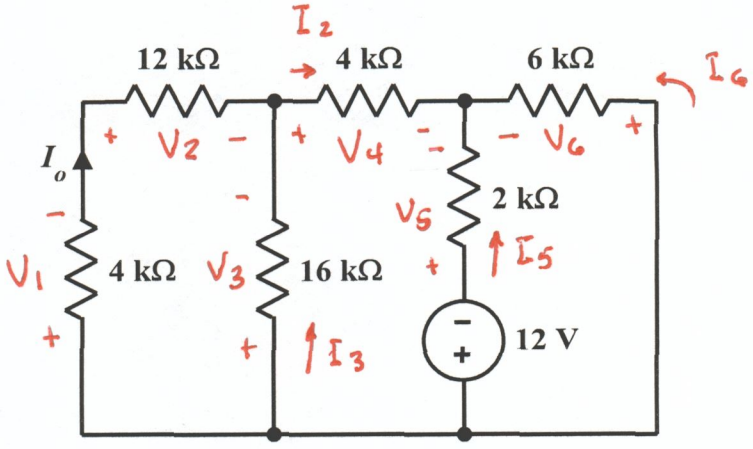
EE 2240

Problem #09

Determine the value of I_o.



$V_1 = (4k\Omega)\, I_o$

$V_2 = (12k\Omega)\, I_o$

$V_3 = V_1 + V_2 = 16000\, I_o$

$I_3 = \frac{V_3}{16k\Omega} = I_o$

$I_2 = I_o + I_3 = 2 I_o$

$V_4 = (4k\Omega)\, I_2 = 8000\, I_o$

$V_5 = -12 + V_3 + V_4 = -12 + 24000\, I_o$

$I_5 = \frac{V_5}{2k\Omega} = -6mA + 12 I_o$

$I_6 = -I_2 - I_5 = 6mA - 14 I_o$

$V_6 = (6k\Omega)\, I_6 = 36V - 84000\, I_o$

$V_6 - V_5 = 12V \Rightarrow 48 - 108000\, I_o = 12$

$I_o = \frac{48-12}{108000} = \frac{1}{3}\, mA$