

2024 AP Chemistry Summer Homework

- Read and Take Notes: Chapters 6 & 7
Theodore E. Brown, et al., *Chemistry: The Central Science*, 13th Edition.
Pearson. New York, NY, 2015
- Complete this packet.
- Memorization quiz will be the first week of school.

Use the following packet to review content that was covered in Honors/General Chemistry. While answering the questions, be sure to check for understanding and ask questions when needed. Having a good understanding of these concepts will help you be successful in AP Chemistry. For the memorization section, please memorize the information and be prepared to take a quiz during the first week of school. Use the *AP Chemistry Review Packet: Helpful Information* Google Slides presentation for notes to help you work through the problems.

Significant Figures

Give the number of significant figures in each of the following.

1.05 _____

.0003040 _____

29000 _____

Determine the answer for each of the following. Use the correct number of significant figures.

$17.34 + 4.900 + 23.1 =$ _____

$9.80 - 4.762 =$ _____

$3.9 \times 6.05 \times 420 =$ _____

Round each of the following to 3 significant figures.

77.0653 _____

6,300,178.2 _____

10.2030 _____

Explain the process of measuring (volume, length, temperature, etc.) using appropriate significant figures.

Scientific Notation

Convert each of the following into scientific notation.

727 _____

172000 _____

.000984 _____

Convert each into decimal form

1.56×10^4 _____

3.6×10^{-2} _____

736.9×10^5 _____

Naming Compounds

Identify the following compounds as ionic, molecular, acid, or base. Then, name the compound.

1) Na_2CO_3 _____

2) P_2O_5 _____

3) NH_3 _____

4) H_2PO_4 _____

5) FeSO_4 _____

6) SiO_2 _____

7) HBr _____

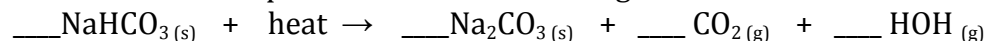
8) BaCl_2 _____

9) $\text{Co}(\text{OH})_2$ _____

10) B_2H_4 _____

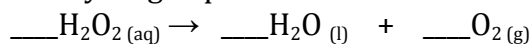
Moles & Stoichiometry

Given the unbalanced decomposition reaction of baking soda:



Balance the reaction. How many grams of CO_2 is produced by the decomposition of 42.0 grams of baking soda (NaHCO_3)?

The catalytic decomposition of hydrogen peroxide is:



Balance the reaction. How many moles of water and oxygen are produced by the decomposition of 68.0 grams of hydrogen peroxide?

Periodic Trends

Describe the following periodic trends, both in terms of groups and periods. See *AP Chemistry Review Packet: Helpful Information* Google Slides presentation to explain why these trends are important.

- Atomic Radius _____

- Ionic Radius _____

- Ionization energy _____

- Electronegativity _____

Valence Electrons

How many valence electrons do elements in the following groups typically have?

- | | |
|----------|----------|
| 1A _____ | 2A _____ |
| 3A _____ | 5A _____ |
| 6A _____ | 7A _____ |
| 8A _____ | |

Solubility

Use the solubility rules to determine if the following compounds are soluble or insoluble.

- $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$ _____
 $\text{Ba}(\text{OH})_2$ _____
 NaOH _____
 RbNO_3 _____
 MgSO_4 _____

Memorize

- Memorize the 7 Diatomic Molecules
- Memorize 1 mole = 6.02×10^{23} particles = 22.4 Liters of gas at STP
- Memorize the Solubility Rules
- Memorize the names of the elements on the Periodic Table (elements 1-36) (On the AP Test, the symbols are given, but element names are not)
- Memorize the 8 Common Polyatomic Ions

Label each of the following as either a physical process or a chemical process.

Corrosion of aluminum metal _____

Melting of ice _____

Digesting a candy bar _____

Sublimation of dry ice (CO₂) _____

Explosion of nitroglycerin _____

Pulverizing an aspirin _____

Is the boiling of water a chemical or physical change? Explain.

Explain the main differences between the solid, liquid, and gas phase of matter.

Define the words:

Atomic number

Atomic mass

Mass number

Molecular formula

Empirical formula

Isotope

Cation

Anion

Polyatomic ion

Alloy

In an experiment, a student gently heated a hydrated copper hydrate to remove the water from the copper. The following data was recorded: Calculate the experimental percent of water in the compound.

Mass of crucible, cover, and contents before heating: 23.4 g

Mass of empty crucible and cover: 18.82 g

Mass of crucible, cover, and contents after heating to constant mass: 20.94 g

Gallium has 2 common isotopes, Ga- 69 and Ga- 71. Which isotope is the most abundant and how do you know?

Write the net ionic equation and identify the spectator ions for the following:

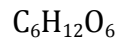
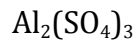
Hydrochloric acid is neutralized with a solution of sodium hydroxide

Acetic acid reacts with a solution of calcium hydroxide

Silver chloride solution reacts with nitric acid solution

Determine the empirical and molecular formula Ibuprofen, a headache remedy that contains 75.6 % C, 8.80 % H, and 15.5 % O by mass and has a molar mass about 206 g/mol.

Calculate the percent composition of oxygen in the following:



What mass of water can be produced when 5.87g of magnesium hydroxide reacts with 75.0 mL of 1.50 M sulfuric acid to produce liquid water and magnesium sulfate?

If 45 mL of water is added to 250mL of a 0.75 M K_2SO_4 solution, what will the molarity of the diluted solution be?