Periodic Table of Elements v4.2

i citodic table of Elements vii																			
	Super Se			nversions		riodic Trends		Equilib	rium		Quantum			Walent	(Wa)				
	HI HBr	NO NO <sub>2</sub>		m = 101.3 J $C + 273.15$		$\mathbb{Z}_{eff}$ increase $ ightarrow_{\downarrow}$ EN, IE, & EA increase $ ightarrow_{\uparrow}$ Radius & Metallic decrease $ ightarrow_{\uparrow}$		When $aA + bB \rightleftharpoons cC + dD$ , $K_c = \frac{[C]^c[D]^d}{[A]^a[B]^b}$ $K_p = \frac{(P_C)^c(P_D)^d}{(P_A)^a(P_B)^b}$ $K_a = \frac{[H^+][A^-]}{[HA]}$ $K_b = \frac{[OH^-][HB^+]}{[B]}$		E	$E_{ m photon} = hf = rac{hc}{\lambda}$ $\lambda = rac{h}{mv}$ $R_{H_{ m Rydberg}} = 1.097  imes 10^7  { m m}^{-1}$			$1 \; Walent = 0.082 \; L(mol \; K)^{-1}$					
	HCI	CO		= 4.184  J	Radius &					D									
	HNO <sub>3</sub>					ıit.a				$n_{H_{Ryr}}$	$R_{H_{Rydberg}} = 1.097 \times 10^{\circ}  \mathrm{m}^{-1}$ $\frac{1}{\lambda} = R_{H} \left( \frac{1}{n_{i}^{2}} - \frac{1}{n_{f}^{2}} \right)$		R=1 Walentmosphere (Wam)						
	HCIO:	$C_2H_6$	(m	)L (milli)Liter(:	<b>Units</b> s) mmHg n	mmHg mm of Mercury					$\Delta E = (-2.18 \times 10^{-18} \text{ J}) \left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$			=1 Walentorr					
	HCIO	$C_3H_8$ $C_4H_{10}$		g Gram(s)	(k)J (kilo)Joule(s)					$\Delta E = (-$	-2.16 × 10 J	$\left(\frac{\overline{n_f^2}}{\overline{n_f^2}} - \frac{\overline{n_i^2}}{\overline{n_i^2}}\right)$	$1~\mathrm{m}^3 = 8.2 \times 10^{-5}~\mathrm{Wamokel}$ (Wal)						
		N <sub>2</sub> O		nm Nanometer(s) V V tm Atmosphere(s) mol N		/olt(s) //ole(s)		$K_w = K_a K_b = [H^+][OH^-]$ $K_w = 1.0 \times 10^{-14} (25^{\circ} \text{ C})$		т	Thermo/Electrochem		Ideal Gas at STP: 1.837 Wake (Wk)						
	1 IA	NH <sub>3</sub> SO <sub>3</sub>		. (,			р	$\begin{aligned} pH &= p K_a + \log \frac{[A^-]}{[HA]} = -\log[H^+] \\ &pH + pOH = 14. \\ &p K_a = -\log K_a, p K_b = -\log K_b. \end{aligned}$		•	$q = mc\Delta T$							18 VIIIA	
	<b>1</b> 2.20	$SO_2$		Constants			. n			$\triangle S^{\circ} =$	$\triangle S^{\circ} = \sum_{\text{products}} S^{\circ} - \sum_{\text{reactants}} S^{\circ}$								
1	H <sub>2</sub>	H <sub>2</sub> S HCl	Avogadro' Faraday C	's Number		$214  imes 10^{23}  ext{mol}^-$ .33 C $ ext{mol}^{-1}$	1	$p_{\Pi_a} = \log \Pi_a, p_{\Pi_0} = \log \Pi_0.$			Same for $\triangle H^\circ$ and $\triangle G^\circ$ $\triangle G^\circ = \triangle H^\circ - T \triangle S^\circ$								
	Hydrogen 1.01	2 II Atomic M		Mass Constant $1 \text{ amu} =$		$.660538 \times 10^{-27}$	kg	Gasses/So			$= -RT \ln K = -nFE^{\circ}$ $I = \frac{q}{t}$ $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{RT}{nF} \ln Q.$			14 IVA	15 VA 16 VIA		17 VIIA	Helium 4.00	
	2 0.00		Molar Gas	s Constant		$R = 8.3145 \text{ J (mol K)}^{-1}$ $R = 0.082057 \text{ L atm (mol K)}^{-1}$		$PV = nRT$ $P_A = P_{total} X_A$ , where $X_A = \frac{moles\ A}{total\ moles}$		= F <sub>ee</sub>								10	
2	3 0.98 <b>Li</b> Lithium	4 1.57 <b>Be</b>				$R = 62.36 \text{ L torr (mol K)}^{-1}$ $k_e = 8.987551 \times 10^9 \text{ N m}^2 \text{ C}^{-2}$ $c = 2.998 \times 10^8 \text{ m s}^{-1}$ $k_b = 1.3807 \times 10^{-23} \text{ J K}^{-1}$		$P_{ ext{total}} = P_A + P_B + P_C + \cdots$ $M = \frac{\text{moles solute}}{\text{Liters solution}}, m = \frac{\text{moles solute}}{\text{kg solvent}}$		es — Co	ceil nF v			6 2.55	7 3.14 <b>N</b> <sub>2</sub>	${f O_2}^{3.44}$	9 3.98 <b>F<sub>2</sub></b>	Ne	
		Beryllium		s Constant Light (Vacuum)				$M=rac{ ext{fillows solute}}{ ext{Liters solution}}, \ 1  ext{ atm} = 760  ext{ mm}$	$m = \frac{\text{moles solute}}{\text{kg solvent}}$ $\text{Hg} = 760 \text{ torr}$		Kinetics			Carbon	Nitrogen	Oxygen	Fluorine	Neon	
	6.94	9.01		n Constant	$k_b = 1.380$			STP = $273.15$ K and $1.0$ atm At STP, ideal gas $22.4$ L mol $^{-1}$ . Standard conditions $25^{\circ}$ C, $1$ atm.			$[A]_t - [A]_0 = -kt$ (1 <sup>st</sup> order) $\ln[A]_t - \ln[A]_0 = -k$ (2 <sup>nd</sup> order) $\frac{1}{[A]_t} - \frac{1}{[A]_0} = kt$ (3 <sup>rd</sup> order)			12.01	14.01	16.00	19.00	20.18	
3	11 0.93 Na Sodium 22.99	<b>12</b> 1.31		a Proton/Electr	ron $e = 1.602$					$\ln[A]_t$				<b>14</b> 1.90	<b>15</b> 2.19	<b>16</b> 2.38	<b>17</b> 3.16	18	
		Mg		Planck's Constant $h=6.626\times 10^{-34}~{\rm Js}$ Specific heat cap. of ${\rm H_2O_{(I)}}$ $c=4.18~{\rm kJ~kg^{-1}}^{\circ}{\rm C^{-1}}$				$v_{rms} = \sqrt{rac{3RT}{\mathcal{M}}}$			$t_{1/2} = rac{[A]_t}{t} \left(1^{st} \; order ight)$			Si		Sulfur Cl <sub>2</sub>		Ar	
		Magnesium 24.31	a 1115	4 1 V D				ID 0.7/IIID 0.7/IIID 1		10.1/11/15	10.1/110				Silicon Phosphorus 30.97		Chlorine 35.45	Argon 39.95	
	22.33	21.01	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIIIB	9 VIIIB	10 VIIIB	11 IB	12 IIB	26.98	20.03	30.31	32.06	33.13	03.30	
4	<b>19</b> 0.82	20 1.00	21 1.36		<b>23</b> 1.63		<b>25</b> 1.55			28 1.91	<b>29</b> 1.90	30 1.65	31 1.81	2.01	<b>33</b> 2.18	<b>34</b> 2.55	<b>35</b> 2.96	<b>36</b> 3.00	
	<b>K</b> Potassium	<b>Ca</b> Calcium	<b>Sc</b> Scandium	<b>Ti</b> Titanium	<b>V</b> Vanadium	<b>Cr</b> ★ Chromium	Mn Manganese	Fe Iron	<b>Co</b> Cobalt	<b>Ni</b> Nickel	<b>Cu</b> ★ Copper	Zn Zinc <sup>(2+)</sup>	<b>Ga</b> Gallium	<b>Ge</b> Germanium	<b>As</b> Arsenic	<b>Se</b> Selenium	Br <sub>2</sub>	<b>Kr</b> Krypton	
	39.10	40.08	44.96	47.87	50.94	52.00	54.94	55.85	58.93	58.69	63.55	65.38	69.72	72.63	74.92	78.97	79.90	83.80	
5	37 0.82 <b>Rb</b>	<b>38</b> 0.95	<b>39</b> 1.22	<b>40</b> 1.33	<b>41</b> 1.6	<b>42</b> 2.16	<b>43</b> 1.9	<b>44</b> 2.2	<b>45</b> 2.28	<b>46</b> 2.20	<b>47</b> 1.93	<b>48</b> 1.69	<b>49</b> 1.78	<b>50</b> 1.96	<b>51</b> 2.05	<b>52</b> 2.1	<b>53</b> 2.86	<b>54</b> 2.60	
		Sr	Υ	Zr	Nb★	Mo★	Tc	Ru★	Rh★	Pd**	Ag★	Cd	In	Sn	Sb	Te	$I_2$	Xe	
J	Rubidium 85.47	Strontium	Yttrium	Zirconium	Niobium	Molybdenum	Technetium	Ruthenium	Rhodium	Palladium	Silver <sup>(1+)</sup>	Cadmium	Indium	Tin	Antimony	Tellurium	lodine	Xenon	
	85.47	87.62	88.91	91.22	92.91	95.95	(98)	101.07	102.91	106.42	107.87	112.41	114.82	118.71	121.76	127.60	126.90	131.29	
6	<b>Cs</b> Caesium 132.91	<b>56</b> 0.89	57-71	<b>72</b> 1.3	<b>73</b> 1.5	<b>74</b> 2.36	<b>75</b> 1.9	<b>76</b> 2.2	<b>77</b> 2.20	<b>78</b> 2.28	<b>79</b> 2.54	<b>80</b> 2.00	81 1.62	<b>82</b> 1.87	<b>83</b> 2.02	<b>84</b> 2.0	<b>85</b> 2.2	86 2.2	
		<b>Ba</b> Barium	La-Lu Lanthanide	<b>Hf</b> Hafnium	<b>Ta</b> Tantalum	<b>W</b> Tungsten	Re Rhenium	<b>Os</b> Osmium	<b>l r</b> Iridium	<b>Pt</b> ★ Platinum	<b>Au</b> ★ Gold	<b>Hg</b> Mercury	<b>TI</b> Thallium	Pb Lead	<b>Bi</b> Bismuth	<b>Po</b> Polonium	<b>At</b> Astatine	<b>Rn</b> Radon	
		137.33	: :	178.49	180.95	183.84	186.21	190.23	192.22	195.08	196.97	200.59	204.38	207.2	208.98	(209)	(210)	(222)	
7	<b>87</b> 0.7	<b>88</b> 0.9	89-103	104	105	106	107	108 109		110	111	112	113	114	115	116	117	118	
			Ac-Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	FI	Mc	Lv	Ts	Og	
1	Francium	Radium	Actinide	Ruther- fordium	Dubnium	Seaborgium	Bohrium	Hassium	Meitnerium	Darm- stadtium	Roentgenium	Copernicium	Nihonium	Flerovium	Moscovium	Livermorium	Tennessine	Ogannesson	
	(223)	(226)		(267)	(268)	(269)	(270)	(277)	(278)	(281)	(282)	(285)	(286)	(289)	(290)	(293)	(294)	(294)	
		Ikali Metal	<b>Z</b> E.N.	<b>57</b> 1.1 <b>58</b>	<b>58</b> 1.12	<b>59</b> 1.13	60 1.14	<b>61</b> 1.13		<b>63</b> _ 1.2	<b>64</b> 1.2	<b>65</b> 1.1	<b>66</b> 1.22	<b>67</b> 1.23	<b>68</b> 1.24	<b>69</b> 1.25	<b>70</b> 1.1	<b>71</b> 1.27	
		Alkaline-Earth Metal	Sym	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Но	Er	Tm	Yb	Lu	
	1	Metalloid Non-metal	Name : mass :	Lanthanum 138.91	Cerium 140.12	Praseodymium 140.91	Neodymium 144.24		Samarium 150.36	Europium 151.96	Gadolinium 157.25	Terbium 158.93	Dysprosium 162.50	Holmium 164.93	Erbium 167.26	Thulium 168.93	Ytterbium 173.05	Lutetium 174.97	
	i i	Halogen						02 1.26											
		Noble Gas Lanthanide/Acti	nide	89 1.1 <b>Ac</b>	90 1.3 <b>Th</b>	91 1.5 <b>Pa</b>	92 1.38 <b>U</b>	93 1.36 Np	94 1.28 Pu	95 1.13 Am	96 1.28 Cm	97 1.3 Bk	98 1.3	99 1.3 Es	100 1.3 Fm	101 1.3 Md	102 1.3 No	103 1.3	
	Synthetic ★ Aufbau Exception			Actinium	Thorium	Protactinium	Uranium	Neptunium	Plutonium	Americium	Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	Nobelium	Lawrencium	
				(227)	232.04	231.04	238.03	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(266)	