CLASS COPY

Chemistry Spring Final Review 2010-2011

Alchemy Unit

1. Define matter.

2. What is the density formula? What is the density of a coin with a mass of 5.5 grams and volume of 26.1 mL?

3. What lab equipment do I use to measure mass, take the volume of liquids, and heat substances?

4. What would you observe for $H_2O(s)$, $H_2O(l)$, $H_2O(g)$, and NaCl (aq)?

5. Using the periodic table, where are the metals and nonmetals? What is hydrogen?

6. Where are the alkali, alkaline earth, transition metals, halogens, and noble gases?

7. On the periodic table, what are the trends for atomic mass and reactivity as you move across a period and down a group?

8. a). What are valence electrons?
   b). How many valence electrons do Mg, S, and Al have?

9. In ionic bonds, metals tend to lose electrons and nonmetals gain electrons. What happens to these elements to achieve noble electron configuration?
   a). oxygen b). chlorine c). sodium d). barium

10. What is the chemical formula of the compound formed when beryllium reacts with fluorine? When potassium reacts with sulfur?

11. What are the types of radioactive decay. Write out 2 example equations of each kind.

Smells Unit

12. What is the HONC1234 rule? Draw the Lewis Dot structures for the following molecules.
    a). OCl_2 b). SiI_4

13. What is the difference between lone pairs and bonded pairs? How many lone pairs and bonded pairs are on the molecules in question 11?

14. Write the molecular formula, structural formula, Lewis Dot structure, and ball-and-stick formula for water.

15. What is electronegativity? Where are the most and least electronegative elements?

16. How does the electronegativity differences determine nonpolar covalent, polar covalent, and ionic bonds? What are happening to the electrons in these different bonds?

Toxins Unit

17. What are the chemical formula of the following polyatomic ions and their charges?
    a). sulfate b) sulfite c) hydroxide d) nitrate e) nitrite

18. What are the four types of chemicals reactions we have learned? Give an example of all four types.

19. Name the type of chemical reaction and balance the equation.

a. ____ S_8 + ____O_2 → ____ SO_3

b. ____ NaBr + ____ CaF_2 → ____ NaF + ____ $CaBr_2$

20. Complete the following reactions and then balance them.

a. Sr + HCl → _____ + _____

b. ZnF_2 + $NaNO_3$ → _____ + _____

c. H_2SO_4 + BaI_2 → _____ + _____

d. $Ca(OH)_2$ + Li → _____ + _____

21. Answer the following questions about a mole.

a. How many atoms are in 1 mole of Cu, copper?

b. How many molecules are in 0.5 mole of H_2O, water?

21. What is the molar mass of $Al_2(SO_4)_3$?

22. Answer the following questions about the relationship between mole and mass.

a. How many moles are in 2.5 grams of H_2O, water?

b. How many grams are 0.75 moles of H_2O, water?

Use the following combustion reaction with propane, C_3H_8, to answer the following stoichiometry questions.

$$C_3H_8 + 5O_2 \rightarrow 3\ CO_2 + 4H_2O$$

23. How many moles of O_2, oxygen, will produce 2.5 moles of H_2O, water?

24. How many grams of O_2, oxygen, will be needed to react 1.50 moles of C_3H_8, propane?

25. How many moles of H_2O, water, will be produced if there is 25.0 grams of CO_2, carbon dioxide gas?

26. How many grams of C_3H_8, propane, are needed to produce 175 grams of CO_2, carbon dioxide gas?

27. How do you neutralize an acid?

28. Find the pH of each solution and determine if it is an acid, base, or neutral substance.

a). [H+] = 0.0001 M b). [OH-]= 0.000001 M

c).[H+] = 1.0×10^{-3} M d). $[OH^-] = 1.0 \times 10^{-9}$ M

g) pOH= 3.5 h) pOH= 7.7

29. Define a solute, solvent, and solution. What are two ways to make a solution?

30. How many moles of vinegar are in a 0.67M solution that is 1.2 L in volume?

31. What is the molarity of a solution of 2.8 moles nitric acid prepared in 250 mL water?

32. If you have 35g NaCl dissolved in 750 mL of water, what is the molarity?

33. 45g of $Ca(OH)_2$ was used to make a 2.0M solution. How much water was used?

Weather Unit

34. How do you convert from Celsius to Kelvin temperature? Then solve the following temperature conversions.

a. 25 °C = _____K

b. 110 °C = _____K

Pressure Conversion units

1 atm = 101.3 kPa = 101,325 Pa = 760 mm Hg = 760 torr = 14.7 lb/in^2 (psi)

35. The air pressure inside a submarine is 0.54 atm. What would be the height in millimeters of mercury (Hg) by this pressure?

36. The pressure gauge on a compressed air tank reads 43.2 lb/in^2. What is the pressure in torr?

37. What are Boyle's Law, Charles' Law, Gay-Lussac's Law, and the combined Gas Laws?

38. At constant temperature, what will happen to pressure if the volume is decreased? What gas law does this represent?

39. At constant volume, what will happen to pressure if temperature is increased? What gas law does this represent?

40. At constant pressure, what will happen to the volume of the temperature decreased? What gas law does this represent?

Use Charles', Boyle's, Gay-Lussac's, and Combined Gas Law to solve the following problems.

41. A balloonist puts 63,000.0 liters of air into her balloon at 32.0°C. The air in the balloon is heated to 275°C. What is the final volume of the air in the balloon?

42. At 2.0 atm of pressure, the volume of a balloon is 0.40 L. Assuming that the temperature remains constant, what will the volume of the balloon be at 1.7 atm of pressure?

43. At 300 K, the pressure inside a rigid can is 2.2 atm. If the temperature increases to 315K, what is the pressure inside the can?

44. What is the final volume of a 400.0 mL gas sample that is subjected to a temperature change from 22.0 °C to 30.0 °C and a pressure change from 760.0 mm Hg to 360.0 mm Hg?

45. What is STP?

46. How many liters does 3 moles of chlorine gas occupy?

47. How many moles does 55.0 liters of hydrogen gas occupy?

48. How many atoms do 125 liters of helium gas?

49. How many liters are in 1.25×10^{24} atoms of neon gas?

Fire Unit

50. What are endothermic and exothermic processes?

51. Which requires more heat? A) Heating 50g water 20°C-40°C OR B) Heating 30g water 20°C-50°C

52. Which cup of water gets the hottest?
A) 350 calories transferred by 50g water starting at 30°C
B) 500 calories transferred by 80g water starting at 30°C

53. What will extinguish a fire?

54. Which the following will combust? A) H_2O b) CO_2 C) NaCl D) Mg E) CH_4

55. A 4g marshmallow is burned completely warming 300mL water. The temperature of the water is raises 20°C to 60°C.

a) How many calories of heat were transferred to the water?
b) Calculate the calories per gram of marshmallow.
c) How many food Calories does one marshmallow have?