SCH3U-Review

Unit #5: "pH, pOH, Pressure"

1. What is pH and pOH
2. What is the pH scale
3. **pH & pOH questions: if given [H+] find the pH the conc of OH- and determine the pOH. Know pH & pOH equation. Know pH + pOH = 14. I might give you a salt or a solution and you need to determine it's pH. (convert grams to moles then basket method to find moles of products, then use moles of products and sub into pH or pOH equation.
4. Difference between and acid and a base. Why is ammonia considered a base even though it gives off no OH- ions? What's a hydronium ion?
5. What are three names for the ion that acids give off?
6. What is a conjugate base and conjugate acid. If given an equation identify the acid, base, conjugate base and conjugate acid.
7. Difference between a strong and a weak acid. Draw a picture to demonstrate
8. If an acid and a base are mixed together what is made?

9. Three ways a particle can move. (Translation, rotation, vibration) explain each
10. What is pressure?
11. Different scenarios questions....if volume reduced pressure does what? If temp decreased then pressure does what? As the the number of moles increases the pressure does what ? etc
12. Explain what atmospheric pressure it.
13. Explain topics related to atmospheric pressure...eg. Climbing mountains and thin air so oxygen mask required, playing and training at high altitudes...body adjust by making more hemoglobin, plains find it hard to fly at high elevations because? Etc.
14. Converting units of pressure into other units of pressure...eg. Atm to mm hg etc.
15. Relationship between volume and temperature? Questions related to this.
16. What is absolute zero? What happens at this temperature? Conversion from Kelvin to Celsius or Celsius to kelvin
17. What is SATP and STP? What conditions are they at?
18. Relationship between pressure and volume? Questions related to this.
19. Relationship between pressure and temperature? Questions related to this.
20. Combined gas law questions
21. Relationship between volume and moles. Questions related to this.
22. What is molar volume? Different weights in molecules have what affect on pressure?
23. What is the Ideal gas law? Questions related to this.
24. What is the law of partial pressure? Questions related to this.

SCH3U-Review Notes

Unit #4: "Solutions & Solubility Unit"

- Know terminology such as. Concentration, solubility, precipitation, ionization, dissociation, pH, dilute, solute, solvent, acid, base, volumetric flask, burette, Erlenmeyer flask, indicator (know 2 common ones), neutralization,

- **Stoichiometery questions that involve solutions being mixed together and you have to determine the amount or conc. of products, excess limiting.

- **Be able to do a titration question similar to lab. Data will be provided and you will need to determine either the amount of an unknown substance in moles, grams, %v/v, or %m/v etc. Similar to lab with vinegar and %v/v.

- Solve concentration questions eg %v/v, m/v, mol/v etc

- Know and be able to describe how to make a stock solution with a desired concentration from either a solid or a stronger stock solution. Eg. How many grams of NaCl would I need to add to 250ml volumetric flask to make a 2.5M solution. Eg. How would you make 250ml of a 2M solution using a 1L of a stock solution that is 5.5 M.

- Solve questions related to ppm or ppb

- Determine the amount of each ion if a solution is made. Eg. How much Cl- ions would be floating around in a 1M solution of NaCl, or in 1M of $CaCl_2$

- **pH & pOH questions: if given [H+] find the pH the conc of OH- and determine the pOH. Know pH & pOH equation. Know pH + pOH = 14. I might give you a salt or a solution and you need to determine it's pH.

- Difference between and acid and a base. Why is ammonia considered a base even though it gives off no OH- ions? What's a hydronium ion?

- What are three names for the ion that acids give off?

- What is a conjugate base and conjugate acid. If given an equation identify the acid, base, conjugate base and conjugate acid.

- Difference between a strong and a weak acid. Draw a picture to demonstrate

- If an acid and a base are mixed together what is made?

SCH3U- Review:

Unit #3:"Quantities in chemical rxn's"

1. Unit conversion using fraction method…e.g. convert 20m/s to mm/day
2. What is a mole?
3. Conversion:
    a. Moles to grams……and Grams to moles
    b. Moles to molecules ….and Molecules to moles
    c. Grams to molecules….and ….molecules to grams
4. Will need to be able to go from work equations to chemical equations(know charges) to balanced chemical equations.
5. Stoichiometery questions….if given a balanced equation determine how many grams, moles or molecules of each of the products or reactants.
6. % yield question
    a. given actual and theoretical find % yield
    b. given % yield and theoretical find actual
7. Why are some causes of actual vs. theoretical values being different…how could you increase % yield?
8. Excess vs. limiting reagent questions….determine which is limiting and excess then determine the quantity of products
9. Big Question: A question that involves going from word to chemical (using charges) then balance equation, then use the values of reactants in mol/l (given a certain amount) and determine which is excess and which is limiting then based on this information determine how much product would be made.
    a. Similar to above but if you want to produce a certain amount of product but given a percent yield of 80% then how much reactants will you need to make 300g of a product knowing that 20% is lost due to % yield.
10. Difference between empirical and molecular formula
11. If given the % composition of each element in a compound determine the empirical formula
    a. If given the mass of 1mole of the substance determine the molecular formula.

SCH3U-Review

Unit #2: "Chemical Reactions Review"

1. Balancing chemical equations
2. Going from word equations to chemical equations to balanced equations
3. Know the different types groups of reactions : E.g. Synthesis, decomposition, single displacement, double displacement, combustion.
4. Know how to use the various activity series to determine if a reactions will occur. (metal activity, halogen activity, metals with acids, metals with water etc)
5. What's a neutralization reaction?
6. What's an acid, base?
7. Use the solubility chart to determine if a substance will be (aq) or (s).
8. What is a precipitate?
9. What does aqueous mean?
10. What does a triangle over the arrow for a reaction mean?
11. What are the various symbols that you can use over an arrow to show the conditions a reaction must be under.
12. What's the difference between a substance that is (l) vs. (aq)?
13. **Know all the types of reactions.
    a. E.g. non-metal-oxide mixed with water produces?
    b. Metal-oxide mixed with water produces?
    c. General decomposition
    d. Carbonic acid (H_2CO_3) decomposition with heat vs with water to produce?.
    e. Decomposition of bases with heat produce?
    f. Metal carbonates decomposition produce?
    g. Single displacement what goes with what and will it occur…use activity series to determine
    h. Single displacement rxn's with metals and acids produce?
    i. Single displacement rxn's with metals with water…use activity series.
    j. General rxn's for double displacement and use solubility chart to determine if the products are aq or s.
    k. Double displacement rxn's that involve making carbonic acid (aq).
    l. Neutralizations rxn's produce what?
    m. Be able to put all the proper states on a chemical reaction (aq, l, s etc)
    n. How would you test for the presence of an acid, base, hydrogen gas, oxygen gas, carbon dioxide?
    o. If a salt calls for heating to make a product how would you heat it up?
    p. Be able to determine how to make a chemical use two or more steps of the above reactions.

SCH3U-Review

Unit #1: "Matter, chemical trends and Chemical bonding"

1. Finding the # of p,n,e o of an atom.
2. # of e's on each ring
3. Draw a bohr diagram
4. Determine how many e's each atom on the periodic table wants using roman numerals
5. Determine what the stable ion is of a particular atom (eg Cl^{-1}, Ca^{+2})
6. What is an isotope? What are different ways of showing in textbooks that an atom has multiple isotope forms.
7. Explain why the masses of various elements have decimal values.
8. What's the difference between an isotope and a radioisotope.
9. Are all elements radioisotopes? Which ones generally area and aren't.
10. What are some applications of radioisotopes.
11. Explain what radiation is.
12. What are some types of radiation? Know difference between types of radiation. Eg. alpha, beta, gamma etc.
13. What type of materials can each type of radiation go through eg. alpha, beta, etc.
14. Be able to determine what type of radiation was given off given the products and reactants of a reaction. (balancing nuclear equations)
15. Explain the difference between an ionic and a covalent compound.
16. Draw bohr diagrams for ionic & covalent compounds with single, double and triple bonds.
17. Naming ionic (mono-atomic, polyatomic) vs. covalent compounds.
18. What are some chemical property differences between Ionic and covalent compounds.
19. Draw Lewis diagrams for ionic, covalent, polyatomic ions etc.
20. What is electronegativity and know how to find and use it to determine if a substance is polar, non polar or ionic.
21. What is a polar, non-polar and ionic substance and which type of these substances do they mix with?
22. What is a dipole and what is its significance? Explain how some substances may have polar bonds yet the over all molecule is non-polar.
23. Determine the chemical name and formulae for ionic, covalent, polyatomic and multivalance compounds.
24. What is a hydrated salt? Name it.
25. How could you calculate what an unknown hydrate salt is? (See lab)
26. Be able to draw a structure diagram and determine if it is possible to make based on the number of bonds (e.g. is CH_5 possible? See building molecules with springs and balls assignment)
27. What is? And describe the trends and explain why for the following
    atomic radius, electron affinity, electronegativity, ionization energy. Use this information to answer questions like " if given two atoms "A" and "B" then which would want to lose and e' easier and why would it want to lose and e'.
28. Explain electron shielding/screening
29. Why are ionization energies for the 1^{st}, 2^{nd}, 3^{rd} e's etc different for all atoms and why do they jump up in values at different #'s for different atoms.