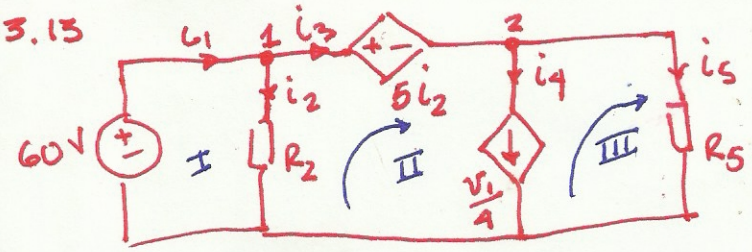
3.13



① Datos

$v_1 = 60V$

$R_2 = 20\,\Omega$

$v_3 = 5i_2$

$i_4 = \frac{v_1}{4}$

$R_5 = 5\,\Omega$

② $v_1 = v_2$ están conectados en paralelo

$\boxed{v_2 = 60V}$

③ $i_2 = \frac{v_2}{R_2}$

$\boxed{i_2 = \frac{60V}{20\,\Omega} = 3A}$

④ $v_3 = i_2 \cdot 5$ (Datos)

$\boxed{v_3 = (3)(5) = 15V}$

⑤ $i_4 = \frac{v_1}{4}$ (Datos)

$\boxed{i_4 = \frac{60V}{4} = 15A}$

⑥ Aplicar LKV para la Malla II

$-v_2 + v_3 + v_4 = 0$

$-60 + 15 = -v_4$

$-45V = -v_4$

$\boxed{v_4 = 45V}$

⑦ Aplicar LKV para la Malla III

$-v_4 + 5i_5 = 0$

$\boxed{i_5 = \frac{v_4}{5} = \frac{45V}{5\,\Omega} = 9A}$

⑧ Aplicar LKC en el nodo 2

$i_3 = i_4 + i_5$

$\boxed{i_3 = 15 + 9 = 24A}$

⑨ Aplicar LKC en el nodo 1

$i_1 = i_2 + i_3$

$\boxed{i_1 = 3 + 24 = 27A}$

⑩

$P_1 = (-27)(60) = -1620\,W$

$P_2 = i_2^2 R_2 = (3)^2(20) = 180\,W$

$P_3 = (i_3)^2 R_3 = i_3 v_3 = (24)(15) = 360\,W$

$P_4 = i_4 \cdot v_4 = (15)(45) = 675\,W$

$P_5 = i_5^2 R_5 = (9)^2(5) = 405\,W$

0 es la suma de todo.