

Name: _____ (40 minutes)

Review Lab # 3

Do each part, answer the questions on loose-leaf paper, use plenty of space and be neat. Show off how much you have learned this year.

Part 1—Candle burning (demo). I will mass a candle and burn it for about 15 minutes. We'll mass it again, and see how much mass is lost. Answer all of the questions below.

Part 2—Drawing Spectrographs, those pesky mobile excited electrons. Put on the refractive lens glasses and draw the best you can a spectrograph of the substance in the lamp.

Part 3—Lewis Dots, draw the 6 diagrams from the cards. Some are correct, some are broken one way or another. Fix the ones that are in need of fixin'.

Part 4—Aluminum foil in hydrochloric acid (be careful). Catch the gas with a larger test tube. Observe and check for exo or endothermic by touch. Test that gas with a burning splint of wood. Put the foil into the acid in a large test tube. Have a beaker to hold this tube when done.

Part 5—Pump up the bottle with the air pump quickly as you can. Note the temperature of the bottle as you pump. Let the air out quickly by giving the bottle cap a quick twist. Note temperature!

Questions:

Wax has the chemical formula of $C_{22}H_{46}$. Start mass _____ end mass _____

1. What is the molar mass of wax? How many grams were burned?
2. Write the balanced chemical equation for this reaction.
3. Is this wax an alkane, an alkene, or an alkyne? How are you sure?
4. How many total grams of products form?
5. How many atoms of wax were burned?
6. How many moles of water form?

The spectrograph in AP Chem will have nanometer wave lengths associated with the drawing, pertaining to the light (a measure of energy). In our class we just draw color lines approximating the spectra.

7. Assume the gas in the tube is krypton. What is the ground state electron configuration of krypton?
8. What is one possible excited state electron configuration for krypton?
9. When is the spectra produced, is it when the atom gains energy and the electron jumps up to an excited orbital?, or when the electron jumps back to the ground state?
(Get up and read the white pages on the cabinets on the side of the classroom now.)
10. How could a scientist use the concept of spectra to help her determine what substances were collected from a crime scene?
11. How could a different scientist use spectra to determine what the chemical make up of a recently discovered planet is?

The mustachioed Professor Lewis was a chemist who wanted to make his students understand bonding easier for his students to understand, so he invented his dot diagrams. Some people call them Electron Dot Diagrams or just Lewis Diagrams.

12. What are the dots around the chemical symbol in a Lewis Dot diagram?
13. Skip this one
14. Draw a Lewis Dot diagram to show how the bonding occurs in an ionic bond, for MgO .
15. Draw a Lewis Diagram for water, showing how electrons are SHARED.

16. Give a name to the bond between the hydrogen and oxygen using as many words as you can.
17. What sorts of bonds form between different water molecules?
18. How do you know that the bond between hydrogen and oxygen is polar?
19. Which bond is more polar, between H and O in water, or between H and Cl in hydrogen monochloride?
How do you measure the polarity differences?
20. Write the balanced chemical equation for your metal plus acid reaction in Part 4 of this lab?
21. What sort of reaction is this?
22. Rewrite the balanced reaction with oxidation numbers. Write the two half reactions.
23. Which is the spectator ion in this reaction.
24. Is it exothermic or endothermic? What's the ΔH ?
25. What gas is produced? How do you know?
26. If you put 25.0 grams of aluminum into 35.0 grams of acid, and your products are aluminum chloride with mass of 59.0 grams of, how many grams of the gas formed?
27. How many moles of that gas formed? (assume STP)

Pumping the bottle with air quickly makes it warmer. Opening the top a bit makes the gas rush out fast, also creating a quick heat loss, it's colder.

28. How are pressure + temperature related? Draw a small graph showing this.
29. Pressure + volume are related differently. What's that relationship called? Draw another graph showing that relationship.
30. You fill up a weather balloon with helium. You put in 70.0 grams of helium gas at STP.
How many moles did you put into your balloon?
31. What is the volume of the balloon, assuming STP to start?
32. If the balloon rises up to 11,200 meters the temperature drops to -33.0°C and the pressure drops to just 0.740 atm. What is the new volume of your balloon?
33. Who loves chemistry? Has it been a good year? Thanks for being here with me, I had a lot of fun too!

31 questions = 31 points total