Periodic Table of Elements v4

Super Seven		even Gas	Con	worsions	Da	Periodic Trends		5 333 :			2 Company							
	HI HBr HCI HNO ₃		$1 L \cdot ats$ $K = {}^{c}$	Conversions $1 \text{ L} \cdot \text{atm} = 101.3 \text{ J}$ $K = {}^{\circ}\text{C} + 273.15$ $1 \text{ cal} = 4.184 \text{ J}$		EN, IE, EA, & \mathbb{Z}_{eff} increase $\rightarrow \uparrow$ Radius & Metallic decrease $\rightarrow \uparrow$		Equilibrium $ \text{When } aA + bB \ \rightleftharpoons \ cC + dD, $ $ K_c \ = \ \frac{[C]^c[D]^d}{[A]^a[B]^b} $		$R_{H_{R_1}}$	Quantum $E_{\rm photon} \ = \ hf \ = \ \frac{hc}{\lambda}$ $\lambda \ = \ \frac{h}{mv}$ $R_{H_{\rm Rydberg}} \ = \ 1.097 \times 10^7 \ {\rm m}^{-1}$							
	H ₂ SO ₂ HClO ₂ HClO ₂	C_2H_6 C_3H_8 C_4H_{10}		g = Gram(s) $(k)J = (k)$		nm of Mercury xilo)Joule(s) olt(s)		$K_{p} = \frac{(P_{C})^{c}(P_{D})^{d}}{(P_{A})^{a}(P_{B})^{b}}$ $K_{a} = \frac{[H^{+}][A^{-}]}{[HA]}$ $K_{b} = \frac{[OH^{-}][HB^{+}]}{[B]}$ $K_{w} = K_{a}K_{b} = [H^{+}][OH^{-}]$ $K_{w} = 1.0 \times 10^{-14} \ (25^{\circ} \ C)$ $pH = pK_{a} + \log \frac{[A^{-}]}{[HA]} = -\log[H^{+}]$ $pH + pOH = 14.$ $pK_{a} = -\log K_{a}, pK_{b} = -\log K_{b}.$ $Gasses/Solutions$		<u> </u>	$\frac{1}{\lambda} = R_H \left(\frac{1}{n_i^2} - \frac{1}{n_f^2} \right)$ $\triangle E = (-2.18 \times 10^{-18} \text{ J}) \left(\frac{1}{n_f^2} - \frac{1}{n_i^2} \right)$							
	1 IA	N ₂ O NH ₃		cm Atmosphere	e(s) mol Mole(s)					Т	Thermo/Electrochem							18 VIIIA
1	1 2.20 H ₂ Hydrogen	SO ₃ SO ₂ H ₂ S HCI	Faraday C	's Number Constant	F = 96485	$\begin{split} N_A &= 6.02214 \times 10^{23} \text{mol}^{-1} \\ F &= 96485.33 \text{ C mol}^{-1} \\ 1 \text{ amu} &= 1.660538 \times 10^{-27} \text{ kg} \\ R &= 8.3145 \text{ J (mol K)}^{-1} \\ R &= 0.082057 \text{ L atm (mol K)}^{-1} \\ R &= 62.36 \text{ L torr (mol K)}^{-1} \\ k_e &= 8.987551 \times 10^9 \text{ N m}^2 \text{ C}^{-2} \\ c &= 2.998 \times 10^8 \text{ m s}^{-1} \\ k_b &= 1.3807 \times 10^{-23} \text{ J K}^{-1} \end{split}$				\triangle	$\begin{array}{rcl} q &=& mc\triangle T \\ \triangle S^\circ &=& \sum_{products} S^\circ - \sum_{reactants} S^\circ \\ Same for \triangle H^\circ \ and \triangle G^\circ \\ \triangle G^\circ &=& \triangle H^\circ - T\triangle S^\circ \\ &=& -RT\ln K = -nFE^\circ \\ I &=& \frac{q}{t} \\ E_cell &=& E_cell^\circ - \frac{RT}{nF}\ln Q. \end{array}$							He Helium
	1.01	2 IIA		lass Constant s Constant	R = 8.3145									14 IVA	15 VA	16 VIA	17 VIIA	4.00
2	3 0.98 Li Lithium 6.94	4 1.57 Be Beryllium 9.01	Speed of I Boltzmani	s Constant Light (Vacuum) n Constant	R = 62.36 $k_e = 8.9873$ c = 2.998 > $k_b = 1.380$			$P_{\text{total}} = P_A + P$	re $X_A = \frac{\text{moles } A}{\text{total mole}}$ $P_B + P_C + \cdots$ $P_B = \frac{\text{moles solute}}{\text{kg solvent}}$	es $[A]_t$	Kinetics $[A]_t - [A]_0 = -kt \text{ (1st order)}$		5 2.04 B Boron 10.81	6 2.55 C Carbon 12.01	7 3.14 N ₂ Nitrogen 14.01	8 3.44 O ₂ Oxygen 16.00	9 3.98 F ₂ Fluorine 19.00	Ne Neon 20.18
3	11 0.93 Na Sodium 22.99	12 1.31 Mg Magnesium 24.31	Planck's (a Proton/Electron $e=1.602$ onstant $h=6.626$ at cap. of $\mathrm{H_2O_{(I)}}$ $c=4.18~\mathrm{k}$ 4 IVB 5 VB		$ imes 10^{-34} \; Js$	A	STP = 273.15 K and 1.0 atm At STP, ideal gas 22.4 L mol $^{-1}$. Standard conditions 25° C, 1 atm		$\frac{1}{[A]_t}$	$\ln[A]_t - \ln[A]_0 = -k \text{ (2}^{\text{nd}} \text{ order)}$ $\frac{1}{[A]_t} - \frac{1}{[A]_0} = kt \text{ (3}^{\text{rd}} \text{ order)}$ $t_{1/2} = \frac{0.963}{t} \text{ (1}^{\text{st}} \text{ order)}$ VIIIB 11 IB 12 IIB		13 1.61 Al Aluminium 26.98	14 1.90 Si Silicon 28.09	15 2.19 P Phosphorus 30.97	16 2.38 S Sulfur 32.06	17 3.16 Cl ₂ Chlorine 35.45	Ar Argon 39.95
4	19 0.82 K Potassium 39.10	20 1.00 Ca Calcium 40.08	21 1.36 Sc Scandium 44.96	22 1.54 Ti Titanium 47.87	23 1.63 V Vanadium 50.94	24 1.66 Cr* Chromium 52.00	25 1.55 Mn Manganese 54.94	26 1.83 Fe Iron 55.85	27 1.88 Co Cobalt 58.93	28 1.91 Ni Nickel 58.69	29 1.90 Cu * Copper 63.55	30 1.65 Zn Zinc ⁽²⁺⁾ 65.38	31 1.81 Ga Gallium 69.72	32 2.01 Ge Germanium 72.63	33 2.18 As Arsenic 74.92	34 2.55 Se Selenium 78.97	35 2.96 Br₂ Bromine 79.90	36 3.00 Kr Krypton 83.80
5	Rb Rubidium 85.47	38 0.95 Sr Strontium 87.62	39 1.22 Y Yttrium 88.91	40 1.33 Zr Zirconium 91.22	Nb ★ Niobium 92.91	Mo ★ Molybdenum 95.95	Tc Tchnetium (98)	Ru* Ruthenium 101.07	Rh ★ Rhodium 102.91	Pd ★★ Palladium 106.42		48 1.69 Cd Cadmium 112.41	49 1.78 In Indium 114.82	50 1.96 Sn Tin 118.71	51 2.05 Sb Antimony 121.76	Te Tellurium 127.60	53 2.86 12 lodine 126.90	Xe Xenon 131.29
6	Cs Caesium 132.91	Ba Barium 137.33	57-71 La-Lu Lanthanide	72 1.3 Hf Hafnium 178.49	73 1.5 Ta Tantalum 180.95	74 2.36 W Tungsten 183.84	75 1.9 Re Rhenium 186.21	76 2.2 Os Osmium 190.23	77 2.20 r Iridium 192.22	78 2.28 Pt★ Platinum 195.08	79 2.54 Au ★ Gold 196.97	Hg Mercury 200.59	81 1.62 TI Thallium 204.38	82 1.87 Pb Lead 207.2	83 2.02 Bi Bismuth 208.98	Po Polonium (209)	At Astatine (210)	86 2.2 Rn Radon (222)
7	Fr Francium (223)	Ra Radium (226)	89-103 Ac-Lr Actinide	104 Rf Rutherfordium (267)	105 Db Dubnium (268)	106 Sg Seaborgium (269)	107 Bh Bohrium (270)	108 Hs Hassium (277)	109 Mt Meitnerium (278)	110 Ds Darmstadtiun (281)	111 Rg Roentgenium (282)	112 Cn Copernicium (285)	113 Nh Nihonium (286)	114 Fl Flerovium (289)	Moscovium (290)	116 L V Livermorium (293)	Tennessine (294)	118 Og Ogannesson (294)
	7 1 1 1	Alkali Metal Alkaline-Earth Metal Metalloid Non-metal	Z E.N. Sym Name mass	57 1.1 La Lanthanum 138.91	58 1.12 Ce Cerium 140.12	Pr Praseodymium 140.91	60 1.14 Nd Neodymium 144.24	Pm Promethium (145)	62 1.17 Sm Samarium 150.36	63 1.2 Eu Europium 151.96	Gd Gadolinium 157.25	65 1.1 Tb Terbium 158.93	Dy Dysprosium 162.50	67 1.23 Ho Holmium 164.93	68 1.24 Er Erbium 167.26	Tm Thulium 168.93	70 1.1 Yb Ytterbium 173.05	71 1.27 Lu Lutetium 174.97
	Halogen Noble Gas Lanthanide/Actinide Synthetic ★ Aufbau Exception			Ac Actinium (227)	90 1.3 Th Thorium 232.04	91 1.5 Pa Protactinium 231.04	92 1.38 U Uranium 238.03	93 1.36 Np Neptunium (237)	94 1.28 Pu Plutonium (244)	95 1.13 Am Americium (243)	96 1.28 Cm Curium (247)	97 1.3 Bk Berkelium (247)	98 1.3 Cf Californium (251)	99 1.3 Es Einsteinium (252)	100 1.3 Fm Fermium (257)	101 1.3 Md Mendelevium (258)	102 1.3 No Nobelium (259)	103 1.3 Lr Lawrencium (266)