

Open book and closed notes.

Show your work for credit and place a box around each of your answers.

1. What is the DC value of  $V_{out}$ ? Estimate the range of the output swing assuming all transistors remain in the saturation region. Estimate the low-frequency gain circuit,  $V_{out}/V_s$ . Estimate the low-frequency gain from  $V_s$  to the drain of M1. (5 points)

