1. How many moles of water are made from the reaction of 2.2 moles of oxygen gas?

\[ 2H_2 + O_2 \rightarrow 2H_2O \]

A) 4.4  B) 1.1  C) 2.2  D) 3.3  E) not enough information

2. Consider the following generic chemical equation:

\[ 2W + 3X \rightarrow 3Y + Z \]

When 5 units of W and 6 units of X are allowed to react, the limiting reactant would be:

A) W  B) X  C) Y  D) Z  E) There is no limiting reactant in this situation.

3. In order to determine the limiting reactant in a particular reaction, you must know each of the following EXCEPT

A) the mass of each reactant present  B) the molar mass of each reactant present
C) the coefficient of each reactant in a balanced equation  D) the mass of each product formed

4. How many grams of NH\textsubscript{3} can be produced by the reaction of 2.00 g of N\textsubscript{2} with 3.00 g H\textsubscript{2}?

Balanced reaction: \[ \]  

A) 0.964  B) 2.43  C) 4.00  D) 17.0  E) none of the above

5. How many grams of the excess reactant are left over according to the reaction below given that you start with 10.0 g of Al and 19.0 grams of O\textsubscript{2}?

\[ 4Al + 3O_2 \rightarrow 2Al_2O_3 \]

A) 8.90  B) 10.1  C) 1.1  D) 14.6  E) not enough information
5. What is the theoretical yield of a reaction if 25.0 grams of product were actually produced from a reaction that has a 88% yield?
A) 28.4   B) 22.0   C) 3.52   D) 352   E) none of the above

6. What is the SI unit for pressure?
A) Pa   B) atm   C) mm Hg   D) torr   E) psi

7. For an ideal gas, which two variables are INVERSELY proportional to each other, assuming all the other conditions remain constant?
A) V and P   B) T and P   C) V and T   D) V and n   E) None of the above

8. When the temperature of a gas sample is doubled from 75 °C to 150 °C, the volume of the gas:
   (Assume the pressure is constant.)
A) increases by a factor of 75   B) halves   C) doubles   D) remains the same   E) none of the above

9. Which of the following is NOT part of the Kinetic Molecular Theory?
A) Gas particles do not repel each other.
B) There is a large distance between gas particles as compared to their relative size.
C) The size of the actual gas particles is small compared to the volume of the whole gas.
D) The average energy of the particles is dependent on the molecular mass of the particle.
E) All of the above statements are part of the Kinetic Molecular Theory.

10. The partial pressures in a mixture of CO₂, N₂, and O₂ in a sample of gas are 50.0 atm, 495 atm, and 205 atm, respectively. Calculate the mole percentage of each gas.
A) 5.00%, 70.3%, 24.7%   B) 6.67%, 66.0%, 27.3%   C) 0.500%, 49.5%, 50.0%
D) 10.0%, 50.0%, 40.0%   E) 1.50%, 75.5%, 23.0%
11. This question has two parts:

a) How many moles of an ideal gas are in a container with a volume of 5.50 L at 580 mm Hg and 20 °C? Note: R = 0.0821 L·atm/(mol·K).

A) 1.32 mol  B) 0.229 mol  C) 0.174 mol  D) 2.58 mol  E) 5.73 mol

b) If the mass of the gas is 4.87 g, what is the most likely identity of the gas? ________________

Non-ideality of gases.

Real gases behave as ideal gases in approximately room temperature and pressure. Can you think of pressure and temperature conditions when gases will start to deviate from ideal gas behavior?

A corrected gas equation is used for conditions of non-ideality of gases. Using this equation, a sample of 8.00 mol of Cl₂ gas, in a 4.00 L tank at 27.0°C has a pressure of 29.5 atm. Calculate the pressure predicted by the ideal gas equation and compare it with the pressure calculated from the corrected gas equation.