Unit 4 – Chemical Quantities & Stoichiometry

IPOD Questions

It's *the* Problem Of *the* Day

IPOD # 19

Convert the following by remembering that…

1 mol = 6.02 x 10^{23} particles (atoms, ions, molecules, formula units)

1 mol = 22.4 L of a Gas

1 mol = molar mass

- How many molecules are in 0.56 mol of water?

- What volume does 0.335 mol of dicarbon hexahydride gas occupy at STP?

- How many moles of lead (II) chloride are in 1.57 grams?

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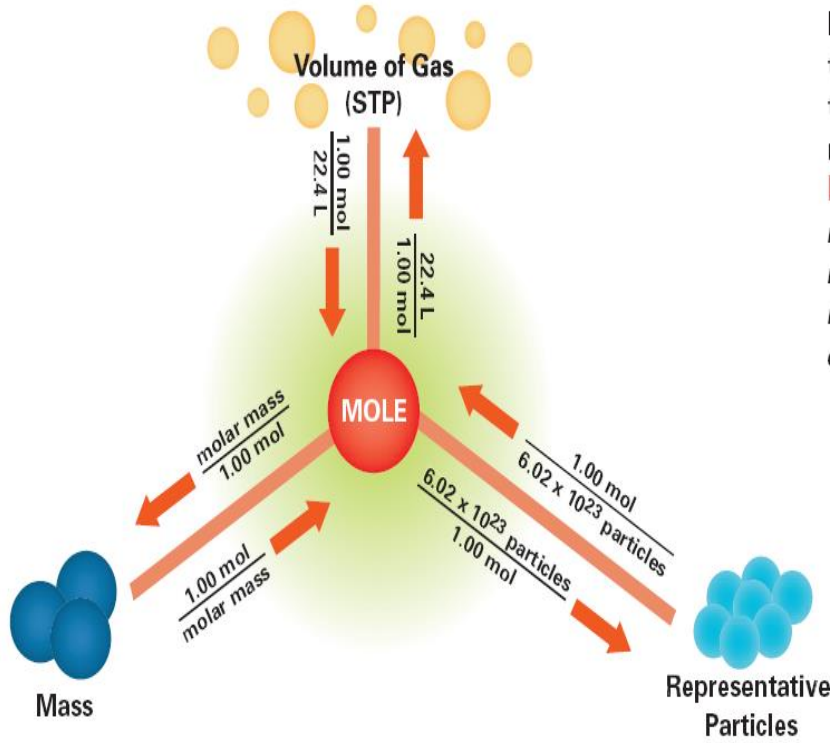
IPOD #20

Convert the following by remembering that..

1 mol = 6.02 x 10^{23} particles (atoms, ions, molecules, formula units)

1 mol = 22.4 L of a Gas

1 mol = molar mass (g)



- What is the volume, in liters, of 835 g of sulfur trioxide at STP?

- Calculate the number of formula units of ammonium nitrate in 5.78 moles?

- What is the mass of 1.25 x 10^{23} formula units of calcium carbonate?

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IPOD # 21

Calculate the percent composition of each compound:

1) Copper (I) phosphate
2) Dihydrogen monosulfide

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IPOD # 22

Write each of the following as a balanced equation

1. $AgNO_3 + H_2S \rightarrow Ag_2S + HNO_3$

2. $Zn(OH)_2 + H_3PO_4 \rightarrow Zn_3(PO_4)_2 + H_2O$

3. Iron (III) chloride + calcium hydroxide → iron (III) hydroxide + calcium chloride

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IPOD # 23

Write the reactants, state the reaction type, predict the products & balance the following reactions:

1. Type: _____ Sodium hydroxide + iron (III) nitrate →

2. Type: _____ Zinc + silver (I) nitrate → *if a reaction occurs, zinc metal will have a +2 charge in a compound.*

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IPOD # 24

Write the reactants, state the reaction type, predict the products & balance the following reactions:

1. Type: _____ Hydroiodic acid →

2. Type: _____ Beryllium + oxygen gas →

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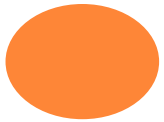
IPOD # 25

Write the reactants, state the reaction type, predict the products & balance the following reactions:

1. Type: _____ Magnesium nitride →
2. Type: _____ C_7H_{16} + oxygen →
3. Type: _____ Sulfuric acid + aluminum hydroxide →
4. Type: _____ Potassium + oxygen →
5. Type: _____ Magnesium + hydrobromic acid →



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IPOD # 26

Start with a Balanced Equation & then solve…

1. Phosphorus and hydrogen can combine to form phosphine (PH_3). How many liters of phosphine are formed when 0.42 moles of hydrogen react with phosphorus?

2. How many molecules of oxygen gas are produced by the decomposition of 6.5 g of potassium chlorate? Potassium chloride is also a product.

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IPOD # 27

Start with a Balanced Equation & then solve…

1. When 84.8 g of iron (III) oxide reacts with an excess of carbon monoxide, 58.0 g of solid metal iron is produced along with carbon dioxide gas. What is the percent yield of this reaction?

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IPOD # 28

Start with a Balanced Equation & then solve…

Methanol (CH3OH) is used in the production of many chemicals. Methanol is made by reacting carbon monoxide and hydrogen gas at high temperature and pressure and can be shown in the following reaction:

$$CO(g) + 2H_2(g) \rightarrow CH_3OH(g)$$

a) What type of reaction does this represent?

b) How many grams of hydrogen are necessary to react with 2.85 mol of carbon monoxide?

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IPOD # 28 (LR/ER)

Start with a Balanced Equation & then solve…

1. Iron metal reacts with chlorine gas to produce iron (III) chloride. Suppose 5.0 g of iron is added to 10.0 g of chlorine gas.
   a. What type of reaction does this represent?
   b. Show which reactant is the limiting reactant.
   c. Calculate the mass of product formed.
   d. Calculate the mass of unreacted starting material that remains.
   e. If only 13.98 g of iron (III) chloride is produced, what is the percent yield?