Seat number:

Chemical Engineering Principles (1) Course — **First semester 2018/2019**

Quiz #5 — **Date: November 25, 2018**

Ammonia (NH_3) is burned in a batch reactor to form nitric oxide (NO) and water vapor (H_2O). Initially, the reactor has 50 kg of ammonia and 100 kg of oxygen. It was found that fractional conversion of ammonia is 0.25:

a) Draw a completely labeled flowchart of this process

b) Perform DOF analysis

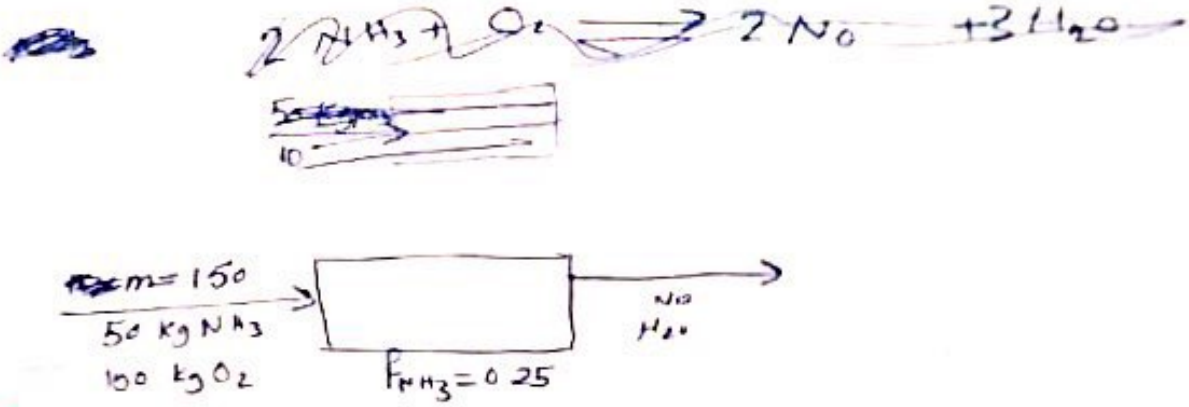
c) Determine the limiting reactant and the excess one.

d) Find the percent excess of the excess reactant.

e) Use the extent of reaction method to find the final molar amounts of all reactants and products.

f) Find the final molar composition in the reactor on a dry basis.

g) What is the maximum amount in kilogram that can be produced of nitrogen monoxide?



DOF = 3 − 3 + 1 − 0

unknown = 3

molecular balance = 3

over equation = 1

of reaction = 1