1) Consider a folded cascade amplifier (lecture slide MOA14).

Assume a load capacitance $C_L$. Assume all parasitic MOSFET capacitances can be lumped into a single capacitor $C_p$ at the drain of the input differential pair. Ignore all other capacitances.

a) Find expressions for the dominant pole $p_d$ and the non-dominant pole $p_{nd}$.

b) Assume this amplifier is being used in a feedback configuration with feedback factor $f$.

What is the constraint between the dominant pole $GBW$ and the non-dominant pole $p_{nd}$ to guarantee at least a 60º phase margin?

Express this constraint as a function of the small signal parameters of the devices and the two capacitors.

c) Find an expression for the closed loop transfer function as a function of $A_0$ (the low frequency open loop gain), $f$, $GBW$ and $p_{nd}$.

d) Using the expression for the closed loop transfer function and the constraint to guarantee 60º phase margin, find an expression for the time domain step response.