

ELEN 607 (ESS)
Spring 2006

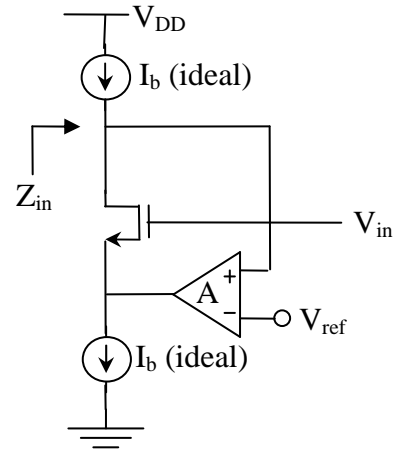
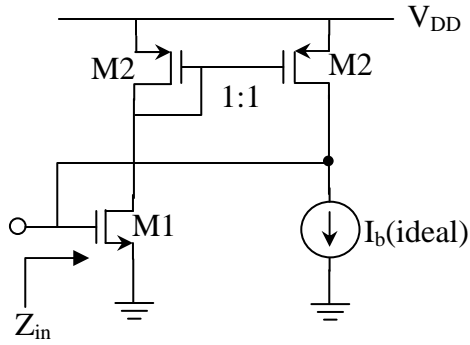
Name _____

EXAM #1

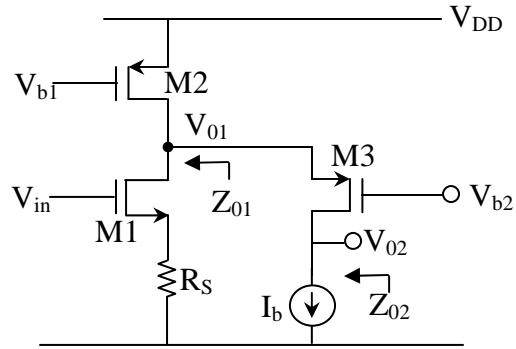
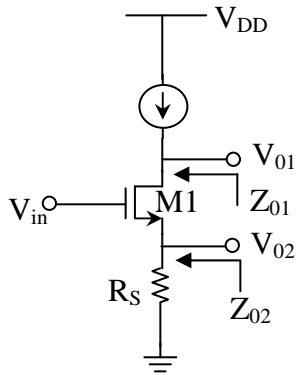
This is a closed book and notes exam. One information page is allowed for the exam.
This exam is worth 17% of your total grade.

Prob.	Maximum	Yours
1	4	
2	4	
3	5	
4	4	
Extra Credit	1	
Total	18	

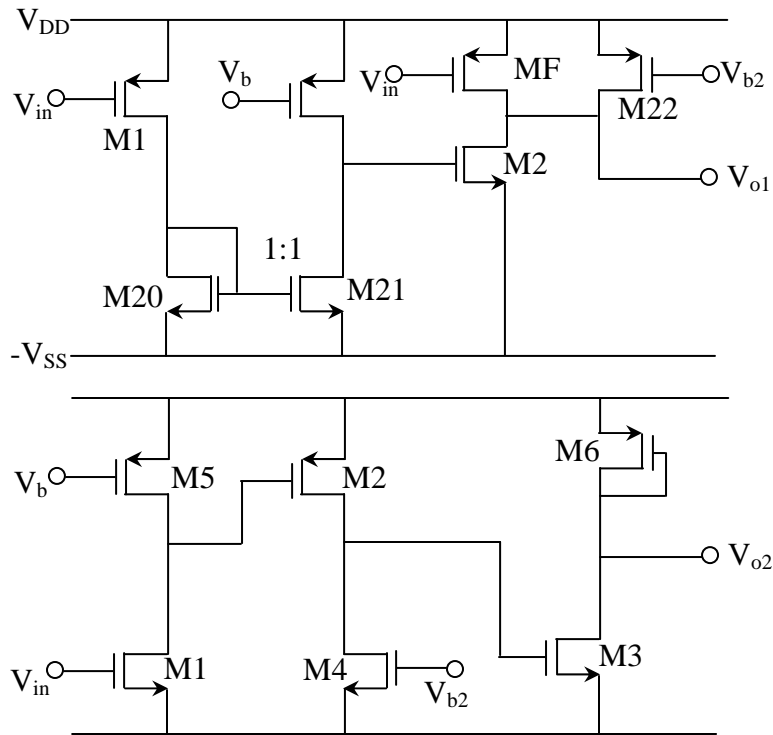
Prob. 1. Determine the low frequency input impedance of the following circuits. Comment where you could use them, provide examples.



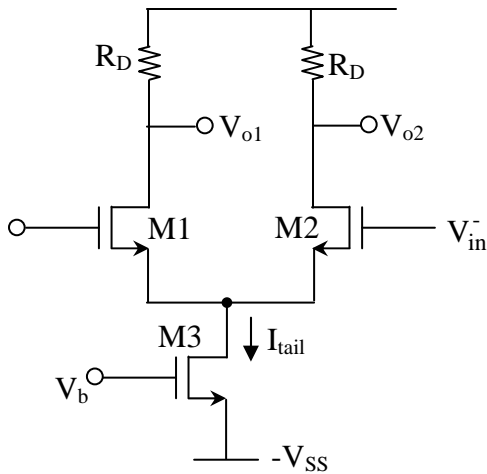
Prob. 2. Determine the effective transconductance, Z_{01} , Z_{02} and the corresponding voltage gains.



Prob. 3. Obtain the approximated voltage gain expressions of the circuits shown below.



Prob. 4. The input common-mode range of a differential amplifier is defined as the range of common-mode voltage V_{iC} over which the amplifier has a linear response to small differential input signals.



- (a) Obtain an expression of I_{tail} for $V_{o1,DC} = V_{o2,DC} = 0V$ as a function of V_{DD} and R_D .
- (b) Determine both the upper and lower limit of V_{iC} as a function of V_{DD} , V_{SS} , R_D , I_{tail} and V_{DSAT3}

EXTRA CREDIT. (1p) (No partial credit) The diode connected has an additional resistor R . Taking into account parasitic capacitances, determine the poles of the diode and the value of R that maximize the bandwidth.

