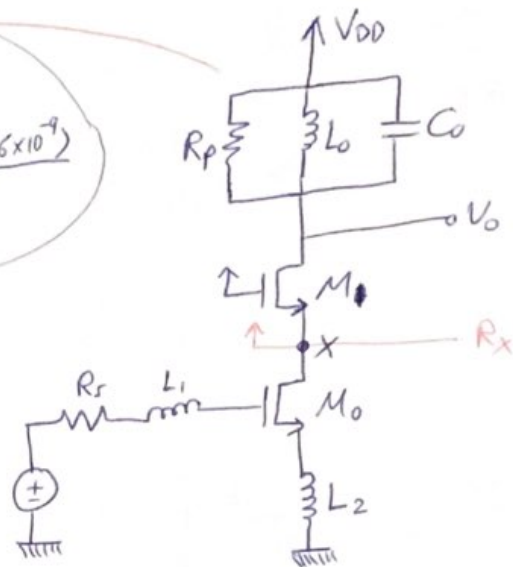


$$\begin{aligned}
 * R_p &= R_s (1 + Q_o^2) \\
 &= 8.4 (1 + (8.527)^2) \\
 &= 619.1617 \, \Omega
 \end{aligned}$$

$$\begin{aligned}
 Q_o &= \frac{\omega_o L_o}{R_s} \\
 &= \frac{(2\pi \times 1.9 \times 10^9)(6 \times 10^{-9})}{8.4} \\
 &= 8.527
 \end{aligned}$$



$$\begin{aligned}
 * R_x &= \frac{1}{g_{m2}} + \frac{R_p}{g_{m2} r_{o2}} \\
 &\approx \frac{1}{g_{m2}}
 \end{aligned}$$

$$\rightarrow A_{V_o} = -g_{m0} R_x \approx -\frac{g_{m0}}{g_{m1}}$$

$$\rightarrow A_{V_i} = \frac{V_o}{V_x} = g_{m1} R_p$$

$$\therefore A_{V_{total}} = \frac{1}{2} Q_i A_{V_o} A_{V_i} = \frac{1}{2} Q_i g_{m0} R_p$$

$$\begin{aligned}
 \Rightarrow Q_i &= \frac{\omega_o (L_1 + L_2)}{R_s + \frac{g_{m0}}{C_{gs}} L_2} = \frac{(2\pi \times 1.9 \times 10^9)((10+1) \times 10^{-9})}{50 + \left(\frac{28.42 \times 10^{-3}}{611.467 \times 10^{-15}} \times 1 \times 10^{-9} \right)} \\
 &= 1.3611
 \end{aligned}$$

$$\begin{aligned}
 \therefore A_{V_{total}} &= \frac{1}{2} (1.3611) (28.42 \times 10^{-3}) (619.1617) \\
 &= 11.975
 \end{aligned}$$

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



$$\begin{aligned}
 * Z_{in} &= \omega_T L_2 = \frac{g_{m0}}{C_{gs}} L_2 \\
 &= 46.4784 \, \Omega
 \end{aligned}$$

$$\begin{aligned}
 * NF &= 1 + \gamma g_m R_s \left(\frac{\omega_o}{\omega_T} \right)^2 \\
 &= 1 + \left(1 \times 0.02842 \times 50 \times \left(\frac{2\pi \times 1.9 \times 10^9}{\frac{0.02842}{611.467 \times 10^{-15}}} \right)^2 \right) \\
 &= 1.093747
 \end{aligned}$$

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