Chem 1A Quiz & Exam Information Page

NOTE: A copy of this information page will be provided to you for quizzes and exams. I will have a copy stapled to the front of every quiz and exam you take this quarter.

Periodic Table:

Period	1A												3A	4A	5A	6A	7A	8A
	1 H 1.008																	2 He 4.003
2	3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
3	11 Na 22.99	12 Mg 24.30	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
6	55 Cs 132.9	56 Ba 137.3	La-Lu	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
7	87 Fr (223)	88 Ra (226)	Ac-Lr	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (264)	108 Hs (265)	109 Mt (268)	110 Uun (269)	111 Uuu (272)	112 Uub (269)		114 Uuq		116 Uuh		118 Uuo

s block	*d* block	*p* block

Lanthanides	57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.2	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
Actinides	89 Ac (227)	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

f block

Ion	Name	Ion	Name
NH_4^+	ammonium	CO_3^{2-}	carbonate
NO_2^-	nitrite	HCO_3^-	hydrogen carbonate (or bicarbonate)
NO_3^-	nitrate		
SO_3^{2-}	sulfite	ClO^-	hypochlorite
SO_4^{2-}	sulfate	ClO_2^-	chlorite
HSO_4^-	hydrogen sulfate (or bisulfate)	ClO_3^-	chlorate
		ClO_4^-	perchlorate
OH^-	hydroxide	$C_2H_3O_2^-$ (or CH_3COO^-)	acetate
CN^-	cyanide	MnO_4^-	permanganate
SCN^-	thiocyanide	$Cr_2O_7^{2-}$	dichromate
PO_4^{3-}	phosphate	CrO_4^{2-}	chromate
HPO_4^{2-}	hydrogen phosphate	$C_2O_4^{2-}$	oxalate
$H_2PO_4^-$	dihydrogen phosphate	O_2^{2-}	peroxide
IO_3^-	iodate	BrO_3^-	bromate
IO_2^-	iodite	BrO_2^-	bromite
IO^-	hypoiodite	BrO^-	hypobromite

Prefix	Number Indicated
mono-	1
di-	2
tri-	3
tetra-	4
penta-	5
hexa-	6
hepta-	7
octa-	8

Constants:

$N_A = 6.022 \times 10^{23}\ mol^{-1}$
$R = 0.08206\ L\ atm\ mol^{-1}K^{-1}$
$R = 8.314\ J\ mol^{-1}K^{-1}$
$\pi = 3.14$
$c = 3 \times 10^{8}\ m/s$
$h = 6.626 \times 10^{-34}\ J\ s$
$STP = 0^{o}C,\ 1\ atm$

Conversion Factors:

1 atm = 760 torr
$1\ J = 1\ kg\ m^2\ s^{-2}$
Kelvin = Celsius + 273
$1\ nm = 10^{-9}\ m$

Equations:

$M = \frac{n}{V}$ $M_1V_1 = M_2V_2$ $PV = nRT$ $\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$ $P_1 = X_1P_{tot}$ $X_1 = \frac{n_1}{n_{tot}}$

$(KE)_{av} = \frac{3}{2}RT$ $u_{av} = \overline{u} = \sqrt{\frac{8RT}{\pi M}}$ $u_{rms} = \sqrt{\overline{u^2}} = \sqrt{\frac{3RT}{M}}$ $Z = 4\left(\frac{N}{V}\right)d^2\sqrt{\frac{\pi RT}{M}}$

$E = h\nu$ $E = hc/\lambda$ $c = \nu\lambda$ $\Delta E = -(2.18\times10^{-18}\ J)\left(\frac{Z^2}{n_{final}^2} - \frac{Z^2}{n_{initial}^2}\right)$

$KE_{electron} = E_{photon} - E_{binding}$ $\lambda = h/mv$ $KE = (1/2)\ mv^2$

Solubility of Ionic Compounds in Water:

Anion	Soluble*	Slightly Soluble*	Insoluble*
NO_3^- (nitrate)	All	—	—
CH_3COO^- (acetate)	Most	—	$Be(CH_3COO)_2$
F^- (fluoride)	Group I, AgF, BeF_2	SrF_2, BaF_2, PbF_2	MgF_2, CaF_2
Cl^- (chloride)	Most	$PbCl_2$	AgCl, Hg_2Cl_2
Br^- (bromide)	Most	$PbBr_2$, $HgBr_2$	AgBr, Hg_2Br_2
SO_4^{2-} (sulfate)	Most	$CaSO_4$, Ag_2SO_4	$BaSO_4$, $SrSO_4$ $PbSO_4$, Hg_2SO_4
S^{2-} (sulfide)	Group I and II, $(NH_4)_2S$	—	Most
CO_3^{2-} (carbonate)	Group I, $(NH_4)_2CO_3$	—	Most
SO_3^{2-} (sulfite)	Group I, $(NH_4)_2SO_3$	—	Most
PO_4^{3-} (phosphate)	Group I, $(NH_4)_3PO_4$	—	Most
OH^- (hydroxide)	Group I, $Ba(OH)_2$, NH_4OH	$Sr(OH)_2$, $Ca(OH)_2$	Most

***Soluble**: dissolves to the extent of > 10 g/L ***Slightly Soluble**: 0.1 to 10 g/L ***Insoluble**: < 0.1 g/L