Chemical Engineering 201
Fall 2001

Midterm # 3

Name _____

Problem # 1 _____

Problem # 2 _____

Problem # 3 _____

Problem One

100 moles of carbon monoxide are reacted with 75 moles of hydrogen (H_2) gas in a reactor to form methanol. There is 75% conversion of the limiting reactant in the reactor and the effluent comes out of the reactor at 2 atm and 395 K. What is the volume of the reactor effluent in liters? What are the mole percents of all of the reactor effluents? What is the percent excess of the non-limiting reactant?

% excess of non-limiting reactant:

Volume:

Mole percents:

Problem Two:

At a temperature of 5^{o}C and 1 atm, 50 milliliters of ethanol are mixed with 100 ml of water before the mixture is sent to a distillation column. The overhead stream has 90 mole% ethanol while the bottom stream contains 75 wt% water. What are the mass flowrates of the distillation column exit streams?

Problem 3:

How much air needs to be fed to a combustor if 200 moles of methane are burned and if there is 200% excess oxygen, only half of the methane reacts, and half of the reacted methane forms carbon monoxide while the other half forms carbon dioxide?

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Problem # 4 _____