

**Chemical Engineering 201
Fall 2004**

Midterm # 2

Name _____

Problem # 1 _____

Problem # 2 _____

Problem # 3 _____

Problem One (40 points):

A mixture of 50 mole percent ethanol is made with glycerol. This mixture is placed into a manometer that is open to atmospheric pressure on one side, where a barometer gives a reading of 0.96 atm. The other end of the manometer is attached to a pipe where a gas is flowing through it with a pressure of 0.89 atm. What is the height difference between the manometer fluid liquid levels in the two arms of the manometer (in m)?

Problem Two (35 points):

A mixture of ethanol and water that is 50 weight percent of each is fed to a distillation column. The overhead stream contains 15 wt% water while the bottom stream contains 25% ethanol. What is the mass ratio of the total overhead stream to the total bottom stream?

Problem Three (25 points):

Estimate $\ln(3)$ without using a calculator with the first four terms of a Taylor series approximation.

b) Write the numbers in the formula you would use in order to find the fractional percent error, but do not compute.