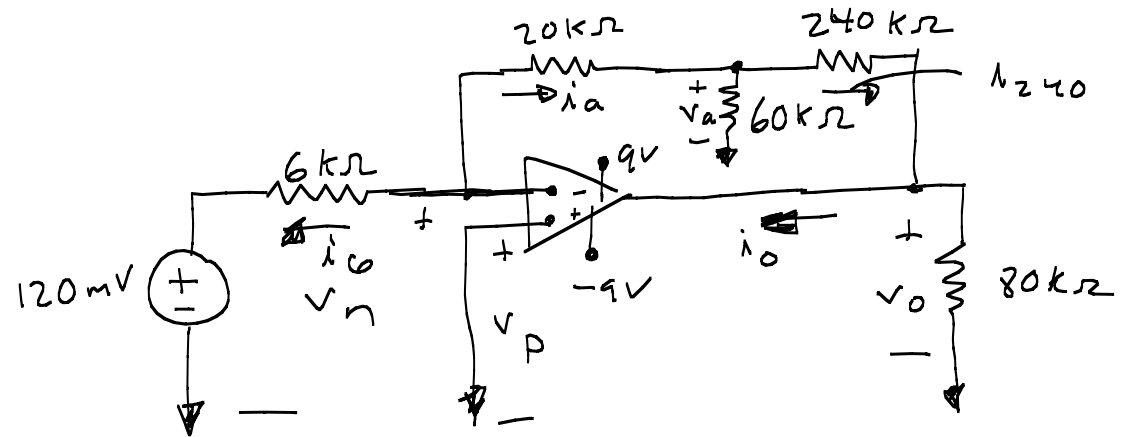


Problem 1

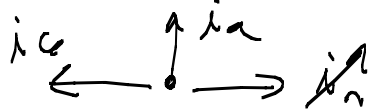
Determine v_o & i_o



$$v_p = 0, \quad v_n = v_p = 0 \quad i_n = i_p = 0$$

$$i_G = \frac{v_n - 120\text{mV}}{6\text{k}\Omega} = -20\mu\text{A}$$

KCL



$$i_G + i_a = 0$$

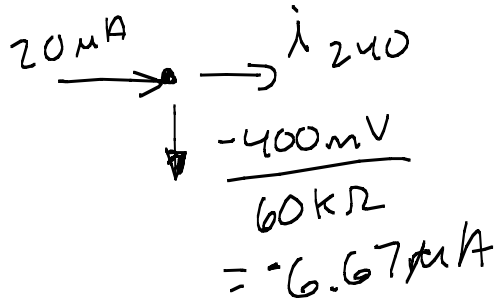
$$i_a = -i_G = 20\mu\text{A}$$

KVL

$$-v_n + (20\text{k}\Omega)(20\mu\text{A}) + v_a = 0$$

$$v_a = -400\text{mV}$$

KCL



$$-20 \mu A + (-6.67) + i_{240} = 0$$

$$\boxed{i_{240} = 26.67 \mu A}$$

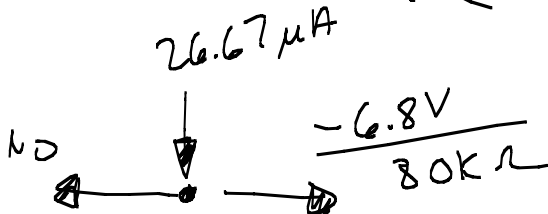
KVL

$$-V_o + (20 \mu A)(20 k\Omega) + (26.67 \mu A)(240 k\Omega) + V_o = 0$$

$$V_o = -6.8 V$$

$$-9V \leq V_o \leq 9V \quad \checkmark$$

$$\boxed{V_o = -6.8 V}$$



$$i_o - 26.67 + \left(-\frac{6.8}{80}\right) = 0$$

$$\boxed{i_o = 111.67 \mu A}$$