

Summer Review**Station 1****(Ch 1) - MEASUREMENTS**

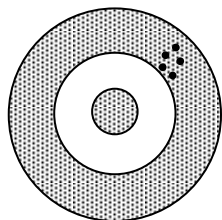
Write in the number of significant figures for each of the following measurements:

3 3.00 mL 3 0.00290 g 4 50.00 m 2 0.070 kg 1 400 L

Combine the masses 0.0562 kg, 124.213 g and 1635 mg. The answer should be reported as: 182.0 g
 $56.2 \text{ g} + 124.213 \text{ g} + 1.635 \text{ g} = 182.048$ **round number off to largest digit with uncertainty... tenths**

You measure a 5.75 mL sample of mercury with a mass of 77.05 g. The measured density is 13.4 g/mL
 density = mass/volume = $77.05 \text{ g} / 5.75 \text{ mL} = 13.4 \text{ g/mL}$

Mercury's accepted density is $13.53 \text{ g} \cdot \text{mL}^{-1}$. The % error in your measurement is: 0.96 %
 $100 \times (13.53 - 13.4) / 13.53 = 0.96 \%$



Is this person accurate? N
not on the bull's eye

Is the person precise? Y
closely grouped

Summer Review**Station 2****(Ch 1) - MATTER**

This molecule contains 3 (C, H & O) elements and 12 atoms.

The molecular formula for this substance is: C₃H₆O₃

You may need to see the color version of this molecule to be certain.

Calculate the number of seconds in 5.25 years using unit analysis: (1 year = 365.25 days)

$$5.25 \text{ years} \times \frac{365.25 \text{ days}}{1 \text{ year}} \times \frac{24 \text{ hours}}{1 \text{ day}} \times \frac{3600 \text{ sec}}{1 \text{ hour}} = 165677400 \text{ sec} = 166,000,000 \text{ sec} = 1.66 \times 10^8 \text{ sec}$$

A **calculator** displays the answer to a problem as **53.29841**

Report this answer to:

53.298 5 significant figures

53.3 3 significant figures

50 1 significant figure

Summer Review

Station 3

(Ch 3) - MEASURING CHEMICALS

Calculate the molar mass of Ba(NO₃)₂.

$$\begin{aligned} \text{Ba: } & 137.33 \\ \text{N}_2: & 28.02 \\ \text{O}_6: & 96.00 \quad = 261.35 \text{ g/mol} \end{aligned}$$

Calculate the percent composition of each element in the following compound.

Ba(NO ₃) ₂	Ba = $\frac{137.33}{261.35} \times 100 = 52.5\%$	N = $\frac{28.02}{261.35} \times 100 = 10.7\%$	O = $\frac{96.00}{261.35} \times 100 = 36.7\%$
-----------------------------------	--	--	--

Write the formula for ionic compounds made from these ions:

Name	Cation	Anion	Formula
sodium phosphate	Na ⁺	PO ₄ ³⁻	Na ₃ PO ₄
stannic chloride	Sn ⁴⁺	Cl ⁻	SnCl ₄
aluminum hydroxide	Al ³⁺	OH ⁻	Al(OH) ₃
ammonium sulfate	NH ₄ ⁺	SO ₄ ²⁻	(NH ₄) ₂ SO ₄

Summer Review

Station 4

(Ch 3) - MOLE PROBLEMS

Solve the following mole problems:

How many molecules of CO₂ (MM = 44.0 g/mol) are in 17.75 grams of CO₂?

$$17.75 \text{ g CO}_2 \times \frac{1 \text{ mole CO}_2}{44.0 \text{ g CO}_2} \times \frac{6.02 \times 10^{23} \text{ molecules CO}_2}{1 \text{ mole CO}_2} = 2.43 \times 10^{23} \text{ molecules CO}_2$$

What volume (in Liters) does 20.0 grams of butane, C₄H₁₀, occupy at STP? (MM C₄H₁₀ = 58.14 g/mol)

$$20.0 \text{ g C}_4\text{H}_{10} \times \frac{1 \text{ mole C}_4\text{H}_{10}}{58.14 \text{ g C}_4\text{H}_{10}} \times \frac{22.4 \text{ L C}_4\text{H}_{10}}{1 \text{ mole C}_4\text{H}_{10}} = 7.71 \text{ L C}_4\text{H}_{10}$$

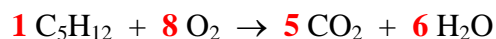
List the 7 diatomic elements:	H	N	O	F	Cl	Br	I
	H ₂	N ₂	O ₂	F ₂	Cl ₂	Br ₂	I ₂

Summer Review

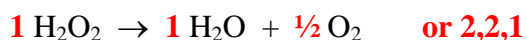
Station 5

(Ch 4) - REACTIONS

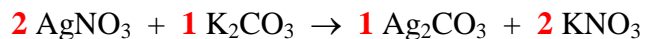
Balance these equations and classify their type (single replacement, double replacement, etc.)



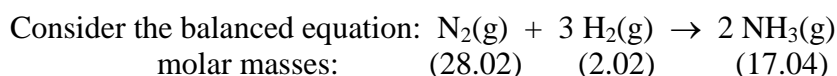
Classify this reaction: Combustion (Redox)



Classify this reaction: Decomposition (Redox)



Classify this reaction: Double Replacement



How many grams of $\text{NH}_3(\text{g})$ is formed when 12.80 grams of $\text{H}_2(\text{g})$ reacts with 55.25 grams of $\text{N}_2(\text{g})$?

Note: Two "Givens" signifies a Limiting Reactant Problem.

$$12.80 \text{ g H}_2 \times \frac{1 \text{ mol H}_2}{2.02 \text{ g H}_2} \times \frac{2 \text{ mol NH}_3}{3 \text{ mol H}_2} \times \frac{17.04 \text{ g NH}_3}{1 \text{ mol NH}_3} = 71.98 \text{ g NH}_3$$

$$55.25 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28.02 \text{ g N}_2} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol N}_2} \times \frac{17.04 \text{ g NH}_3}{1 \text{ mol NH}_3} = 67.199 = \boxed{67.20 \text{ g NH}_3} \text{ (Smaller Answer is Correct)}$$

Summer Review

Station 6

(Ch 4) - EMPIRICAL FORMULAS

Empirical Formulas:

A substance is 33.33% carbon, 7.47% hydrogen, and 59.20% oxygen.

What is its empirical formula? $\text{C}_3\text{H}_8\text{O}_4$

Assume 100 g of substance:

$$33.33 \text{ g C} \times \frac{1 \text{ mole C}}{12.01 \text{ g C}} = \frac{2.775 \text{ mol C}}{2.775} = 1 \times 3 = 3$$

$$7.47 \text{ g H} \times \frac{1 \text{ mole H}}{1.01 \text{ g H}} = \frac{7.396 \text{ mol H}}{2.775} = 2.66 \times 3 = 8$$

$$59.20 \text{ g O} \times \frac{1 \text{ mole O}}{16.00 \text{ g O}} = \frac{3.700 \text{ mol O}}{2.775} = 1.33 \times 3 = 4$$

Summer Review

Station 7

(Ch 5) - DRIVING FORCES

Circle the precipitates :	PbI₂	Ba(OH) ₂	Ag₂CO₃	CaF₂	K ₂ SO ₃	(NH ₄) ₂ S
----------------------------------	------------------------	---------------------	-------------------------------------	------------------------	--------------------------------	-----------------------------------

List the strong acids :	HCl	HI	HBr	H₂SO₄	HNO₃	HClO₃	HClO₄	HIO₄
--------------------------------	------------	-----------	------------	------------------------------------	------------------------	-------------------------	-------------------------	------------------------

Write the balanced molecular, ionic, and net ionic equation for:

Solutions of acetic acid and sodium nitrite are mixed.



HNO₂ decomposes to gases, but you need 2 HNO₂ → H₂O + NO + NO₂... so double the above equation.



Summer Review

Station 8

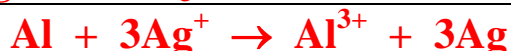
(Ch 5) - REDOX REACTIONS

Write the balanced net ionic equation for:

Aluminum metal is added to a solution of silver nitrate.

Al⁰ metal must change... into the ion, Al³⁺

If Al's oxidation number increases, an oxidation number must also decrease... Ag⁺ → Ag⁰



What substance is being **oxidized**? Al Which **atom** is being **reduced**? Ag⁺

What is the **oxidizing agent**? AgNO₃

What is the **oxidation number** of N in the nitrate ion, NO₃⁻

$$x + 3(-2) = -1$$

$$x = +5$$

When solutions of NaOH and HCl are added together, the mixture gets hot.

50.0 mL of 2.00 M NaOH and 50.0 mL of 2.00 M HCl are mixed.

Both solutions are at room temperature, 18.0°C, and the final temperature of the mixture is 32.0°C.

- a) Calculate the heat released by the reaction.

$$\begin{aligned}q &= m \cdot C \cdot \Delta T \\ &= (100. \text{ g}) (4.184 \text{ J/g} \cdot ^\circ\text{C}) (14.0^\circ\text{C}) = 5,857.6 \text{ J} = \mathbf{5.86 \text{ kJ}}\end{aligned}$$

- b) Calculate the moles of HCl formed.

$$n = \text{vol} \times \text{Molarity} = (0.050 \text{ L}) (2.00 \text{ M}) = \mathbf{0.100 \text{ mole H}_2\text{O formed}}$$

- c) Calculate the ΔH of neutralization in kJ/mol.

$$\Delta H = 5.86 \text{ kJ} / 0.100 \text{ mol} = \mathbf{-58.6 \text{ kJ/mol}}$$