

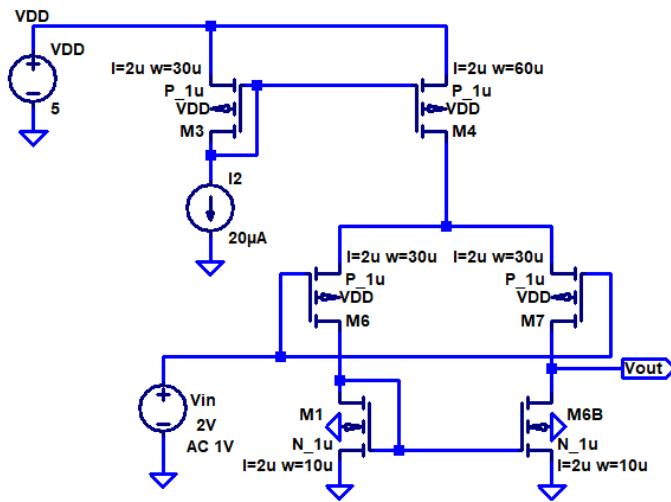
Final Exam – EE 420 Engineering Electronics II and ECG 620 Analog IC Design
Spring 2019 – University of Nevada, Las Vegas

NAME: _____

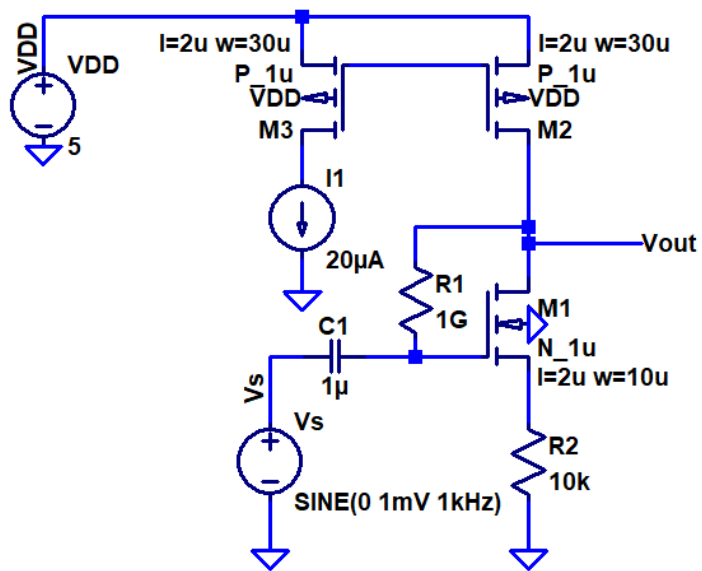
Open book and closed notes. No extra paper, do your work on this exam, use the back if needed. **Show your work for credit and be neat! Place a box around each of your answers.** Unless otherwise indicated use the book's 1 μm process with $V_{DD} = 5\text{V}$.

1. Show how to determine V_{REF} (a symbolic equation) for the BGR in Fig. 23.29a of the book. Make sure your assumptions and derivation are very clear. (15 points)

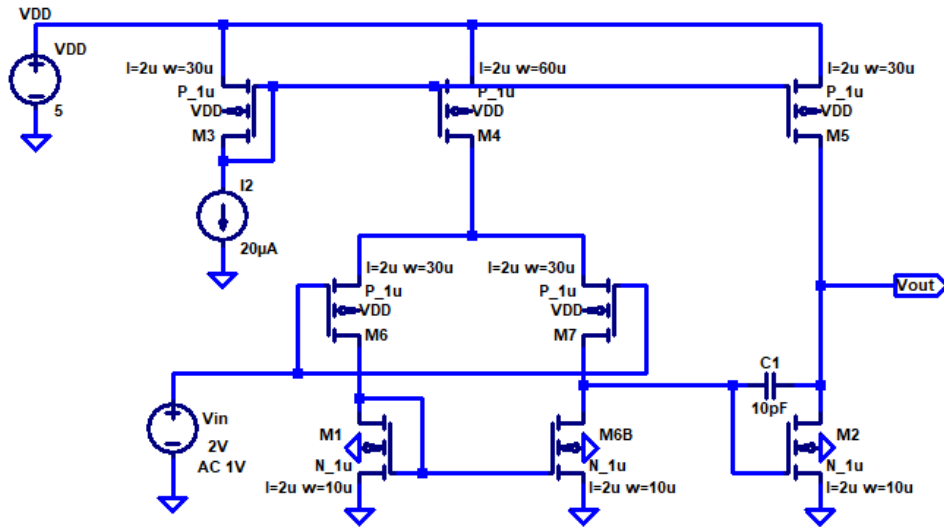
2. Find the AC output voltage in the following circuit (a number). Show your work for credit and state all assumptions. (15 points)



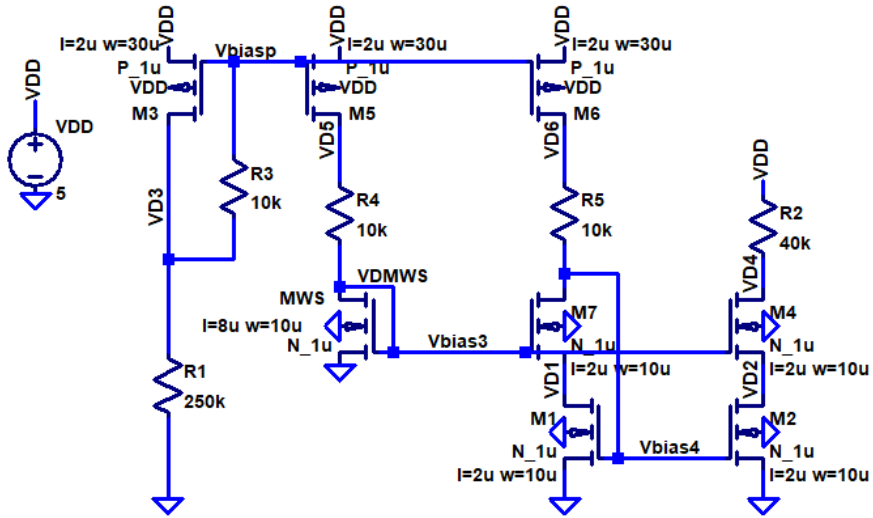
3. Estimate the AC current through R2 and the AC output voltage in the circuit seen below. (15 points)



4. Estimate the location of the dominant pole in the following circuit (a number). As always show your work for credit. (20 points)



5. Find all of the voltages and currents in the following circuit. (15 points)



6. Sketch the schematic of your course project. List the DC voltages in your design when V_{DD} is 2V and the input common-mode voltage is 1V. Show how you calculated the output swing, input CMR, and small-signal gain. Where do you think your design could be improved? (20 points)

