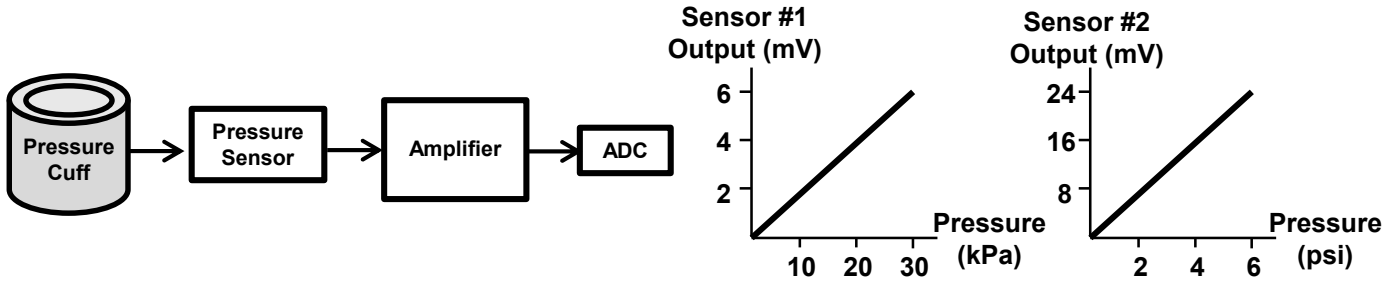
BME/ECE 386 QUIZ (W20) NAME:_____

1 problem for 20 pts

Blood Pressure

You are asked to design a blood pressure measurement system that measures up to 240 mmHg with a sensitivity of 0.5 mmHg. The electronic hardware consists of a piezoresistive pressure sensor, instrumentation amplifier, and analog-to-digital converter (ADC).



- There are two available amplifiers: (A_{d1} = 150, V_{N1} = 1 mV) and (A_{d2} = 600, V_{N2} = 6 mV).
- Both amplifiers have V_{REF} = 1.5V and are powered by +10V and GND. Therefore, assume the output is limited to +9V (max) and 1V (min).
- The ADC operates from 0 to 5V (12 bits) with V_N = 3 mV.

NOTE:

- Recall that 1 atm = 760 mmHg = 101 kPa = 14.7 psi (this will NOT be provided on the exam).
- The total noise from two components is computed by: $V_{N,TOTAL} = \sqrt{{V_{N1}}^2 + {V_{N2}}^2}$

Problem: Which combination of sensor and amplifier best satisfies the desired system specs? You must show why each combination is OK or not OK. Show all work!

(extra sheet for work)