REVIEW 8

1. Fill in the blanks

a) Gases consist of large numbers of particles that are in continuous, random_____

b) The combined volume of all the particles of a gas is negligible compared to the total volume of the particles'_____

c) Attractive (or repulsive) forces between ideal gas molecules are _____

d) Ideal gas behavior is far more likely at high _____and low _____

e) The middle of the kinetic energy distribution curve is the _____kinetic energy of molecules.

2. What is the partial pressure of oxygen in the air at STP? Air is 21% oxygen.

3. What allows us to conclude that the volume ratio of two different gases is equal to their mole ratio?

4. Prove that the density of an ideal gas equals $P\mathcal{M}/RT$, where $\mathcal{M}$ = molar mass

5.

One reaction involved in the conversion of iron ore to the metal is

$$FeO(s) + CO(g) \rightarrow Fe(s) + CO_2(g)$$

Calculate the standard enthalpy change for this reaction from these reactions of iron oxides with CO:

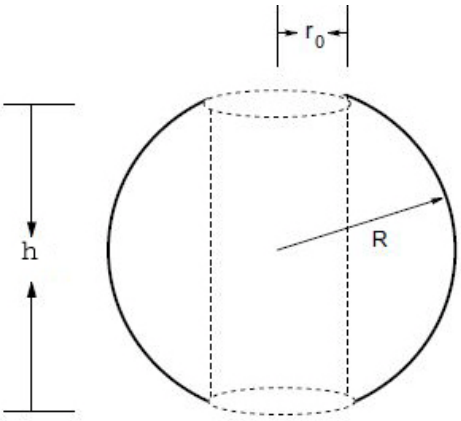
(1) $3\,Fe_2O_3(s) + CO(g) \rightarrow 2\,Fe_3O_4(s) + CO_2(g)$ $\quad \Delta H^\circ = -47.0\,kJ$

(2) $Fe_2O_3(s) + 3\,CO(g) \rightarrow 2\,Fe(s) + 3\,CO_2(g)$ $\quad \Delta H^\circ = -25.0\,kJ$

(3) $Fe_3O_4(s) + CO(g) \rightarrow 3\,FeO(s) + CO_2(g)$ $\quad \Delta H^\circ = 19.0\,kJ$

6. Two spherical apples are peeled. It takes 12.0 s for apple A to accumulate 1.0 g of brownish phenolic compounds.

   From an identical apple B, we cut out a cylindrical hole that passes through the apple's center, and we throw out the cylinder.



How long will it take apple B to form 1.0 g of brownish phenolic compounds if R = 2r?

7. The bond energy of X-X is 30.0kJ/mole and that of Y-Y is 40.0 kJ/mole.

   If $35\ kJ + X_2 + Y_2 \rightarrow 2\ XY$

   what is the bond energy of XY on a per mole basis?

   Some basic questions: