Documento Personal de Identificación – **DPI**

UNIVERSIDAD DE SAN CARLOS
FACULTAD DE INGENIERIA
DEPARTAMENTO DE FISICIA
CURSO DE VACACIONES DICIEMBRE 2023

Firma:

Carné: 201709088 Curso: Física 2 Sección: C

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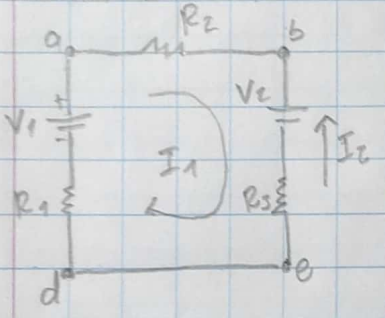
----------Puede iniciar su examen a partir de aquí ----------

Pregunta 1

$R_1 = 50.0\,\Omega$ $R_3 = 30.0\,\Omega$ $R_5 = 40.0\,\Omega$ $V_2 = 75.0\,V$

$R_2 = 20.0\,\Omega$ $R_4 = 25.0\,\Omega$ $V_1 = 60.0\,V$ $V_3 = 140.0\,V$

a) Malla 1



$-R_1I_1 + V_1 - R_2I_1 - V_2 - R_3I_1 + R_3I_2 = 0$

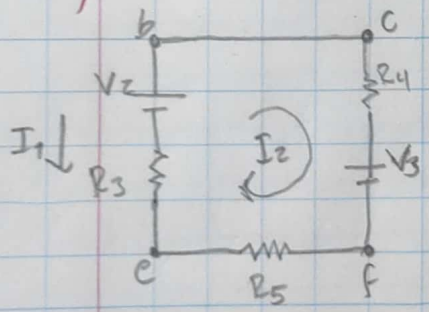
$V_1 - I_1(R_1 + R_2 + R_3) - V_2 + R_3I_2 = 0$

$I_1(R_1 + R_2 + R_3) = V_1 - V_2 + R_3I_2$

$I_1(50 + 20 + 30) = 60 - 75 + 30I_2$

$100I_1 = -15 + 30I_2$

b) Malla 2



$R_3I_1 + V_2 - R_4I_2 - V_3 - R_5I_2 = 0$

$R_3I_1 + V_2 - V_3 - I_2(R_4 + R_5) = 0$

$30I_1 + 75 - 140 - I_2(25 + 40) = 0$

$30I_1 + 35 - 65I_2 = 0$

$I_1 = \frac{30I_2 - 15}{100}$

$30\left(\frac{30I_2}{100} - \frac{15}{100}\right) - 65I_2 + 35 = 0$

$9I_2 - \frac{9}{2} - 65I_2 + 35 = 0$

$-56I_2 + 30.5 = 0$

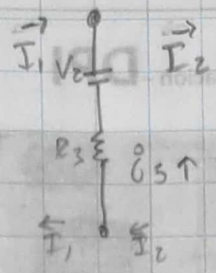
$I_2 = \frac{-30.5}{-56} = 0.5446\,A \cong 544.6\,mA$

$I_1 = 0.01338\,A$

$I_1 = 13.38\,mA$

$I_1 = 13.4\,mA$. **$I_2 = 544.6\,mA$.**

c) $I_{entra} = I_{sale}$



$i_3 - I_2 + I_1 = 0$

$i_3 = I_2 - I_1$

$i_3 = (544.6 \times 10^{-3}) - (13.4 \times 10^{-3})$

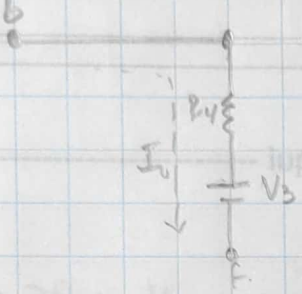
$i_3 = 0.5312\ A$

$P = R i_3^2 \Rightarrow P = (30)(0.5312)^2$

$P = 8.465\ W$

$P = 8.47\ W$

d)



$-V_b - R_4 I_2 - V_3 + V_f = 0$

$V_b - V_f = R_4 I_2 + V_3$

$V_{bf} = (25)(0.5446) + 40$

$V_{bf} = 53.6\ V$

$V_{bf} = 53.6\ V$

Pregunta 5:

$\mathcal{E} = 70\ V$ $\quad C = 2500\ \mu F$

$R = 80.0\ K\Omega$ $\quad t = 0\ s$