Equations for Midterm

Density

$$Density = \frac{Mass}{Volume} \text{ or } D = \frac{M}{V}$$

Temperature

$$F = \frac{9}{5}C + 32 \text{ and } C = \frac{5}{9}(F - 32) \text{ and}$$

K= C+ 273

Velocity & acceleration:

$$v = \frac{d}{t} \qquad a = \frac{v_f - v_i}{t}$$

Acceleration due to gravity (or *g*)

is equal to –9.80 m/s^2.

The Big Six

$d = v_{ave} \bullet t$ $\qquad$ $v_f = v_i + a\,t$

$d = v_i t + \frac{1}{2}\, a\, t^2$ $\qquad$ $v_f^2 = v_i^2 + 2\, a\, d$

$v_{ave} = (v_i + v_f)/2$

Force:

F = m a

Work

W = force × distance or $W = F \times d$

For work against gravity

W=mgh where m is mass in kg, g is 9.8 m/s^2, and h is the height of the object

Power

$$\text{power} = \frac{\text{work}}{\text{time}} \text{ or } P = \frac{W}{t}$$

Energy

$$KE = \frac{1}{2}mv^2$$

Momentum

p= m v

where p is momentum, m is mass in kg, and v is velocity in m/s

Combined ideal gas law

$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ and PV=nRT *remember T in Kelvin*

Ohm's Law

$$I = \frac{V}{R} \text{ or } V = I \cdot R$$

I is current in amps(A)
V is voltage in volts (V)
R is resistance in ohms (Ω)

power

P=I V $\qquad$ P is in Watts (W)

Waves

v= f λ The speed of sound is 3 x 10^8 m/s

Where v is speed, f is frequency and lambda is wavelength.

T=1/f where T is the period.

Gas Laws

$PV=nRT$ $\qquad \frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

K=273+°C $\qquad$ 760 mm Hg = 760 torr=1 atm

R= 0.08206 L atm $mol^{-1}K^{-1}$

Rules for naming simple ionic compounds.

1. Name the metal by its elemental name.
2. Name the nonmetal by its elemental name and an -ide ending.
3. Metals that can have different oxidation states (charges) use roman numerals in their names to indicate their specific positive charge.
   Example Fe^{2+} is Iron(II)

(See following page to determine which metals can have more than one positive charge.)

4. Name polyatomic ions by their names.

Rules for naming binary covalent compounds:

1) Name the first nonmetal by its elemental name.
2) Name the second nonmetal by its elemental name and an -ide ending.
3) Use the prefixes mono, di, tri, tetra, penta or hexa to indicate the number of atoms of that element in the molecule.
4) If mono is the prefix on the first atom, it is understood and not written.

Formula	Name
NH_4^+	Ammonium
OH^-	Hydroxide
NO_3^-	Nitrate
$CH_3CO_2^-$	Acetate
CN^-	Cyanide
CO_3^{2-}	Carbonate
HCO_3^-	Bicarbonate
SO_4^{2-}	Sulfate
PO_4^{3-}	Phosphate
ClO_3^-	Chlorate

Charges of some Common Monatomic ions

H 1+ 1-																	
Li 1+	Be 2+													N 3-	O 2-	F 1-	
Na 1+	Mg 2+											Al 3+		P 3-	S 2-	Cl 1-	
K 1+	Ca 2+	Sc 3+	Ti 3+ 4+	V 3+ 4+	Cr 2+ 3+	Mn 2+ 3+	Fe 2+ 3+	Co 2+ 3+	Ni 2+ 4+	Cu 1+ 2+	Zn 2+					Br 1-	
Rb 1+	Sr 2+								Pd 2+ 4+	Ag 1+	Cd 2+		Sn 2+ 4+			I 1-	
Cs 1+	Ba 2+								Pt 2+ 4+	Au 1+ 3+	Hg 2+ *		Pb 2+ 4+				
Fr 1+	Ra 2+																

Please note that many of the metals shown here can have more possibilities that I can show here. Vanadium, for example, can be 2+, 3+, 4+ or 5+. I have only shown the more common charges.
*Mercury can be 1+ in the polyatomic ion Hg_2^{2+}.

Periodic Table of the Elements

Chemistry Reference Sheet

California Standards Test

	1 1A												13 3A	14 4A	15 5A	16 6A	17 7A	18 8A
1	1 **H** Hydrogen 1.01	2 2A																2 **He** Helium 4.00
2	3 **Li** Lithium 6.94	4 **Be** Beryllium 9.01											5 **B** Boron 10.81	6 **C** Carbon 12.01	7 **N** Nitrogen 14.01	8 **O** Oxygen 16.00	9 **F** Fluorine 19.00	10 **Ne** Neon 20.18
3	11 **Na** Sodium 22.99	12 **Mg** Magnesium 24.31	3 3B	4 4B	5 5B	6 6B	7 7B	8	9 8B	10	11 1B	12 2B	13 **Al** Aluminum 26.98	14 **Si** Silicon 28.09	15 **P** Phosphorus 30.97	16 **S** Sulfur 32.07	17 **Cl** Chlorine 35.45	18 **Ar** Argon 39.95
4	19 **K** Potassium 39.10	20 **Ca** Calcium 40.08	21 **Sc** Scandium 44.96	22 **Ti** Titanium 47.87	23 **V** Vanadium 50.94	24 **Cr** Chromium 52.00	25 **Mn** Manganese 54.94	26 **Fe** Iron 55.85	27 **Co** Cobalt 58.93	28 **Ni** Nickel 58.69	29 **Cu** Copper 63.55	30 **Zn** Zinc 65.39	31 **Ga** Gallium 69.72	32 **Ge** Germanium 72.61	33 **As** Arsenic 74.92	34 **Se** Selenium 78.96	35 **Br** Bromine 79.90	36 **Kr** Krypton 83.80
5	37 **Rb** Rubidium 85.47	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.91	40 **Zr** Zirconium 91.22	41 **Nb** Niobium 92.91	42 **Mo** Molybdenum 95.94	43 **Tc** Technetium (98)	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.91	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.87	48 **Cd** Cadmium 112.41	49 **In** Indium 114.82	50 **Sn** Tin 118.71	51 **Sb** Antimony 121.76	52 **Te** Tellurium 127.60	53 **I** Iodine 126.90	54 **Xe** Xenon 131.29
6	55 **Cs** Cesium 132.91	56 **Ba** Barium 137.33	57 **La** Lanthanum 138.91	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.95	74 **W** Tungsten 183.84	75 **Re** Rhenium 186.21	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.22	78 **Pt** Platinum 195.08	79 **Au** Gold 196.97	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.38	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.98	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
7	87 **Fr** Francium (223)	88 **Ra** Radium (226)	89 **Ac** Actinium (227)	104 **Rf** Rutherfordium (261)	105 **Db** Dubnium (262)	106 **Sg** Seaborgium (266)	107 **Bh** Bohrium (264)	108 **Hs** Hassium (269)	109 **Mt** Meitnerium (268)									

58 **Ce** Cerium 140.12	59 **Pr** Praseodymium 140.91	60 **Nd** Neodymium 144.24	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.96	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.93	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93	70 **Yb** Ytterbium 173.04	71 **Lu** Lutetium 174.97
90 **Th** Thorium 232.04	91 **Pa** Protactinium 231.04	92 **U** Uranium 238.03	93 **Np** Neptunium (237)	94 **Pu** Plutonium (244)	95 **Am** Americium (243)	96 **Cm** Curium (247)	97 **Bk** Berkelium (247)	98 **Cf** Californium (251)	99 **Es** Einsteinium (252)	100 **Fm** Fermium (257)	101 **Md** Mendelevium (258)	102 **No** Nobelium (259)	103 **Lr** Lawrencium (262)

Key

11 — Atomic number
Na — Element symbol
Sodium — Element name
22.99 — Average atomic mass*

* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.