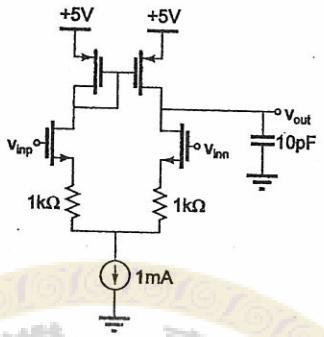
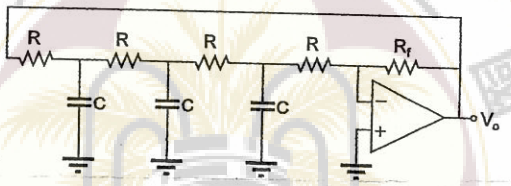
國立臺灣大學101學年度碩士班招生考試試題

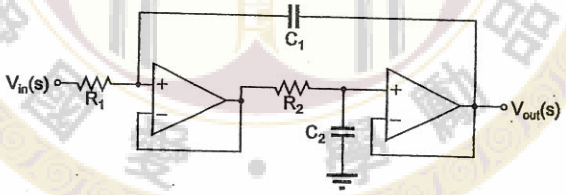
1. (30 分) Please find the unity-gain bandwidth for the following amplifier. [$\mu_n C_{ox}=100\mu A/V^2$, $\mu_p C_{ox}=50\mu A/V^2$, $V_{tn}= -V_{tp} =0.5V$, and $\lambda=0.05V^{-1}$. Please assume all transistors are biased correctly in the saturation region and all have ratios of 10/1.]



2. (25 分) Assume C=1nF, please find R and R_f such that an oscillation of 100kHz can be obtained.



3. (30 分) The following circuit is a second-order low-pass filter. (a) Please find the transfer function [$V_{out}(s)/V_{in}(s)$] in terms of R_1, R_2, C_1, C_2, and s. (b) Assume $C_1=C_2=100pF$, please find R_1 and R_2 such that the filter is a second-order butterworth low-pass filter with a 3-dB cutoff frequency of 1MHz.



4. (15 分) Please draw the CMOS realization of (A(B+CD))' without cascading logic gates and with only A, B, C, and D as inputs.

試題隨卷繳回