|  |  |
| --- | --- |
| Unit 1 | Unit 2  **Bohr:** orbitals  **Thompson:** electron- plum pudding  **Millikan:** Charge of electron- oil drop  **Rutherford-** Positive Nucleus (proton)- Gold Foil  **Chadwick**- neutron- Beryllium with alpha particles  **Schrodinger-** Location of electrons- Quantum mechanical model  **Aristotle**- Matter was continuous  **Democritus**- “atom” matter was indivisible  **John Dalton**- Atomic Theory  **Quantum#’s**  [**energy level(**1-7) , **sublevel** (s=0, p=1, d=2,f=3), **orbital** (bus seat -7 -+7), **spin of electron**(+ ½ , - ½ )] |
| Unit 3  **Dobereiner-** Triads (similar properties)  **Newlands-** law of octaves  **Mendeleev**- Farther of Periodic Table (ordered by mass)  **Mosley-** re-ordered periodic table by atomic number  **Atomic radius-** size of an atom (decreases across a period, increases down a group)  **Electronegativity**- attractiveness of electrons (increases across a period, decreases down a group)  **Ionization Energy**- energy needed to remove and electron (increases across a period, decreases down a group)  **Shielding**- blocking of attractive force by nucleus on electron, caused by additional energy levels (remains constant across a period, increases down a group) | Unit 4  **Lewis structures:**  Count Valence electrons  Divide by 2 to get pairs of electrons  Least electro negative in the center  Connect terminal atoms with central atoms using a bond  Satisfy Octet rule of terminal atoms  Remaining pairs go on central atom  **C-NOPS** can make a double bond  **Ionic**- metal and nonmetal (transfer electrons)  **Covalent**- nonmetal and nonmetal (share electrons)  **Metallic**- Metal and metal (electron sea) |
| Unit 5  **Covalent naming-** use prefix  Do NOT criss-cross charges  IDE= monoatomic  **Ionic naming-** Name cation (transition metal gets roman numeral for charge)  Name Anion—IDE= monoatomic  Criss-cross charges and reduce  **Acid Naming**- ATE🡪IC ITE🡪 OUS IDE🡪 IC  Binary acids- HYDRO-\_\_\_\_\_\_\_-IC  **Organic naming**- Alkane- single bonds (2n+2)  Alkene- double bond (2n)  Alkyne triple bond (2n-2) | Unit 6  **BrINClHOF**--- diatomic elements  **MINHO**- Order to balance equations  **Combustion**- Hydrocarbon (CH) + Oxygen 🡪 Water + CO2  **Decomposition**- AB 🡪 A + B  **Synthesis** – A + B 🡪 AB  **Single Replacement** - AB + C 🡪 AC + B  **Double replacement**- AB + CD 🡪 AD + BC  **Neutralization** – Acid + Base 🡪 Water + Salt |
| Unit 7  1. moles 🡪 grams: Use molar mass  2. moles 🡪 liters: If @ STP use 22.4L; if not use Density  3. moles 🡪 particles: Use 6.022x1023particles  **Empirical Formula**: convert all elements to moles  Divide all by the lowest number of moles  Use the whole numbers as subscripts for elements  **Molecular formula:**  n= the factor by which you multiply all subscripts in the empirical formula | Unit 8 STOICHIOMETRY Start with given amount in problem and  1. Convert given to moles  2. Use mole to mole ratio from balanced equation.  3. Convert out of moles to desired unit  n= total number of divisions  Nuclear Chemistry  Alpha- Proton-  Beta- Neutron-  Gamma- Positron- |
| Unit 9  **q= mc∆T f – Ti**  **H= enthalpy**  -∆H= exothermic  +∆H= Endothermic  **Factors that affect Equilibrium**   1. Pressure 2. Concentration 3. Temperature   **Factors that affect reaction rate**   1. Concentration 2. Pressure 3. Temperature 4. Surface area 5. Catalysts | Unit 10  **pH = -log[H+] pOH = -log[OH-]**  **[H+] = 10 ^-pH [OH-] = 10^-pOH**  **pH + pOH = 14**  pH = 7 🡪 neutral solution  pH > 7 🡪 basic solution  pH < 7 🡪 acidic solution  **WATER DATA**  1. boiling point of water = 100°C, 373K  2. freezing point of water = 0°C, 273K  4. WATER IS VERY POLAR AND HAS H-BONDING, MAKING IT VERY STRONG  -THERE IS NO CHANGE IN TEMPERATURE DURING A PHASE CHANGE !! - the energy is being used to break the molecules apart for the phase change |
| Unit 11  **Ideal Gas Law**  **Combined Gas Law**  **Dalton’s law of partial pressure**  Pt=Pa+Pb+Pc…..  **Kinetic Molecular Theory of Gases:**   1. Gases are made of particles in rapid motion. 2. Gas particles have no attractive forces (they don’t stick together) 3. Gases at the same temperature have the same kinetic energy. 4. Temperature and kinetic energy are directly related. 5. Collisions between gas particles are perfectly elastic (don’t lose energy). | Polyatomic   |  |  | | --- | --- | | Carbonate | CO3-2 | | Phosphate | PO4-3 | | Chlorate | ClO3-1 | | Nitrate | NO3-1 | | Chromate | CrO4-2 | | Permanganate | MnO4-1 | | Ammonium | NH4+1 | | Hydronium | H3O+1 | | Acetate | C2H3O2-1 | | Sulfate | SO4-2 | | Cyanide | CN-1 | | Bicarbonate | HCO3-1 | | Hydroxide | OH-1 | | peroxide | O2-2 | |