UNIVERSITY OF OSLO

Faculty of mathematics and natural sciences

Examination in	Inf 3410 — Analog Microelectronics
Day of examination:	15. December, 2009
Examination hours:	9.00 – 12.00
This problem set consists of 2 pages.	
Appendices:	none
Permitted aids:	All printed and written including calculator

Please make sure that your copy of the problem set is complete before you attempt to answer anything.

For all questions clearly state you assumptions. You may assume all transistors to have similar electrical properties.

All questions are weighted with an explicitly marked percentage.

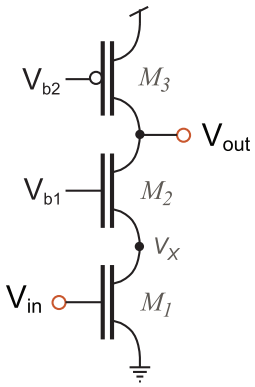

Figure 1: Amplifier 1.

The amplifier in figure 1 is a combination of three transistors aiming at improved performance.

Problem 1 (5%)

What is the complete stage in figure 1 called? What is the functional behavior of the circuit?

Problem 2 (10%)

Explain how the circuit in figure 1 works and identify the configuration of each of the transistors.

(Continued on page 2.)

Problem 3 (20%)

Determine the small signal voltage gain of the circuit in figure 1. Take the body effect into account.

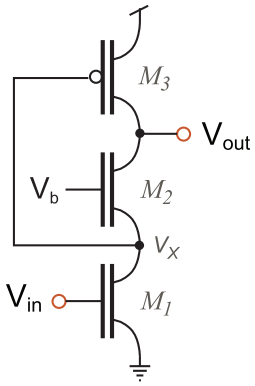

Figure 2: Amplifier 2.

Problem 4 (25%)

Determine the small signal voltage gain of the circuit in figure 2. Take the body effect into account.

Problem 5 (10%)

By comparing the voltage gain expressions, determine which of the two amplifiers has the highest gain.

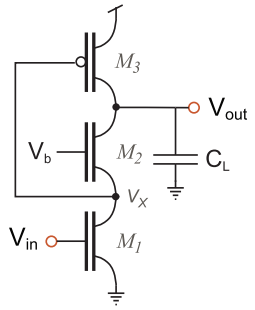

Figure 3: Amplifier 2 with load capacitor.

Problem 6 (30%)

Determine the frequency dependant transfer function, $H(s)$, of the amplifier in figure 3. For simplicity we ignore all capacitances except for the output load capacitance.