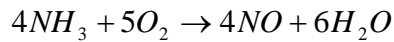


**CHE 201
HW 7**

Q1)

Ammonia is burned to form nitric oxide by the following reaction ;



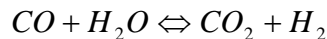
a) Calculate the ratio (Kmoles NH₃ reacted / Kmoles H₂O formed)

b) If ammonia is fed to a continuous reactor at a rate of 150 lbmoles NH₃ / h ,what Oxygen feed rate (gmoles / h) would be needed to have 60% excess O₂.

c) If 112 lbm of Ammonia and 160 lbm of Oxygen are fed to a batch reactor ,determine the limiting reactant and the percentage excess of the other reactant

Q2)

The equilibrium state of the following reaction :



Is described by the following relation

$$[(Y_{CO_2}) (Y_{H_2})] / [(Y_{CO}) (Y_{H_2O})] = K_e$$

Where $K_e = 0.0247 \exp (4020 / T)$

T is the reactor temperature in Kelvin

Y_i is the mole fraction of species i

The feed to a batch reactor contains 10 mole% CO , 10 mole % CO₂ .40 mole% water ,and the balance is inert gas .The reactor temperature (T) is 110 K

a) Use a basis of 100 moles feed gas ,draw a flow chart .Prove that you have enough information to calculate the composition at equilibrium

b) Calculate the total moles at equilibrium

c) Calculate the composition at equilibrium