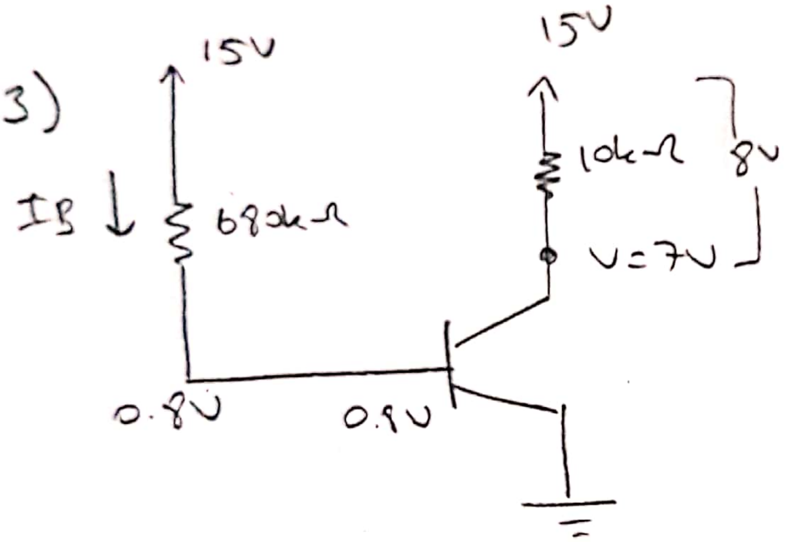
$I_B = \frac{9-0.6}{470} = 0.017mA$

$I_C = \beta \cdot I_B = 0.893mA$

$V_C = 9-(0.893) \cdot 4.7 = 4.8V$

$V_{CE} = 4.8 - 0 = 4.8V$

3)

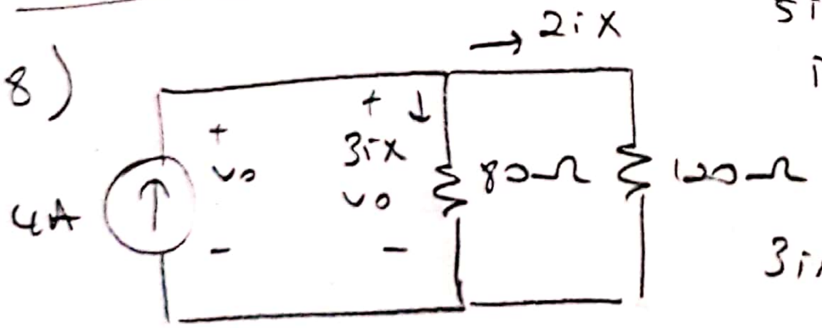


$I_C = \frac{8}{10} = 0.8mA$

$I_B = \frac{15-0.8}{680} = 0.021mA$

$\beta = \frac{I_C}{I_B} = 38.3$

8)



$5i_x = 4A$

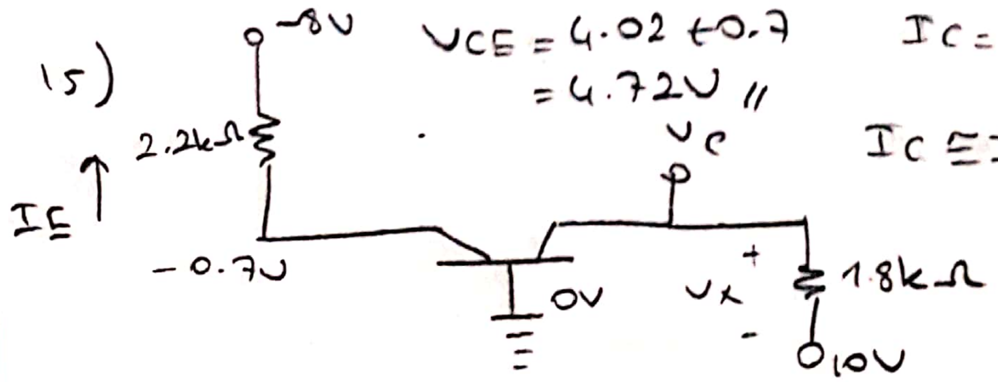
$i_x = \frac{4A}{5}$

$3i_x = \frac{12A}{5}$

$V_o = \frac{12A}{5} \cdot 80\Omega$

$V_O = 192V$

15)



$V_{CE} = 4.02 + 0.7$
$= 4.72V$

$I_C = \frac{7.3}{2.2} = 3.32mA$

$I_C \cong I_E = 3.32mA$

$V_x = 3.32 \times 1.8$

$V_x = 5.98V$

$V_C = 10 - 5.98$

$V_C = 4.02V$

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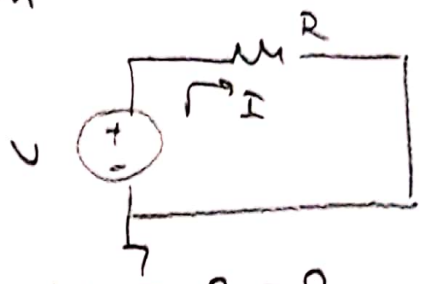
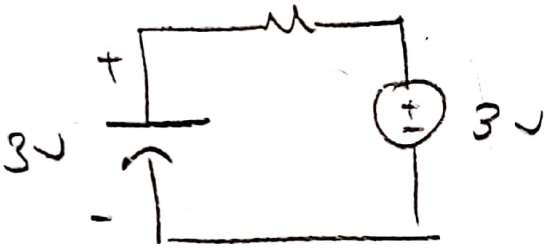
21) By the Kirchoff's Voltage Law (KVL) sum of the voltages in a circuit is zero $\sum_{i=0}^{n} V_i = 0$



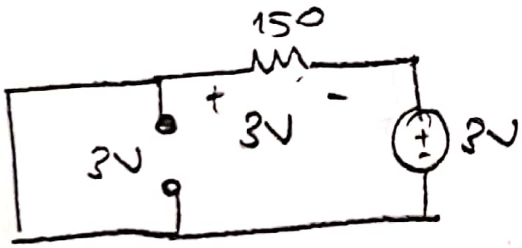
$V - I \cdot R = 0$

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

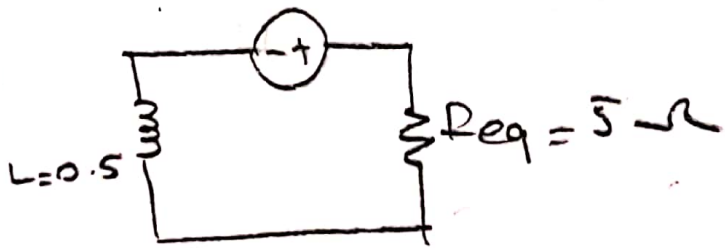
13) After many time, capacitor stores all the voltage It acts like an open circuit



14) At steady stage $t<0$. $V_{150\Omega} = 3V$



9) $\tau = \frac{L}{R}$ for $t>0$



$\tau = \frac{0.5}{5} = 0.1\,s = 100\,ms$

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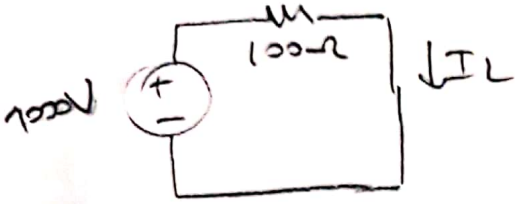
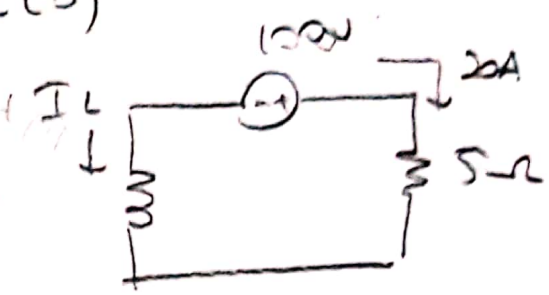
10) for $t<0$, steady stage



$I_L = 10\,A \rightarrow i(0)$

$i(0) = 10\,A$

$i(\infty) = -20A$



$$i(t) = \left(-20 + 30e^{-t/\tau}\right) A$$

$i(0) = 10A$, $i(\infty) = -20\,A$

18) $\alpha = \frac{R}{2L}$, $\omega_0 = \sqrt{\frac{1}{LC}}$ $\alpha = \omega_0$ (Critically damped)

$$\frac{R}{2.125\times10^{-3}} = \sqrt{\frac{1}{125\times10^{-3}.0.32\times10^{-6}}}$$

$$\frac{R.10^3}{250} = \sqrt{\frac{10^8}{40}} = \frac{10^4}{2}$$

$$\frac{R.10^3}{250} = 5000 \Rightarrow 4R = 5000$$

$$R = 1250\,\Omega$$

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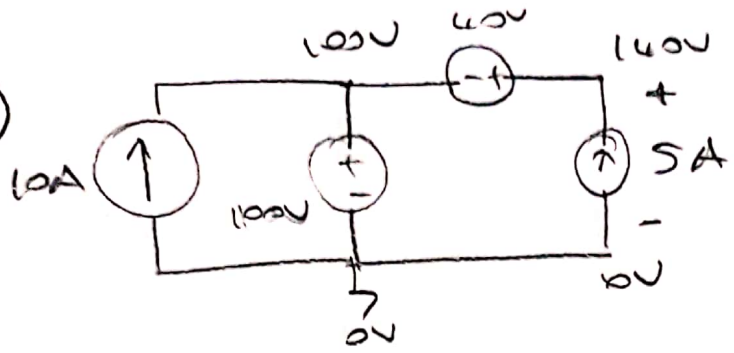
20)

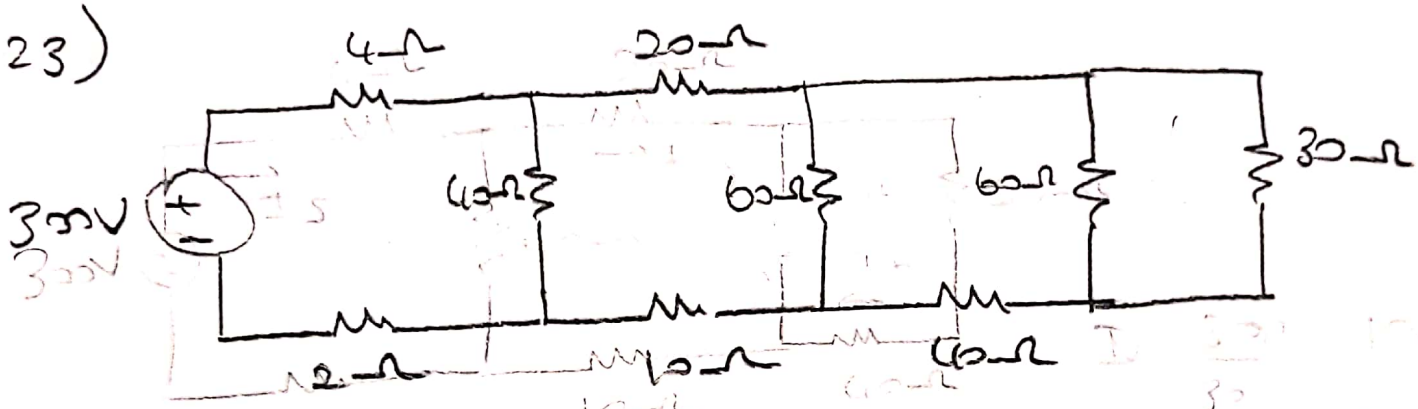


$P = IV$

$P = -5 \cdot 140$

$P = -700\,W$

23)



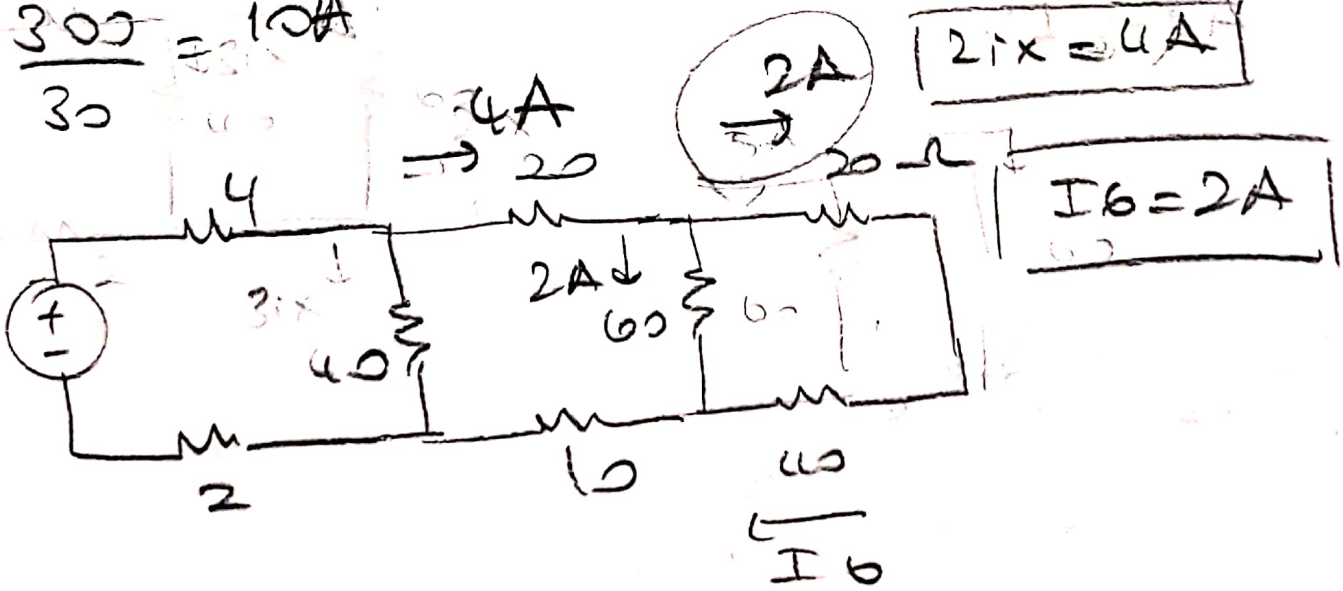
$R_{eq} = \{[(60 \| 30 + 40) \| 60 + 30] \| 40 + 6 = 30\,\Omega$

$I = \frac{300}{30} = 10A$

$5I_x = 10A$

$2i_x = 4A$

$I_6 = 2A$



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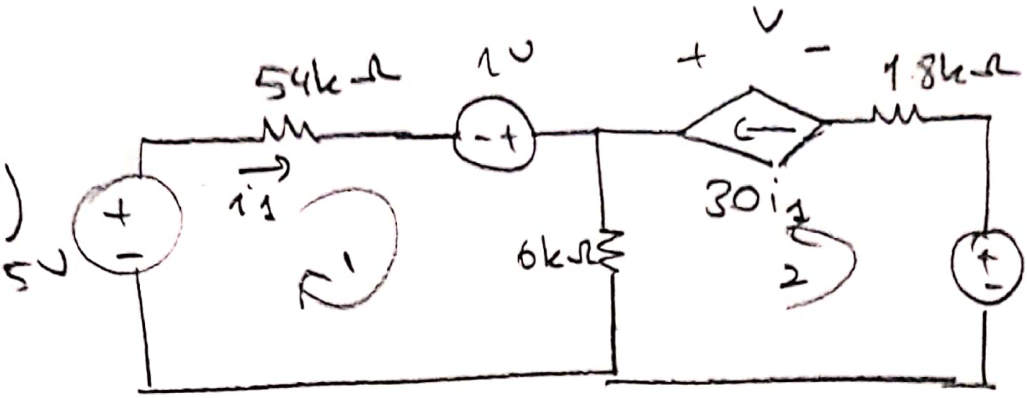
17)



30i = 0.75 A

loop 1

$5 - 54i_1 + 1 - 31i_1 \cdot 6 = 0$

$6 = 240 i_1$

$i_1 = 0.025\ A$

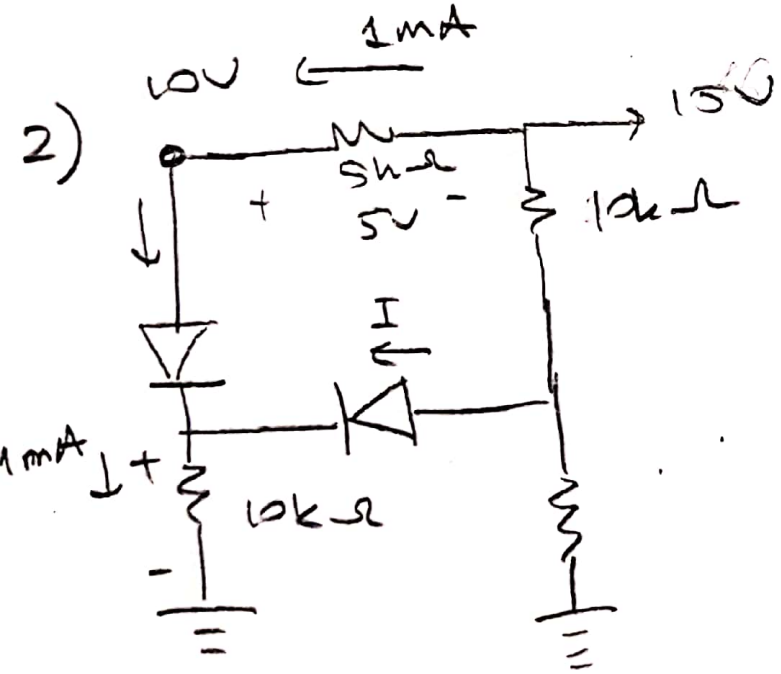
loop 2

$8 - (1.8)(0.75) + V - (31 i_1) \cdot 6 = 0$

$\Rightarrow 6.65 + V - 4.65 = 0$

$V = -2V$

2)



$I = 0\ A$

$\downarrow$

$D_2 = OFF$

$D_1 = ON$ (1mA goes through)

$V = 15 - 5k\Omega \cdot 1mA$

$V = 10V$

19) $\dfrac{V_1 - V_2}{R_1 + R_0} + \dfrac{V_1}{R_2} + \dfrac{V_1 - V_2}{R_3} = 0$