**Prepared by Jordan Salhoobi**

# How much chemistry do you know?

| Q# | Question | How to answer it |
|---|---|---|
| 1 | How do ionic compounds conduct electricity? | They must be mixed in water (Aq). They must be in solutions form BECAUSE they dissociate into ions in water |
| 2 | How do metals conduct electricity | They must be in liquid or solid form. BECAUSE OF FREE MOBILE ELECTRONS will carry electricity. |
| 3 | What happens to noble gases when electric current runs through them?<br>What about flame test justification | They glow colors as the electrons return from excited state (higher energy level to the ground state (lower energy level). |
| 4 | Why do I crisscross or reverse crisscross charges of a chemical formula? | To find the ion formula (charges) which help you<br>(1) Find the # of electrons lost or gained → +2 charge means lost 2 electrons<br>(2) Find group number of unknown element X. $X_2O$ = X comes from group 1.<br>(3) Find roman numerals to name the *metals* bonded in ionic compounds. |
| 5 | What are the rules for writing IONIC compounds formulas? | - Roman numerals are used to identify the charge of the metal they go on top as superscripts and provide the Ion Formula.<br>- Metals & Hydrogen are always written FIRST in compound formulas. CRISSCROSS charges to find compound chemical formulas<br>• Br I N Cl H O F lonely elements are always in pairs Example: H is written as $H_2$.<br>Name Chromium VI Chloride<br>ION FORMULA (charges): $Cr^{+6}$ $Cl^{-1}$<br>COMPOUND FORMULA (subscripts): $CrCl_6$ |
| 6 | How do I name or write molecular compounds? (made of nonmetals only) | For naming: USE prefixes mono, di, tri, tetra, penta, hexa, hepta, octa<br>For writing: the prefixes become the subscripts.<br>Ex: dinitrogen monoxide is $N_2O$<br><br>Prefixes mono to tetra must be memorized, the rest are on table P.<br>Never use the prefix mono with the first element |
| 7 | How do I name Ionic Compounds (made of Metal + Nonmetal). | Naming:<br>- If the formula is 3 or more capital letters, the last 2 letters must come from table E and the ending of the name must be the same as table E.<br>$Na_2(SO_4)$ → Sodium sulf**ATE**<br>- If the formula has only 2 letters, the ending must be IDE<br>NaF → Sodium Fluoride<br>- Metals that have multiple charges must have a roman numeral in the name to represent the # of electrons lost of gained.<br>$Fe_2O_3$ → Iron III oxide → reverse crisscross to find the charge of the metals<br>$Fe_2(SO_4)_3$ → Iron III sulfate→ reverse cross # outside parenthesis<br>- When there are no numbers to crisscross, the charge of the metal is the opposite of the charge of the nonmetal or the polyatomic ion. Opposite charges that have the same magnitude cancel each other.<br>FeO → Iron II oxide→ Oxygen is -2 therefore Iron must be +2<br>$FeSO_4$ → Iron II Sulfate. $SO_4$ (table E) is -2 therefore Fe must be +2. |
| 8 | Naming / writing hydrocarbons | See table P, Table Q. notice the endings |

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| 9 | What are saturated hydrocarbons | Single bonded carbons → alk**ANES** (ANE ending) |
| 10 | What are unsaturated hydrocarbons | Double bonded or triple bonded carbons→ alkenes/alkynes ENE, YNE |
| 11 | How do I draw lewis dot diagrams? | ASK yourself am I drawing a Lewis dot diagram of an<br>**Element**<br>- all you need is a symbol and VE dots<br>**Ionic compound (metals +nonmetals)**<br>- You need to BVICS → **B**rackets; **V**alence electrons (non for metals), (8 for nonmetals); **I**onic charges; **c**oefficients as displayed by compound formula's subscripts; **s**ymbols<br>**Molecular compound (nonmetals only)**.<br>- Structure is dependent on the # of atoms present in the compound, 2 or 3 atoms = linear, ex: HCl, $CO_2$, 4 atoms = trigonal pyramidal, ex: $NH_3$, 5 atoms = tetrahedral, ex: $CH_4$. $H_2O$ has a bent structure.<br>- Each atom must have access to 8 valence electrons to be chemically stable except Hydrogen, it only needs two to be stable.<br>- If an atom has 7 valence electrons, one of those 7 electrons bonds with another atom to gain access to an $8^{th}$ electron. If an atom has four valence electrons, all four of those valence electrons will bond with other atoms to gain access to four more electrons and achieve chemical stability. If an atom has 6 valence electrons, it will bond twice; Hydrogen will only bond once… and so on. |
| 12 | Calculate atomic mass given isotopes percentages | (%/100 *isotope mass A) **+** (%/100 *isotope mass B) **+** …. |
| 13 | How do I calculate mass number | Mass = Proton (atom #) + neutrons<br>You need to know that atom # will always = proton # → same thing! |
| 14 | How do I calculate neutrons | M – A# = n |
| 15 | How do I calculate number of electrons for charged ions? Ex: $Na^{+1}$ | PEC Protons – electrons = charge<br>ACE Atom # - Charge = electrons |
| 16 | How do I calculate number of electrons for neutral atoms. Ex. Na | Neutral atoms are neutral because positive Protons = negative electrons<br>Since protons always = Atom #. Atom # shall = electrons. Protons are inside the nucleus so # of P = nucleus charge. THINK $ePNA_{\#}$ |
| 17 | Calculate empirical formulas | Molecular formula / greatest common factor = empirical formula |
| 18 | What are the types of chemical reactions | 1- Synthesis: starts with 2 elements that combine to form one compound.<br>2- Decomposition: starts with 1 compound that breaks down<br>3- Single replacement: starts with a single element and a single compound. These reactions are possible if the lonely element is more active than the bonded element, see table J.<br>4- Double replacement: starts with 2 compounds |
| 19 | What are the types of organic reactions | 1- Addition: **Unsaturated Hydrocarbon + $H_2$ or + any Group 17 element**<br>2- Substitution: **Saturated hydrocarbon substitutes two of its hydrogens with two group 17 elements**<br>3- Fermentation: **Sugar + yeast → Alcohol + $CO_2$**<br>4- Combustions: **hydrocarbon + $O_2$ → $CO_2$ + $H_2O$**<br>5- Saponification: **Fat + Base ($OH^-$) → Soap + Glycerol**<br>6- Esterification: **Acid (tableK) + Alcohol(OH) → Ester(tableR) + Water**<br>7- Polymerization: **individual hydrocarbons combine to make one long chain.** |

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| 20 | Types of nuclear reactions | 1- Fission: produces **lots of radioactive waste**. **Bombard** a neutron with a U-235 isotope to **split** its nucleus and **release energy.**<br>2- Fusion: produces no radioactive waste: **combine** two small **Hydrogen** isotopes to form **helium** and produce the **most amount of energy**. Like inside the stars.<br>3- Transmutation: artificial (physically bombard particles), natural transmutation (one reactant spontaneously decays without interference) |
| 21 | How do I answer mass to mass problems or charge to charge problems | Mass to mass: The **total** sum of reactants' grams MUST EQUAL the **total** sum of products' grams<br>Charge to charge, the total sum of reactants charges must = the total sum of products charges (charges do not have to match) but the number of moles of each atom on the reactants side must = the number of moles of each atom on the products side.'<br>Ex: $2Fe + 3Cl_2 \rightarrow 2Fe^{+3} + 6Cl^{-1}$ |
| 22 | How do I calculate the moles given mass or vice versa | Use the formula on table T. Moles = mass/gfm (gram formula mass) |
| 23 | How do I calculate Gram formula mass? | 1- Most of the time it's given to you, but if not… use the reference table or emmt. |
| 24 | What are ideal gas conditions | Same as beach day conditions… high Temp, low pressure |
| 25 | What is electronegativity | It is the ability of an element to attract electrons. |
| 26 | Why should I care about electronegativity difference | Because I need to figure out whether a BOND is polar!<br>Polar = dissolve in water.<br>If electronegativity difference is less than or equal to 0.4, you have a nonpolar covalent bond.<br>If the electronegativity difference is above 0.4, you have a polar covalent bond.<br>If the bond is between a metal and a nonmetal, you have a polar ionic bond. (Check table F). This is the most polar. |
| 27 | What is ionization energy | It is the energy needed to remove a loosely held electron. |
| 28 | What is the general trend of metals and nonmetals electronegativity and ionization energy? | Metals are low low losers<br>Nonmetals are high high gainers |
| 29 | What do I use table S for | To compare densities of elements, compare electronegativities, ionization energies, and ATOMIC RADIUS |
| 30 | What are the only liquid elements on the periodic table | Mercury (Hg) is a metal; Bromine (Br) is a nonmetal. |
| 31 | What are some properties of metals | Malleable: bendable<br>Ductile: hammered into wires<br>Have luster: shiny<br>Conduct electricity and heat in liquid and solid phases BECAUSE OF FREE MOBILE ELECTRONS<br>Located on the left side of the staircase<br>Mostly solid therefore high melting and boiling points |
| 32 | What are properties of nonmetals | They are brittle (break easily)<br>Mostly gases.<br>They are poor conductors of heat and electricity; no luster. |
| 33 | What are metalloids | All the elements above and below the stairs except Aluminum and Polonium. . They have properties of both metals and nonmetals. Silicone is used in computer chips because it is a semimetal therefore a semiconductor… prevents electrical surge. |

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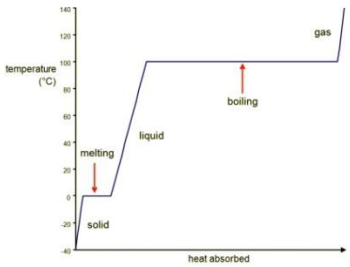
| 34 | What do I need to know about<br><br>Isotopes?<br>Isomers?<br>Allotropes? | Isotopes: Same D-A#pes. Different P-Mn-Structure<br>Same density, Atom#, Protons, electrons, and spectrum<br>Different properties, mass, neutrons, and structure<br>Allotropes: different structures of an element that have different properties.<br>Example: $O_2$ and $O_3$; diamonds, coal, and graphite.<br>Isomers: different structures of compounds that have different functional groups but the same chemical formulas, they have different physical and chemical properties. |
| 35 | What is homogeneous | It is a uniform and consistent arrangement of particle<br>All unsaturated and saturated solutions are homogeneous<br>Super saturated solutions have a precipitate (residue) @ the bottom<br>Compounds are homogenous because their particles are arranged in fixed uniform proportions. |
| 36 | What are the separation techniques | Filtration: separates insoluble substances from water. Ex: sand from water<br>Dissolved solutes and solvents go through filter paper, only insoluble solutes can be separated by filtration.<br>Distillation: Separates liquids based on different boiling points. Liquids of lower boiling points evaporate first.<br>Evaporation: Separates Soluble salts from water<br>Chromatography: separates substances based on their attractions to a gel medium |
| 37 | How do I draw particle diagrams? | Element<br>Identical Singular circles<br>---<br>Diatomic molecule: BrINClHOF<br>Identical circles organized in pairs<br>---<br>Compound<br>2 or 3 different circles BONDED in the fixed proportions<br>---<br>Mixture<br>No specific pattern. Varying proportions<br>--- |
| 38 | How do I answer Vapor pressure questions? | Table H: the boiling point is the intersection between each curve and the dashed line. |
| 39 | How do I answer chemical change questions | By using the keywords: react, burn, corrode, decompose, color change, combine with |
| 40 | How do I answer Physical change problems? | By using the keywords: break, crush, or phase change<br>Phase changes: think S = solid ice, L = liquid water<br>S → L = melt L→ S = freeze<br>L→ G = vaporization G→ L = condensation (rain)<br>S → G (dry ice) = sublimation G→ S = Deposition (snow fall) |
| 41 | At which phase changes does potential energy increase? | Melting, evaporation, sublimation<br>  |
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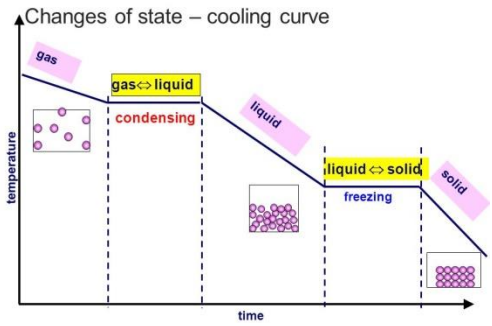
| 42 | At which phase changes does potential energy decrease? | Freezing, condensation, deposition<br>  |
| 43 | On the heating/cooling curve, at which lines does potential energy change? | At the horizontal lines. That is where phase changes occur (melt… evap… etc.<br><br># of horizontal lines determines number of phase changes. MAX # of horizontal lines must be only 2. In sublimation a solid changes directly to a gas therefore only one horizontal line is shown on a heating curve. |
| 44 | On the heating/cooling curve, at which lines does kinetic energy (temperature) change? | At the slanted lines. That is where phases of matter are present (solid… liquid… gas)<br>MAX # of slanted lines cannot exceed three. |
| 45 | How do I answer gas calculation problems? | See table T → $(P_1V_1/T_1) = (P_2V_2/T_2)$ |
| 46 | What is the only indirect relationship between pressure, volume and temperature? | The only indirect relationship is between pressure and volume.<br><br>If pressure goes up, volume comes DOWN and vice versa |
| 47 | What is STP | It's on table A: Standard temperature (273K) and standard pressure (1 atm) |
| 48 | How do I answer concentration problems | 1- Use the Molarity formula on table T: Molarity = moles/liters. Remember there is no abbreviation for moles but mol<br>2- MaVa= MbVb Remember molarity is concentration and is abbreviated M.<br>3- Use the percent composition formula on table T<br>4- Use the PPM formula on table T |
| 49 | How is concentration (molarity) (number of atoms dissolved) associated with boiling point, freezing point and intermolecular forces? | High concentration (molarity) (#of atoms dissolved) =<br>high boiling point<br>high intermolecular forces<br>low freezing point<br>solutions have a higher Bp and Lower Fp than pure water |
| 50 | How is a mixture different from a compound | A mixture has **varying** proportions of particles. Ex. Brass is 80 – 85 % copper. Notice this is not definite.<br>A compound has **definite (fixed)** proportions of particles. And a fixed ratio example the mole ratio of Na to Cl must be 1:1 to make table salt |
| 51 | What are pure substances? | Elements, compounds are pure substances {ECAPS} |
| 52 | What determines if a reaction is successful? | Effective collision determines that. |
| 53 | What is effective collision | A collision that has the correct orientation of particles and sufficient colliding energy |
| 54 | What does a catalyst do? | It speeds up the rate of the reaction by<br>1- Providing an alternate pathway to LOWER the activation energy<br>2- By correcting particle orientations to allow effective collisions |

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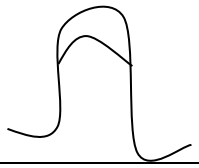
| 55 | What factors help increase the rate of a reaction? | Increasing T C C S N P increases the rate of reaction,<br>(temp, concentration, catalyst, surface area (powders cause more collisions), nature of reactants (more active elements (see table J) allow faster collisions, also ionic compounds dissociate and allow more particle collision), pressure(only affects gas equations) |
| 56 | What does a catalyst do to a potential energy diagram? | It lowers the peac: potential energy of the activation complex and lowers the forward and reverse activation energies.<br>  |
| 57 | What types of energy does a potential energy diagram display | (PER) Potential energy of reactants below the first flat line<br>(PEP) potential energy of products below the second flat line<br>(FAE)forward Activation energy above the first flat line<br>(RAE) reverse activation energy above the second flat line<br>(PEAC) Potential energy of the activation complex |
| 58 | What is the heat of reaction? | It is the VERTICAL distance between the first horizontal line and the second horizontal line<br>it is found by calculating the difference between PEP and PER (PEP-PER) |
| 59 | What does a negative or a positive heat of reaction according to table (I) indicate? | If heat of reaction is negative, reaction is exothermic<br>If heat of reaction is positive, reaction is endothermic<br>If table I reactions are read from right to left, the delta H values must be opposite in sign |
| 60 | How do I determine if a potential energy diagram is exothermic or endothermic? | **EXOLOW**: If the potential energy diagram ends LOW, the diagram is for an exothermic equation<br>If it ends high, its endothermic |
| 61 | What does exothermic mean? | - Enter heat endothermic → exit heat exothermic<br>- heat of reaction ΔH on table I is negative for exothermic rxns<br>- BARF → break bonds by absorbing heat, release heat when forming bonds<br>Decomposition rxns are endo (break bonds), synthesis rxns are exo (form bonds) this is a general trend, please confirm with table I. |
| 62 | What are examples of exothermic reactions | Synthesis,, condensations (g→l), freezing reactions (l→s) |
| 63 | What are examples of endothermic reactions | Decomposition, melting (s→l), evaporation reactions (l→g) |
| 64 | Describe the 3 phases of matter | Solids have definite shape and volume<br>Gases have no definite shape or volume<br>Liquids volume is definite but their shape isn't. 5ml of water is 5ml regardless of the conditions. But 5ml of water could be cylindrical or rectangular... depending on the container |
| 65 | How does adding heat to reaction affect the entropy? | Entropy is defined as distance between particles also known as the random arrangement of particles, adding heat will cause the particles to go further apart in a random way. So adding heat increases entropy |
| 66 | In terms of energy and entropy describe systems in nature. | Systems in nature (such as plants and human), their energy decreases with time and their entropy (random arrangement of particles) increase. |
| 67 | What does avogadros say in regards to gases that have the same volume | All gases that have the SAME volume, have the SAME number of molecules at STP conditions (see table A). |
| 68 | Elements | are pure substances that can never be broken down chemically |

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| 69 | Compounds | Can never be broken down physically but can be broken chemically |
| 70 | what can be broken down physically? | Mixtures (ex: solutions) by following different separation techniques. |
| 71 | What does the average kinetic energy measure? | Temperature |
| 72 | How do I answer heat calculation problems? | Use the heat formulas on table T<br>Is there something melting/freezing? If yes, use the formula Q= Hf*m → horizontal LINES ON HEAT/COOL CURVE<br>Is there something evaporating or condensing? Use the formula Q= Hv*m → horizontal LINES ON HEAT/COOL CURVE<br>Is there just a change in temperature? Use the formula<br>Q= MC Δ T. → SLANTED LINES ON HEAT/COOL CURVE |
| 73 | What is equilibrium?<br><br>What scenarios present equilibrium? | Equilibrium means the rate of forward rxn = rate of reverse rxn, and concentration of products and reactants remain constant (NOT EQUAL)<br><br>During a phase change ex: S→L ... L→G…etc<br>During when an electrochemical cell is dead.<br>Saturated solutions according to table G are at equilibrium. |
| 74 | How do I use table G to answer saturation problems? | You point to the temperature then move your finger upwards until you reach the specified grams in the question.<br>If your finger lies<br>Below the curve of the substance → solution is unsaturated<br>Above the curve→ solution is SUPER saturated<br>ON the curve of the substance solution is SATURATED<br><br>NOTICE TABLE G, only applies to 100g of water! You may have to calculate the amount of grams to saturate 200g, 50g, or 300g of water. |
| 75 | What does saturated mean | The maximum amount of solute possible is dissolved in the 100g of a solution. |
| 76 | What is SUPER saturated? | More than the maximum amount of dissolvable solute is in the solvent… yes you guessed it.. unsaturated, is less than the maximum solute is dissolved in the solvent |
| 77 | Soo what's the solute and solvent again? | Solute is the substance being dissolved… usually salt<br>Solvent is the substance doing the dissolving… usually water |
| 78 | HOW do I convert Kelvin to Celsius? how does heat flow? | See table T for the conversion formula.. K=273 + C<br>Heat always flows from Hot substances to Colder substances |
| 79 | How do I solve le Chatellier equilibrium problems? | If you add a substance onto a system at equilibrium, the system will shift away from wherever that substance is located on the given equilibrium equation. If you remove the substance, the system will shift towards wherever that substance is located.<br>Wherever side the equilibrium shifts to will increase, the other side will decrease<br>If pressure is increased on an equilibrium that is made entirely of gases, the system will shift to the side with the least total number of coefficients (least total moles). If you decrease the pressure, the system will shift to the side with the most coefficients.<br>A catalyst does not cause an equilibrium to shift or favor any side, it only speeds up the reactions equally in both directions. |

<table>
<tr><td>80</td><td>How do I answer mole to mole calculations?</td><td>Setup coefficients and cross multiply.<table><tr><th>? info</th><th>Given Balanced Equation Coefficients</th></tr><tr><td>X</td><td></td></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td>81</td><td>What's the difference between forward rxn and reverse rxn?</td><td>Forward rxn shifts to product side.<br>Reverse reaction shifts to reactants side.</td></tr>
<tr><td>82</td><td>How do you increase the solubility of a gas in liquid?</td><td>Decrease the temperature and increase the pressure</td></tr>
<tr><td>83</td><td>How do you increase the solubility of a solid (salt) in a liquid?</td><td>Increase the temp. Pressure has no effect on solubility of solids in liquids</td></tr>
<tr><td>84</td><td>What is the difference between molecular compounds and ionic compounds in terms of electrons</td><td>Molecular compounds share electrons<br><br>Ionic compounds transfer electrons from the metal loser to the nonmetal gainer</td></tr>
<tr><td>85</td><td>How do I know if a compound is soluble or a precipitate?</td><td>Check table F</td></tr>
<tr><td>86</td><td>What if the compound is not on table F. how do I know if it's soluble in water (polar) or not soluble in water (not polar)<br><br>See bullet 23</td><td>SNAP: Symmetrical is not polar, asymmetrical is polar.<br>Symmetrical means atoms on the left are the same as atoms on the right, and atoms on the top are the same as atoms on the bottom.<br>Ex: $CH_2Br_2$</td></tr>
<tr><td>87</td><td>What is an electrolyte?<br>Give examples</td><td>Electrolytes are substances that conduct electricity in aqueous form (when mixed in water)<br>Examples:<br>Ionic compounds (metal + nonmetal)<br>Acids from table K Bases from table L</td></tr>
<tr><td>88</td><td>What is an Arrhenius acid?</td><td>An acid that produces ONLY H+ ions when dissolved in water<br>ACID (table K) + $H_2O \rightarrow H^+$</td></tr>
<tr><td>89</td><td>What is an Arrhenius base?</td><td>A base that produces ONLY $OH^-$ ions when dissolved in water<br>BASE (table L) + $H_2O \rightarrow$ OH-</td></tr>
<tr><td>90</td><td>What happens when I mix an acid with a base?</td><td>You get salt and water in a double replacement reactions.</td></tr>
<tr><td>91</td><td>What is the process of mixing an acid with a base called?</td><td>Titration, neutralization</td></tr>
<tr><td>92</td><td>If metals lose electrons, what do acids lose?</td><td>They lose H+<br>BA H AD → bases accept H, acids donate it</td></tr>
<tr><td>93</td><td>If nonmetals gain electrons, what do bases gain</td><td>They gain H+<br>BA H AD → bases accept H, acids donate it</td></tr>
<tr><td>94</td><td>How do I solve all PH problems?</td><td>Always draw the PH scale and label it<br><br>(H+ increase)(Acids) 0------7-------14 (Bases) (H+ decrease)<br><br>The difference in PH signifies the number of zeros the H+ changes by.<br>Ex: PH changes from 1 to 3 → 3-1 = 2 → 2 zeros.. H+ changed by 100 folds → 1 to 3 is going in the base direction of pH scale final answer → H+ decreases by 100 folds</td></tr>
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| 95 | How do I answer indicator questions? | See table M. any pH that lies within the range makes the indicator not useful.<br>There are two ranges that are indicated by table M for each indicator<br>- the lower # to zero which correspond by the color on the left<br>- the higher # to 14 which correspond by the color on the right |
| 96 | What are the rules for assigning oxidation numbers to write half reactions | 1- lonely elements = 0<br>2- charged elements oxidation #= the charge<br>3- hydrogen bonded with a **different** element is **always** +1<br>4- oxygen bonded with a **different** element = -2<br>5- group 17 bonded with a **different** element = -1 but must be calculated sometimes, do not assume it is always -1.<br>6- the sum of all oxidation numbers in a compound = 0<br>7- the of oxidation numbers in table E = charge of table E<br>8- when Fluorine is bonded with Oxygen, Oxygen's charge is +2<br>9- when peroxide is bonded with hydrogen, the oxygen's charge is -1<br>10- the elements unknown in the question will always have an oxidation number X, you have to calculate it. |
| 97 | How do I know if an element was oxidized? | It's oxidation number increase<br>It lose electrons and became more positive<br>OILEP → oxidation is losing electrons at the product side |
| 98 | How do I know if an element is reduced? | It's oxidation number decreased<br>It gained electrons and became more negative<br>RIGER → reduction is gaining electrons |
| 99 | What is a redox reaction? | It's a reduction oxidation reaction→ reduction cannot happen without oxidation. These two reactions are interdependent.<br>We write half reactions to display what was oxidized and what was reduced, |
| 100 | How do I balance half reactions | OILEP → RIGER<br>All reactions must be balanced first by using coefficient prior to writing redox reactions.<br>Redox reactions are balanced with electrons and coefficients, Total # of electrons lost must equal the total # gained. |
| 101 | What is an electrochemical cell composed of | 1- Electrodes(anode and cathode)<br>2- Salt bridge<br>3- Conductive wire<br>4- 2 half cells<br>5- Ionic solutions |
| 102 | What is the difference between anode and cathode | An Ox →**A**node **O**xidation (loss of electrons)<br>Red Cat → **R**eduction **C**athode (gain of electrons) |
| 103 | How Do electrons flow in all electrochemical cell? | Always from the anode (the more active metal on table J) to the cathode (the less active metal). |
| 104 | What is the function of salt bridge? | Transfer ions between the half cells.<br>If you remove the salt bridge, cell dies and no electricity is generated |
| 105 | What is the function of a conductive wire | Transfer electrons from the anode to the cathode<br>The mass of the anode always decreases because it loses electrons, the mass of the cathode always increases because it gains electrons |
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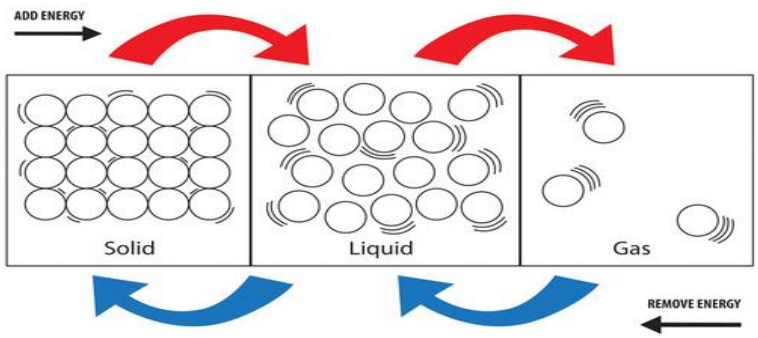
| 106 | What is the difference between a voltaic electrochemical cell and a electrolytic electrochemical cell? | Voltaic cell is spontaneous ( works on its own)<br>Voltaic cell transfer chemical energy to electrical energy<br>Voltaic cell→ Anode is negative, cathode is positive<br>Voltaic cell is an example of a car battery<br><br>Electrolytic cell is not spontaneous ( needs an external source of energy to work)<br>Electrolytic cell transfers electrical energy to chemical energy<br>Electrolytic cell anode is positive (connects to the positive end of the battery), cathode is negative (connects to the negative end of the battery).<br>The cathode always gets plated in electrolytic cell.<br>Electrolytic cell is used to plate jewelry and clean jewelry |
| 107 | What is table J used for? | To indicate which metal is more active than the other or which nonmetal is more active than another. This helps us determine electron flow which is always from the more active metal to the less active metal.<br>Also determine if single replacement reactions will take place: more active metals are more likely to replace less active metals in single replacement reactions<br>More active metals have more metallic properties.. bigger losers. |
| 108 | What are polyatomic ions? | Anything from table E |
| 109 | Why do elements decay | Because their proton to neutron ratio is not 1:1. → You have more neutrons than protons<br>Elements decay to become stable and stop decaying when stable. |
| 110 | What is transmutation | Is a type of nuclear reactions in which the element in the product is not the same as the element in the reactant due to particle emission or radiation.<br>All nuclear reactions have elements not compounds! Their atom# and mass number will always be displayed. Chemical reactions do not have that. |
| 111 | What is the difference between natural transmutation and artificial transmutation? | Natural transmutation starts with one element<br>$92U239 \rightarrow 2a4 + 90^{Th}231$<br>Artificial transmutation starts with an element and a particle from table O<br>$_{13}Al^{27} + {}_{2}a^{4} \rightarrow {}_{15}P^{30} + {}_{0}n^{1}$ |
| 112 | Where do I find decay mode? Also known as what particles an element emits | Table N |
| 113 | Where do I find masses and charges of particles decayed? | Table O… Remember mass on top, mass on top, mass on top<br>Atom# is at the bottom, Atom# is at the bottom |
| 114 | Rank alpha beta gamma from most ionization and lowest penetration to least ionization and most penetration | Alpha is the most ionizing particle (most dangerous) but it has the least penetration power… so it is hard to get it through our skin.<br>Gamma is the least ionizing but has the highest penetration power.<br>The rank is: alpha→ beta → gamma |
| 115 | How do I write decay equations?<br><br>Write the decay equation of Fr-220 | $_{Number}Element^{mass} \rightarrow {}_{Number}Decay\ mode^{mass} + {}_{Number}new\ element^{mass}$<br>→ from table N and O<br>Bottom left numbers shall equal bottom right numbers<br>Top left numbers shall equal top right numbers<br>$_{87}Fr^{220} \rightarrow {}_{2}alpha^{4} + {}_{85}At^{216}$ |
| 116 | What is the purpose of doing a nuclear reaction? | to convert mass to energy<br>to generate electricity |
| 117 | What type of a nuclear reaction produces the most amount of energy ever! | Fusion, that's a solar reaction which means it only happens in stars like the sun |

<table>
<tr><td>118</td><td>Nuclear vs. chemical reactions</td><td>Nuclear reactions release more energy.</td></tr>
<tr><td>119</td><td>What are these nuclides used for?<br>I-131<br>Co-60<br>U-238, Pb-206<br>C-14<br>Tc-99</td><td>I-131 → treat Thyroid disorders<br>C-60 → treat cancer<br>U-238, Pb-206 → geological dating<br>C-14 → fossil dating<br>Tc-99 → diagnose brain tumors</td></tr>
<tr><td>120</td><td>How do I answer half life problems?</td><td>
<table>
<tr><th>Half Life #</th><th>Time = Table N * Half Life #</th><th>Mass = FOR<sub>M</sub><br>Original mass * Fraction = Remaining Mass</th><th>Fraction</th></tr>
<tr><td>0</td><td>0</td><td>This box answers the original (OG) mass</td><td>1</td></tr>
<tr><td>1</td><td>This box answers what is the half life, this is usually obtained from table N</td><td></td><td>1/2</td></tr>
<tr><td>2</td><td></td><td></td><td>1/4</td></tr>
<tr><td>3</td><td></td><td></td><td>1/8</td></tr>
<tr><td>4</td><td></td><td></td><td>1/16</td></tr>
<tr><td>5</td><td></td><td></td><td>1/32</td></tr>
<tr><td>6</td><td></td><td></td><td>1/64</td></tr>
</table>
</td></tr>
<tr><td>121</td><td>Which element is present in all organic compounds?</td><td>Carbons</td></tr>
<tr><td>122</td><td>Where do I find hydrocarbons?</td><td>Table Q</td></tr>
<tr><td>123</td><td>How do I answer naming organic compounds questions?<br><br>Name 1,2 dichloro butane</td><td>Use table P to find the prefix of the longest carbon chain<br>Number the carbons in the longest continuous chain<br>Write the functional group near their allocated carbons<br><br>Butane → is 4 carbons chain → 1,2 is the location of the functional group Cl<br><br>$C_1 – C_2 - C_3 – C_4$<br>Cl Cl</td></tr>
<tr><td>124</td><td>What are functional groups or classes of compounds</td><td>See table R</td></tr>
<tr><td>125</td><td>How do I name ethers or aldehydes or ketones….etc?</td><td>See the examples on table R, use the same endings. FOLLOW THE SAME FORMAT</td></tr>
<tr><td>126</td><td>How do I name hydrocarbons?</td><td>See table Q examples, use the same endings</td></tr>
<tr><td>127</td><td>How do I find how many hydrogens are in an organic compound?</td><td>Follow the equations on table Q</td></tr>
<tr><td>128</td><td>What are the names of group 1,2,17,18?</td><td>Alkali metals, alkaline earth metal, halogens, and noble gases</td></tr>
<tr><td>129</td><td>What do you know about transitional metals?</td><td>They extend from group 3 to the metalloids<br>They produce colorful solution in water. Ex. Cu + water → green water</td></tr>
</table>

| | | |
|---|---|---|
| 130 | Why does one element have a bigger radius than another within a group | The element with the bigger radius has more electron shells (energy levels) |
| 131 | Why does one element have a bigger radius than another within the same period? | The element with the bigger radius has less protons to attract electron shells |
| 132 | Draw a particle diagram of a solid vs. liquid, vs. gas |  |