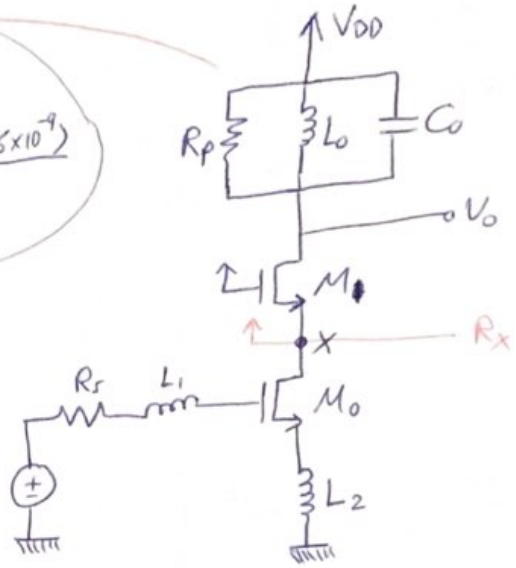
$$* R_p = R_s(1+Q_o^2)$$
$$= 8.4(1+(8.527)^2)$$
$$= 619.1617\ \Omega$$

$$Q_o = \frac{\omega_o L_o}{R_s} = \frac{(2\pi \times 1.9\times10^9)(6\times10^{-9})}{8.4} = 8.527$$

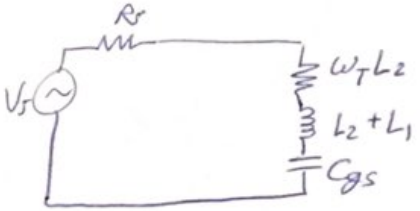


$$* R_x = \frac{1}{g_{m_2}} + \frac{R_p}{g_{m_2} r_{o_2}} \simeq \frac{1}{g_{m_2}}$$

$$\hookrightarrow A_{V_0} = -g_{m_0} R_x \simeq -\frac{g_{m_0}}{g_{m_1}}$$

$$\hookrightarrow A_{V_1} = \frac{V_o}{V_x} = g_{m_1} R_p$$

$$\therefore A_{V_{total}} = \frac{1}{2} Q_1 A_{V_0} A_{V_1} = \frac{1}{2} Q_1 g_{m_0} R_p$$



$$\Rightarrow Q_1 = \frac{\omega_o(L_1+L_2)}{R_s + \frac{g_{m_0}}{C_{gs}} L_2} = \frac{(2\pi\times1.9\times10^9)((10+1)\times10^{-9})}{50 + \left(\frac{28.42\times10^{-3}}{611.467\times10^{-15}} \times \blacksquare \times 10^{-9}\right)}$$

$$= 1.3611$$

$$\therefore A_{V_{total}} = \frac{1}{2}(1.3611)(28.42\times10^{-3})(619.1617)$$
$$= 11.975$$

$$\therefore A_{V_{total(dB)}} = 20\log(11.975) = \underline{21.566\ dB}$$

$$* Z_{in} = \omega_T L_2 = \frac{g_{m_0}}{C_{gs}} L_2$$
$$= 46.4784\ \Omega$$

$$* NF = 1 + \gamma g_m R_s \left(\frac{\omega_o}{\omega_T}\right)^2$$
$$= 1 + \left(1 \times 0.02842 \times 50 \times \left(\frac{2\pi\times1.9\times10^9}{\frac{0.02842}{611.467\times10^{-15}}}\right)^2\right)$$

$$= 1.093747$$

$$\therefore NF_{(dB)} = 0.38917\ dB$$