

FORMULA SHEET (tear off)

1A										8A									
1 H 1.01	2A										3A	4A	5A	6A	7A	2 He 4.00			
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18		
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95		
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	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 65.41	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80		
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		
55 Cs 132.9	56 Ba 137.3	71 Lu 175.0	72 Hf 178.5	73 Ta 181.0	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]		
87 Fr [223]	88 Ra [226]	103 Lr [262]	104 Rf [261]	105 Db [262]	106 Sg [266]														
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						
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]						

$$N_A = 6.022 \times 10^{23}$$

$$1 \text{ amu} = 1.661 \times 10^{-27} \text{ kg}$$

$$1 \text{ atm} = 760 \text{ torr} = 760 \text{ mm Hg}$$

$$R = 0.08206 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K}$$

$$R = 8.314 \text{ J}/\text{mol}\cdot\text{K}$$

$$F = 96485 \text{ C}/\text{mol}$$

$$^{\circ}\text{C} = (5/9) (^{\circ}\text{F} - 32)$$

$$^{\circ}\text{C} = \text{K} - 273.15$$

$$1 \text{ atm} = 1.013 \text{ bar}$$

$$1 \text{ L}\cdot\text{atm} = 101.3 \text{ J}$$

$$1 \text{ J} = 1 \text{ kg}\cdot\text{m}^2/\text{s}^2$$

$$(1 \text{ volt}) \cdot (1 \text{ Coulomb}) = 1 \text{ Joule}$$

$$^{\circ}\text{F} = (9/5)(^{\circ}\text{C}) + 32$$

$$\text{K} = ^{\circ}\text{C} + 273.15$$

$$pV = nRT$$

$$p_A = X_A p_A^{\circ}$$

$$\Delta T_b = K_b m_B$$

$$H = U + pV$$

$$\Delta G_{\text{rxn}} = \Delta G^{\circ}_{\text{rxn}} + RT \ln Q$$

$$\text{If } ax^2 + bx + c = 0, \text{ then } x = \left(\frac{-b \pm [b^2 - 4ac]^{1/2}}{2a} \right)$$

$$K_a \cdot K_b = K_w$$

$$K_a \cdot K_b = 1.0 \times 10^{-14} \text{ (at } T = 25. ^{\circ}\text{C)}$$

$$\text{pH} = \text{p}K_a + \log_{10} \left\{ \frac{[\text{base}]}{[\text{acid}]} \right\}$$

$$\Delta G = -nFE_{\text{cell}}$$

$$[A]_t = [A]_0 e^{-kt}$$

$$[A]_t = \frac{[A]_0}{(1 + kt[A]_0)}$$

$$k = A e^{-E_a/RT}$$

$$[B] = k p_B$$

$$\Delta T_f = K_f m_B$$

$$G = H - TS$$

$$\ln K = -\frac{\Delta G^{\circ}_{\text{rxn}}}{RT}$$

$$2a$$

$$E_{\text{cell}} = E^{\circ}_{\text{cell}} - \frac{RT}{nF} \ln Q$$

$$\ln[A]_t = \ln[A]_0 - kt$$

$$\frac{1}{[A]_t} = \frac{1}{[A]_0} + kt$$

$$\ln k = \ln A - (E_a/R)(1/T)$$

$$\Delta p_A = X_B p_A^{\circ}$$

$$\Pi = M_B RT$$

$$K_p = K_C (RT)^{\Delta n_g}$$

$$\text{pH} + \text{pOH} = \text{p}K_w$$

$$\text{pH} + \text{pOH} = 14.00 \text{ (at } T = 25. ^{\circ}\text{C)}$$

$$\ln K = \frac{nFE^{\circ}_{\text{cell}}}{RT}$$

$$t_{1/2} = (\ln 2)/k$$

$$t_{1/2} = 1/(k[A]_0)$$

$$\ln(k_2/k_1) = - (E_a/R) \left[(1/T_2) - (1/T_1) \right]$$