**Gases FRQ Handout #1**

**2003 B**

A rigid 5.00 L cylinder contains 24.5 g of N2*(g)* and 28.0 g of O2*(g)*

(a) Calculate the total pressure, in atm, of the gas mixture in the cylinder at 298 K.

(b) The temperature of the gas mixture in the cylinder is decreased to 280 K. Calculate each of the following.

(i) The mole fraction of N2*(g)* in the cylinder.

(ii) The partial pressure, in atm, of N2*(g)* in the cylinder.

(c) If the cylinder develops a pinhole-sized leak and some of the gaseous mixture escapes, would the ratio   in the cylinder increase, decrease, or remain the same? Justify your answer.

A different rigid 5.00 L cylinder contains 0.176 mol of NO*(g)* at 298 K. A 0.176 mol sample of O2*(g)* is added to the cylinder, where a reaction occurs to produce NO2*(g)*.

(d) Write the balanced equation for the reaction.

(e) Calculate the total pressure, in atm, in the cylinder at 298 K after the reaction is complete.

**1996 D (Required)**



Represented above are five identical balloons, each filled to the same volume at 25C and 1.0 atmosphere pressure with the pure gases indicated.

(a) Which balloon contains the greatest mass of gas? Explain.

(b) Compare the average kinetic energies of the gas molecules in the balloons. Explain.

(c) Which balloon contains the gas that would be expected to deviate most from the behavior of an ideal gas? Explain.

(d) Twelve hours after being filled, all the balloons have decreased in size. Predict which balloon will be the smallest. Explain your reasoning.