CONSTANTS

$R = 8.3145\ \text{J mol}^{-1}\text{K}^{-1}$
$R = 0.08206\ \text{L atm mol}^{-1}\text{K}^{-1}$
$N_A = 6.023 \times 10^{23}$ atoms/mol
$F = 96{,}485\ \text{C/mol}$
$h = 6.626 \times 10^{-34}\ \text{J s}$
$c = 3 \times 10^{8}\ \text{m/s}$

CONVERSION FACTORS

1 atm = 760 torr
1 A = 1 C/sec
1 V = 1 J/C
1 L atm = 101.3 J

EQUATIONS

$$E = E^{o} - \left(\frac{RT}{nF}\right) \ln Q$$

$$E = E^{o} - \left(\frac{0.0257}{n}\right) \ln Q \quad \text{at } 25\,^{o}\text{C}$$

$$E = E^{o} - \left(\frac{0.0592}{n}\right) \log Q \quad \text{at } 25\,^{o}\text{C}$$

$$E^{o} = \left(\frac{RT}{nF}\right) \ln K$$

$$\Delta G = \Delta G^{o} + RT \ln Q$$

$$\Delta G = \Delta H - T\Delta S$$

$$\Delta G^{o} = -RT \ln K$$

zero order: $[A] = -kt + [A]_o$ $\quad t_{1/2} = \dfrac{[A]_o}{2k}$

first order: $\ln [A] = -kt + \ln [A]_o$ $\quad t_{1/2} = \dfrac{0.693}{k}$

second order: $\dfrac{1}{[A]} = kt + \dfrac{1}{[A]_o}$ $\quad t_{1/2} = \dfrac{1}{k[A]_o}$

$$I = \frac{nF}{t}$$

$$\Delta G = -nFE$$

$$\Delta G^{o} = -nFE^{o}$$

$$q = M c \Delta T$$

$$k = Ae^{-E_a/RT}$$

$$\ln k = \ln A - E_a/RT$$

$$\Delta E = -(2.18 \times 10^{-18})\left(\frac{1}{n^2_{\text{final}}} - \frac{1}{n^2_{\text{initial}}}\right)$$

$$\Delta E = h\nu = \frac{hc}{\lambda}$$

$$\ln\left(\frac{k_2}{k_1}\right) = \frac{E_a}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

$$pH = -\log[H^{+}] \qquad [H^{+}] = 10^{-pH}$$

$$pH = pK_a + \log\left([A^{-}] / [HA]\right) \qquad pK_a = -\log K_a$$

PERIODIC TABLE

Period	1A	2A											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

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)