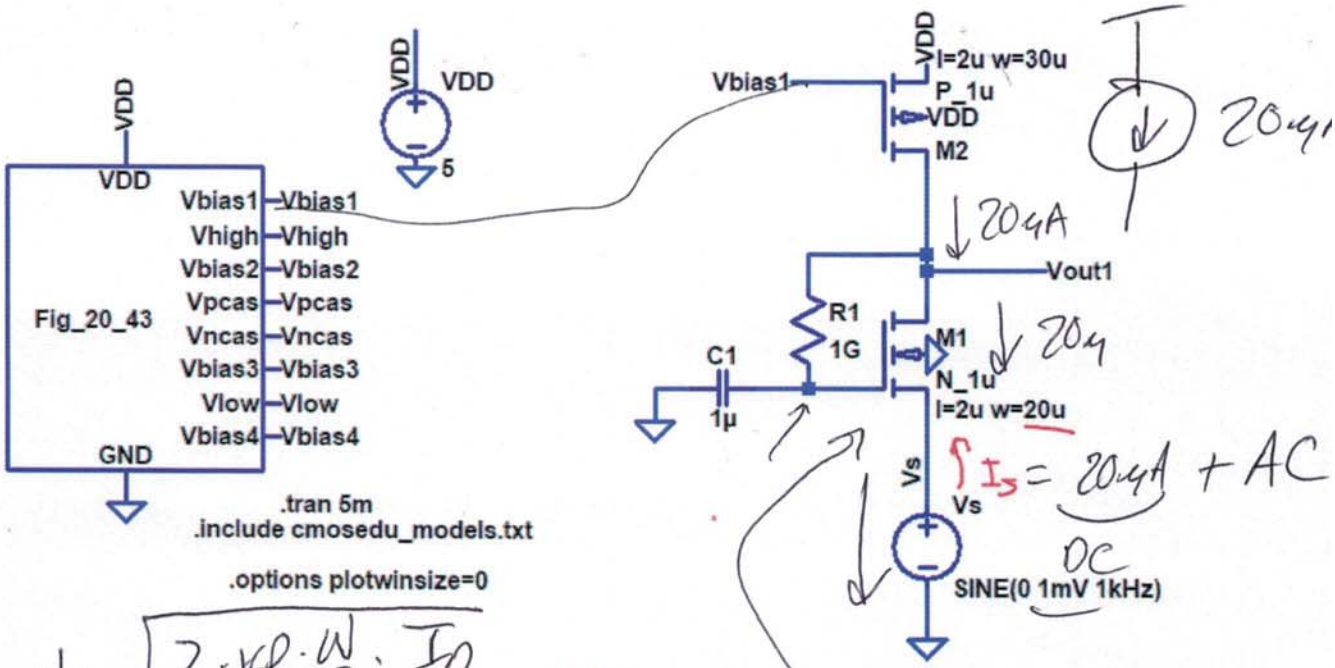
Quiz #14 EE 420/ECG 620 Spring 2020 Name: Dr. Baker

Open book and closed notes.

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

$1mV = 10^{-3}V \rightarrow 20\log 10^{-3} = -60\,dB = 1mV$

1. Estimate the input current, Is, and thus the input resistance in the following circuit. (5 points)



$g_m = \sqrt{2 \cdot KP \cdot \frac{W}{L} \cdot I_D}$

$g_m = 150\mu = \sqrt{2 \cdot 120\mu \cdot \frac{10}{2} \cdot 20\mu}$ (20)

Book $g_m = 150\mu$

$g_m = \sqrt{2 \cdot 150\mu} = 212\mu A = g_m$

ABOVE $g_m =$

$\frac{1mV}{120nA} = 8.3K$

AC CKT

i_d, v_{gs}, $i_T = -i_d$

$v_T = -v_{gs} = \frac{-i_d}{g_m} = \frac{i_T}{g_m}$

$\frac{v_T}{i_T} = \frac{1}{g_m} = 4.7K$