AP Chemistry Summer Assignment

Read chapter 1 in Chemistry: The Central Science

Answer the following questions at the end of the chapter:
1, 3, 5, 17, 18, 21, 23, 32, 35, 37, 43, 45

Memorize the following information

There will be a test on this information during the first week of class. I recommend using flash cards especially for ions and solubility rules.

The periodic table used on the AP test only has symbols not names, so you need to know the symbols for the common elements.

TABLE 1.2 Some Common Elements and Their Symbols

Carbon	C	Aluminum	Al	Copper	Cu (from *cuprum*)
Fluorine	F	Bromine	Br	Iron	Fe (from *ferrum*)
Hydrogen	H	Calcium	Ca	Lead	Pb (from *plumbum*)
Iodine	I	Chlorine	Cl	Mercury	Hg (from *hydrargyrum*)
Nitrogen	N	Helium	He	Potassium	K (from *kalium*)
Oxygen	O	Lithium	Li	Silver	Ag (from *argentum*)
Phosphorus	P	Magnesium	Mg	Sodium	Na (from *natrium*)
Sulfur	S	Silicon	Si	Tin	Sn (from *stannum*)

In chemistry we use the SI system need to know these units.

TABLE 1.4 SI Base Units

Physical Quantity	Name of Unit	Abbreviation
Mass	Kilogram	kg
Length	Meter	m
Time	Second	s[a]
Temperature	Kelvin	K
Amount of substance	Mole	mol
Electric current	Ampere	A
Luminous intensity	Candela	cd

[a] The abbreviation sec is frequently used.

Know the metric prefixes.

TABLE 1.5 Selected Prefixes Used in the Metric System

Prefix	Abbreviation	Meaning	Example
Giga	G	10^9	1 gigameter (Gm) = 1×10^9 m
Mega	M	10^6	1 megameter (Mm) = 1×10^6 m
Kilo	k	10^3	1 kilometer (km) = 1×10^3 m
Deci	d	10^{-1}	1 decimeter (dm) = 0.1 m
Centi	c	10^{-2}	1 centimeter (cm) = 0.01 m
Milli	m	10^{-3}	1 millimeter (mm) = 0.001 m
Micro	μ[a]	10^{-6}	1 micrometer (μm) = 1×10^{-6} m
Nano	n	10^{-9}	1 nanometer (nm) = 1×10^{-9} m
Pico	p	10^{-12}	1 picometer (pm) = 1×10^{-12} m
Femto	f	10^{-15}	1 femtometer (fm) = 1×10^{-15} m

[a] This is the Greek letter mu (pronounced "mew").

Ions are atoms or groups of atoms that have gained or lost electrons. Cations are ions that lost electrons and have a positive charge. Learn the names, symbols, and charges.

TABLE 2.4 Common Cations[a]

Charge	Formula	Name	Formula	Name
1+	**H^+**	**Hydrogen ion**	**NH_4^+**	**Ammonium ion**
	Li^+	Lithium ion	Cu^+	Copper(I) or cuprous ion
	Na^+	**Sodium ion**		
	K^+	**Potassium ion**		
	Cs^+	Cesium ion		
	Ag^+	**Silver ion**		
2+	**Mg^{2+}**	**Magnesium ion**	Co^{2+}	Cobalt(II) or cobaltous ion
	Ca^{2+}	**Calcium ion**	**Cu^{2+}**	**Copper(II)** or cupric ion
	Sr^{2+}	Strontium ion	Fe^{2+}	**Iron(II)** or ferrous ion
	Ba^{2+}	Barium ion	Mn^{2+}	Manganese(II) or manganous ion
	Zn^{2+}	**Zinc ion**	Hg_2^{2+}	Mercury(I) or mercurous ion
	Cd^{2+}	Cadmium ion	Hg^{2+}	**Mercury(II)** or mercuric ion
			Ni^{2+}	Nickel(II) or nickelous ion
			Pb^{2+}	**Lead(II)** or plumbous ion
			Sn^{2+}	Tin(II) or stannous ion
3+	**Al^{3+}**	**Aluminum ion**	Cr^{3+}	Chromium(III) or chromic ion
			Fe^{3+}	**Iron(III)** or ferric ion

[a] The most common ions are in boldface.

Anions are ions that have gained electrons and have a negative charge. Learn the names, symbols, and charges.

TABLE 2.5 Common Anions*

Charge	Formula	Name	Formula	Name
1−	H^-	Hydride ion	$C_2H_3O_2^-$	Acetate ion
	F^-	**Fluoride ion**	ClO_3^-	Chlorate ion
	Cl^-	**Chloride ion**	**ClO_4^-**	**Perchlorate ion**
	Br^-	**Bromide ion**	**NO_3^-**	**Nitrate ion**
	I^-	**Iodide ion**	MnO_4^-	Permanganate ion
	CN^-	Cyanide ion		
	OH^-	**Hydroxide ion**		
2−	**O^{2-}**	**Oxide ion**	**CO_3^{2-}**	**Carbonate ion**
	O_2^{2-}	Peroxide ion	CrO_4^{2-}	Chromate ion
	S^{2-}	**Sulfide ion**	$Cr_2O_7^{2-}$	Dichromate ion
			SO_4^{2-}	**Sulfate ion**
3−	N^{3-}	Nitride ion	**PO_4^{3-}**	**Phosphate ion**

*The most common ions are in boldface.

These prefixed will be used when we learn to name covalent compounds.

TABLE 2.6 Prefixes Used in Naming Binary Compounds Formed Between Nonmetals

Prefix	*Meaning*
Mono-	*1*
Di-	*2*
Tri-	*3*
Tetra-	*4*
Penta-	*5*
Hexa-	*6*
Hepta-	*7*
Octa-	*8*
Nona-	*9*
Deca-	*10*

Learn the names and symbols of the strong acids and bases. Examples of names of bases: LiOH is called lithium hydroxide $Ca(OH)_2$ is called calcium hydroxide.

TABLE 4.2 Common Strong Acids and Bases

Strong Acids	Strong Bases
Hydrochloric, HCl	Group 1A metal hydroxides (LiOH, NaOH, KOH, RbOH, CsOH)
Hydrobromic, HBr	Heavy group 2A metal hydroxides [$Ca(OH)_2$, $Sr(OH)_2$, $Ba(OH)_2$]
Hydroiodic, HI	
Chloric, $HClO_3$	
Perchloric, $HClO_4$	
Nitric, HNO_3	
Sulfuric, H_2SO_4	

Solubility rules tell us if ionic compounds dissolve in water. Soluble means that it dissolves in water and insoluble means that it does not. These are very important. Learn them now. They will be needed on almost every test you take this year.

TABLE 4.1 Solubility Guidelines for Common Ionic Compounds in Water

Soluble Ionic Compounds		Important Exceptions
Compounds containing	NO_3^-	None
	$C_2H_3O_2^-$	None
	Cl^-	Compounds of Ag^-, Hg_2^{2+}, and Pb^{2+}
	Br^-	Compounds of Ag^-, Hg_2^{2+}, and Pb^{2+}
	I^-	Compounds of Ag^-, Hg_2^{2+}, and Pb^{2+}
	SO_4^{2-}	Compounds of Sr^{2+}, Ba^{2+}, Hg_2^{2+}, and Pb^{2-}
Insoluble Ionic Compounds		**Important Exceptions**
Compounds containing	S^{2-}	Compounds of NH_4^{1}, the alkali metal cations, and Ca^{2+}, Sr^{2-}, and Ba^{2+}
	CO_3^{2-}	Compounds of NH_4^+ and the alkali metal cations
	PO_4^{3-}	Compounds of NH_4^+ and the alkali metal cations
	OH^-	Compounds of the alkali metal cations, and NH_4^+, Ca^{2+}, Sr^{2-}, and Ba^{2+}

Sample test questions:

Name the elements:

Cu _____ Pt _____
P _____ Na _____
F _____ Ag _____

Write the symbol for each element:

Iron _____ Carbon _____
Barium _____ Silicon _____
Lead _____ Silver _____

What is the SI unit for

Amount of a substance _____
Temperature _____
Mass _____

What is the metric prefix for:

10^{-6} _____
10^{-3} _____
10^{-9} _____

What is the formula and charge of each ion?

Lithium ion _____ Aluminum ion _____
Chloride ion _____ Ammonium ion _____
Barium ion _____ Nitrate ion _____

Name the following ions

Cu^{2+} _____ Na^{+} _____
OH^{-} _____ CO_3^{2-} _____
I^{-} _____ S^{2-} _____
SO_4^{2-} _____

Write the formula for the following acids and bases

Hydrobromic acid _____
Nitric acid _____
Sodium hydroxide _____
Sulfuric acid _____

Are the following compounds soluble or insoluble?

$AgNO_3$ _____
AgCl _____
$CuSO_4$ _____
Na_3PO_4 _____
$NH_4C_2H_3O_2$ _____