Worksheet 32 – CHEM 121 Fall 2015

Your Name: _____

Directions: Print out and bring with you to complete in class. First 40 minutes with partner, non-programmable calculator only. Next 10 minutes with notes and partner and non-programmable calculator. Remaining 25 minutes on the board showing your work.

1) Draw a simple battery using either beakers and u-tubes (NOT YouTubes!) or a tank and a porous partition and label its parts.

2) Oxidation in a battery occurs at which electrode?

3) Reduction in a battery occurs at which electrode?

4) Draw and label an electrolytic cell.

5) Explain how corrosion on a piece of metal works as a battery.

6) Define the Piezo electric effect, using your own words.

7) In what biologically significant tissues does the Piezo electric effect exist?

8) Explain in your own words how the Piezo electric effect helps develop bone (did you know this is exactly how it works to repair bone when it's fractured?).

9) Using your own diagrams, draw how the Piezo electric effect works at the charge/crystalline level.

10) Draw and label your version of a dry cell battery.

11) What does this symbolism mean? $Ag^+|Ag||Cu|Cu^{2+}$

12) Using your knowledge of redox reactions and the battery nomenclature in #11, write out the completely balanced reaction for the battery in #11.

13) Draw, label and explain the structure, composition and electron flow in and between the donor and acceptor wafers in photovoltaic cells.

14) Using the diagram of the wrench and screwdriver, use colored pencils to illustrate what it takes to develop corrosion on one of them. Label the diagram correctly and be detailed in your sketching.

15) In the space below, draw the following electrolytic battery: $Br_2|Br^-||Ag^+|Ag$ using a 9-volt battery. Label the sketch and show the electron flow. Use inert electrodes.

16) The image is that of a cut-away 9 volt Eveready™ Energizer 9 Volt battery. Explain how it makes 9 volts. Be specific.

17) Using the image at right, explain what is happening.

18) If you put sucrose in the distilled water, using the apparatus in #17, would the light come on? Why or why not?

19) Give two reasons why the light bulb is not lit in the image at right.

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20) What causes batteries to corrode? Why does the battery case corrode?

21) How would you prepare 250 mL of a 25% W/V solution of copper sulfate? What's the formula for copper sulfate?

22) How would you prepare 250 mL of a 15% w/v solution of sodium phosphate? What's the formula for sodium phosphate?

23) How would you prepare 250 mL of a 34% w/v solution of barium sulfate? What's the formula for barium sulfate?

24) Using the mass spectrum, at right, and knowing that a compound that consists of only carbon and hydrogen was injected into the mass spec, determine the empirical formula of the compound. Show your logical progression of the compound.
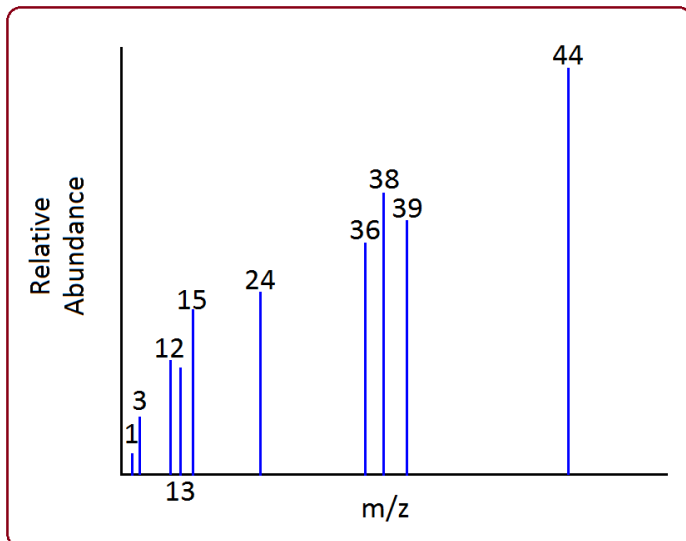
25) Using the formula of the compound from #24, what is the percent composition of carbon and hydrogen?

26) If the molecular weight of your compound is 132 g/mol, what's the molecular formula of the compound?

27) Based on your responses to #'s 24, 25 and 26, were you given a complete mass spectrum of the compound? Explain your reasoning.

28) What's the difference between the "p" in "p"H and "p"CO_2?

29) Carbon dioxide and water react to form what? Write out the reaction.

30) Write out the dissociation (by steps) of carbonic acid using chemical reacitons.