(Fall 2001Midterm)

An ideal gas mixture was put together by mixing the contents of three vessels, each containing a single component ideal gas at the specified temperature and pressure listed below.

Vessel number	Component in the vessel	Molar Mass, (kg/kmol)	Volume of the vessel, (m^3)	Temperature, (^oC)	Pressure, (kPa)
1	CH_4	16	0.85	0	800
2	CO_2	44	0.30	25	400
3	N_2	28	0.35	35	600

The mixed gas was transferred to a fourth container whose volume was known to be 1.0 m^3. The mixture was then heated to a temperature of 400 K. Calculate the following for this mixture:

a. Number of moles of each component in the mixture.(4.5 points)

b. Mass of each component in the mixture.(4.5 points)

c. Mass fraction of CO_2 in the mixture.(2 points)

d. Mole fraction of CH_4 in the mixture. (2 points)

e. Pressure of the mixture after heating to 400 K. (4 points)

f. Partial pressure of CH_4 after heating to 400 K (3 points)