1. A receiver input stage is shown below. Calculate the maximum interfering signal voltage at $V_i$ for $IM_3 < 1\%$.

2. Calculate $IM_2$ and $IM_3$ in the circuit shown below, for two sinusoidal voltages of o-peak amplitude 300 mV each applied at $V_i$. Check with SPICE by simulating $HD_2$ and $HD_3$.

$$k' = 60 \mu A/V^2$$

$$V_t = 0.8 V$$

$$\frac{W}{L} = 10$$
3. A feedback amplifier is shown below.

\[ \beta_0 = 100 \]
\[ I_s = 10^{-16} A \]

a) Calculate the small-signal voltage gain of the circuit and the loop gain at \( f = 1 \text{MHz} \).

b) Calculate \( HD_2 \) in \( V_o \) for a 1V peak-peak sinusoidal output voltage at \( f = 1 \text{MHz} \), assuming \( Q_1 \) is the major source of distortion. Check with SPICE.