CHEMISTRY REFERENCE SHEET

$C_2H_3O_2^-$
$CH_3CO_2^-$

TABLE OF POLYATOMIC IONS

acetate	CH_3COO^-	dihydrogen phosphate	$H_2PO_4^-$	oxalate	$C_2O_4^{2-}$
arsenate	AsO_4^{3-}	hydrogen carbonate	HCO_3^-	perchlorate	ClO_4^-
arsenite	AsO_3^{3-}	hydrogen oxalate	$HC_2O_4^-$	periodate	IO_4^-
benzoate	$C_6H_5COO^-$	hydrogen sulfate	HSO_4^-	permanganate	MnO_4^-
borate	BO_3^{3-}	*hydrogen sulfide	HS^-	* peroxide	O_2^{2-}
bromate	BrO_3^-	hydrogen sulfite	HSO_3^-	phosphate	PO_4^{3-}
carbonate	CO_3^{2-}	*hydroxide	OH^-	pyrophosphate	$P_2O_7^{4-}$
chlorate	ClO_3^-	hypochlorite	ClO^-	sulfate	SO_4^{2-}
chlorite	ClO_2^-	iodate	IO_3^-	sulfite	SO_3^{2-}
chromate	CrO_4^{2-}	monohydrogen phosphate	HPO_4^{2-}	thiocyanate	SCN^-
cyanate	CNO^-	nitrate	NO_3^-	thiosulfate	$S_2O_3^{2-}$
*cyanide	CN^-	nitrite	NO_2^-	**POSITIVE POLYATOMIC IONS**	
dichromate	$Cr_2O_7^{2-}$	orthosilicate	SiO_4^{4-}	* ammonium	NH_4^+
				hydronium	H_3O^+

* Polyatomic Ion –ate, -ite exceptions

GREEK PREFIXES

1. mono-
2. di-
3. tri-
4. tetra-
5. penta-
6. hexa-
7. hepta-
8. octa-
9. nona-
10. deca-

DIATOMIC ELEMENTS (HalOgeNs)

Hydrogen (H_2)
Oxygen (O_2)
Nitrogen (N_2)
Fluorine (F_2)
Chlorine (Cl_2)
Bromine (Br_2)
Iodine (I_2)

Roman Numerals

1 – I	6 – VI
2 – II	7 - VII
3 – III	8 - VIII
4 – IV	9 - IX
5 – V	10 - X

GENERAL SOLUBILITY RULES

Soluble Substances		Insoluble substances	
Containing	**Exceptions**	**Containing**	**Exceptions**
NO_3^- (Nitrates) ClO_3^- (Chlorates)	None	PO_4^{3-} (Phosphates) CO_3^{2-} (Carbonates) CrO_4^{2-} (Chromates) SO_3^{2-} (Sulfite)	Alkali ions, H^+ & NH_4^+
CH_3COO^- (Acetates)	Ag+. Hg+		
Halogens $X^- = F^-, Cl^-, Br^-, I^-$	Ag^+, Hg^+, Cu^+, Pb^{2+}	S^{2-} (Sulfides)	Alkali ions, H^+, NH_4^+, Be^{2+}, Ra^{2+}, Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}
SO_4^{2-} (Sulfates)	Ba^{2+}, Sr^{2+}, Ca^{2+}, Hg^{2+}, Ra^{2+}, Ag^+, Pb^{2+}, Hg^+	OH^- (Hydroxides)	Alkali Ions, H^+, NH_4^+, Sr^{2+}, Ba^{2+}
Alkali ions & NH_4^+	None		

Soluble –dissolve, no precipitate (aq phase)
Insoluble –does not dissolve, precipitate forms (s phase)

TEMPERATURE CONVERSIONS

°C = K – 273
K = °C + 273

ACTIVITY SERIES

CSR

Metals Series

Lithium
Rubidium
Potassium
Sodium
Strontium
Barium
Calcium
Magnesium
Beryllium
Aluminum
Manganese
Zinc
Chromium
Iron
Cadmium
Cobalt
Nickel
Tin
Lead
Hydrogen
Antimony
Bismuth
Arsenic
Copper
Mercury
Silver
Platinum
Gold

ASR

Non-metals Series

Fluorine
Chlorine
Bromine
Iodine
Sulfur

subatomic particle	symbol	electric charge	mass number
electron	e^-	-1	0
proton	p^+	+1	1
neutron	n^0	0	1

SIGNIFICANT FIGURES

1. All non-zero digits (1-9) are significant.
2. Zeros trapped between significant digits are always significant.
3. Zeroes to the right of a decimal
   AND
   to the right of a significant figure are significant.
4. When **multiplying and dividing**, limit and round your answer to the least number of significant figures in any of the factors.
5. When **adding and subtracting**, limit and round your answer to the least number of decimal places in any of the numbers that make up your answer.

GASES

R (Universal Gas Constant) = 8.314 kPa•L / mol•K
= 0.0821 atm•L / mol•K
= 62.4 torr•L / mol•K
= 62.4 mm Hg•L / mol•K

Standard Pressure = 1 atm = 760 torr = 760 mm Hg
= 101.3 kPa

Standard Temperature = 0° C = 273 K

Standard Molar Volume: 1 mole = 22.4 L (at STP)

Combined Gas Law $P_1V_1T_2 = P_2V_2T_1$ or $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Ideal Gas Law $PV = nRT$

Solutions

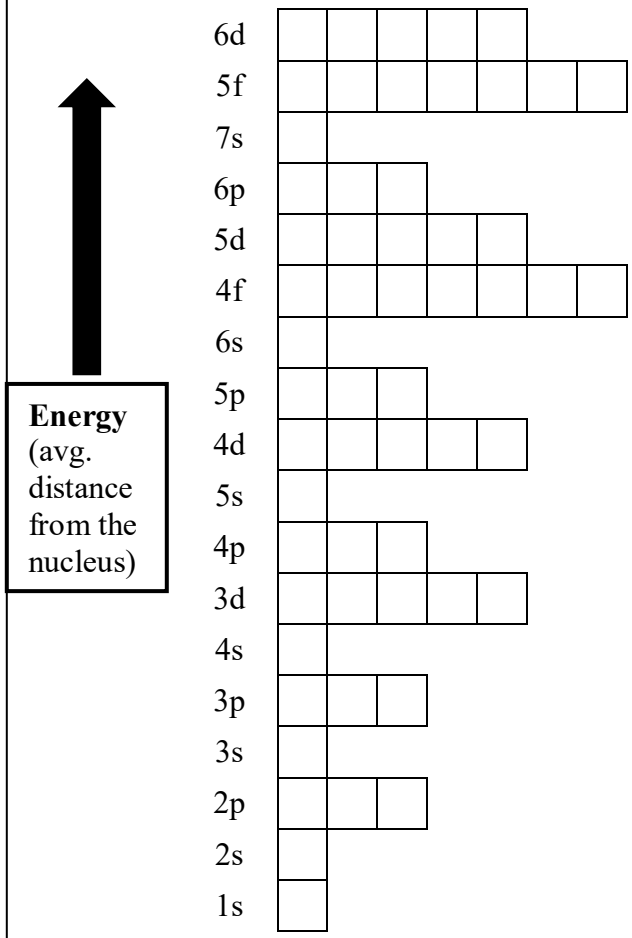
Molarity (M) = moles of solution / liters of solution

Dilution equation: $M_1V_1 = M_2V_2$

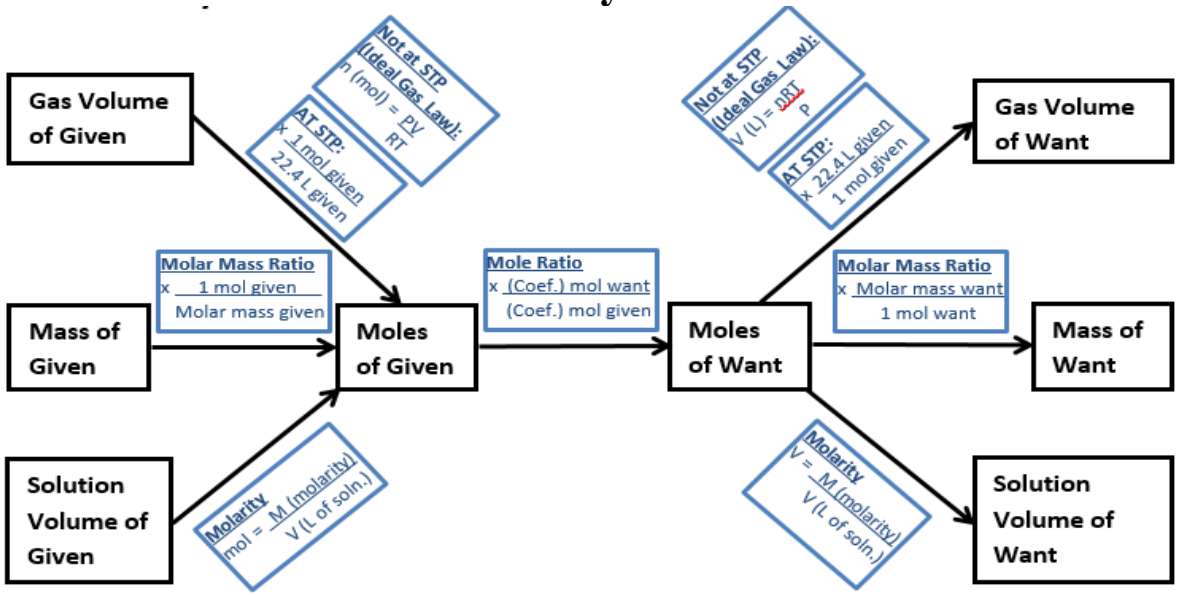
Percent error = $\left[\frac{Value_{accepted} - Value_{experimental}}{Value_{accepted}}\right] \times 100$

Percent yield = [actual yield / theoretical yield] x 100

Orbital Filling Diagram



Stoichiometry Flowchart



Metric Prefixes

Kilo-	(k)	1000
Centi-	(c)	1/100
Milli-	(m)	1/1000

1000 meters (m) = 1 kilometer (km)
1 meter (m) = 100 centimeters (cm)
1 meter (m) = 1000 millimeters (mm)

1000 grams (g) = 1 kilogram (kg)
1 gram (g) = 100 centigrams (cg)
1 gram (g) = 1000 milligrams (mg)

1000 liters (L) = 1 kiloliter (kL)
1 liter (L) = 100 centiliters (cL)
1 liter (L) = 1000 milliliters (mL)