Chemical Engineering 201
Fall 2002

Midterm # 2

Name _____

Problem # 1 _____

Problem # 2 _____

Problem # 3 _____

Problem One (30 points):

You were using a manometer to measure the pressure drop along an air duct about a week ago and it originally had water as the manometer fluid. This week, you notice that the height measured on the manometer is 10 % higher than it was last week even though you are pretty sure the pressure drop has not changed. A chemical analysis of the manometer fluid detects that someone accidentally mixed acetone with the water and then put the original volume of manometer fluid back into the manometer. If the pressure drop in the air duct *has* actually stayed constant, what mass fraction of the manometer fluid is now made up by acetone?

Problem Two (30 points): short answer

What would you type in Visual Basic to declare that a variable called "Number" is double precision?

Describe in your own words what double precision means.

Write down what you would type in an Excel Cell in order to send the variables a, b, c, and d into a Visual Basic function called Count:

Write down what you would type in the Visual Basic program in order to return a value y to the Excel spreadsheet for a function called Sineapprox:

Using a Taylor series expansion with only the first four terms and **without** using a calculator, estimate the value for ln(2) knowing that ln(1) = 0.

Now, using your calculator, what is the true relative error of your approximation.

Problem Three (40 points):

Water that has been contaminated through an industrial spill by benzene is to be treated to remove the benzene so that the water will be drinkable. As the remediation engineer, you decide to use air stripping with pure air to separate the benzene from the water. The water-benzene mixture originally contains 5 mass % benzene (SG = 0.99345) and you remove 98% of the benzene from the water stream as you purify it. The air leaving the stripper is 95 mass % air, but contains no water. What is the mass flowrate of air if you need to clean up 500 gallons of contaminated water per hour?