

Review Assignment (Complete 1-62 ODDS)

Due the day we return

Directions: Please answer each question completely. Look at notes only if you need to. Do not leave any blank. Show work when needed.

1. A student made a mistake when measuring the volume of a big container. He found the volume to be 65 liters. However, the real value for the volume is 50 liters. What is the percent error?

$$\frac{65 - 50}{50} = \boxed{30\%}$$

2. What are the most common types of graphs used in Chemistry?

- a. Line Graphs and Bar Graphs
- b. Scatter Plots and Bar Graphs
- c. Bar Graphs and Pie Graphs
- d. Line Graphs and Scatter Plots

3. What did J.J. Thompson discover?

- a. The electron
- b. The nucleus
- c. The proton
- d. The neutron

4. What does the Law of Conservation of Mass state?

Mass cannot be created or destroyed, only rearranged

5. Fill in each blank for the following isotope: sulfur-34

Protons: 16
Neutrons: 18
Electrons: 18

Mass number: 34
Atomic number: 16
Atomic mass: 32.07

6. How many electrons can the f orbitals hold per level?

14

7. What is the Aufbau Principle?

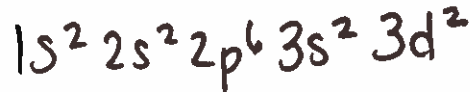
Electrons fill orbitals from lowest energy to highest energy

8. What type of electromagnetic radiation is released when an electron goes from the sixth to the second energy level in Bohr's model of the Hydrogen atom? **Visible - violet**

9. What is the Lewis electron dot diagram of chlorine?



10. Write the electron configuration for Silicon?



11. The Radioactive elements with atomic numbers from 90 to 103 in the periodic table are referred to as the

- a) Noble Gases
- b) Lanthanides
- c) Actinides
- d) Rare-Earth elements

12. True or False? The modern periodic table is organized by increasing atomic number?

- a) True
- b) False

13. Circle the answer with the following elements going in order from smallest to largest atomic radius. C, O, Sn, Sr **O, C, Sn, Sr**

- a) Sn, Sr, O, C
- b) O, Sn, Sr, C
- c) O, C, Sn, Sr
- d) C, O, Sn, Sr
- e) None are correct

14. Use the following and draw lines that match the element with its family/group (~~use~~ ~~reference periodic table given~~):

Selenium	_____	Chalcogens
Chlorine	_____	Transitional Metals
Potassium	_____	Halogens
Iron	_____	Alkali Metals

15. The work of a person named _____ led to a Periodic Table based on increasing atomic number.

- a) Lavoisier
- b) Moseley
- c) Mrs. Powers ☺
- d) Avogadro

16. How are polar covalent and nonpolar covalent bonds different?

- don't share evenly
- different electronegativities
- share evenly
- same electronegativities

17. In terms of electrons, how does an ionic bond form?

transfers electrons from metal to nonmetal

18. How does a covalent bond form?

Sharing electrons

19. What is necessary for a molecule to be polar?

polar bonds and not symmetrical

20. When do you see parenthesis in the formula of an ionic compound?

With transition metals - represents the charge.

21. Write the formula for the following compound:

Don't use with Zn or Ag

Iron (III) Oxide



Potassium Hydrogen Carbonate



Dinitrogen Pentoxide



Phosphorus Trichloride



Lead(IV) Nitrate



22. Write the name of the following compounds:

BaCl₂

barium chloride

Mg₃(PO₄)₂

magnesium phosphate

Na₂SO₄

Sodium sulfate

MnO

manganese (II) oxide

CrCl₃

Chromium (III) chloride

23. Which of the following shows the correct name and formula for the acid?

- A. Acetic Acid; ~~H₂C₂H₃O₂~~ HC₂H₃O₂
- B. Carbonic Acid; HCO₃ H₂CO₃
- C. ~~Hydro~~nitric Acid; HNO₃
- D. Phosphoric Acid; H₃PO₄

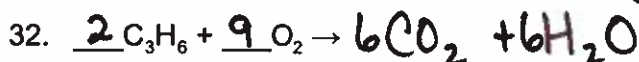
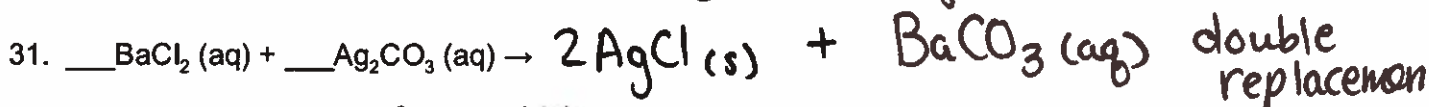
24. When naming binary molecular compounds, which is named first?

- A. The most electronegative atom
- B. The least electronegative atom**
- C. The order doesn't matter
- D. The element with the most number of atoms

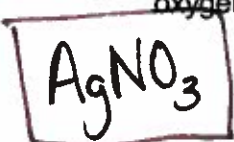
25. When writing ionic formulas, is the cation or anion written first?

- A. Cation is written first.**
- B. Anion is written first.
- C. It is dependent on the ionic compound.
- D. Order doesn't matter.

Directions: For questions 26-32, predict the products, balance the equation and determine the reaction type.



33. The percent composition of a compound is 63.5% silver, 8.2% nitrogen, and 28.3% oxygen. Determine the empirical formula of the compound.



$$\frac{63.5 \text{ g Ag}}{107.87 \text{ g/mol}} = .589 = 1$$

$$\frac{8.2 \text{ g N}}{14.01 \text{ g/mol}} = 0.585 = 1$$

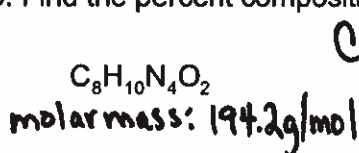
$$\frac{28.3 \text{ g O}}{16 \text{ g/mol}} = 1.769 = 3$$

34. What is the molecular formula of a compound with an empirical formula of NH₂ and a formula mass of 32.06 amu?

$$\frac{32.06}{16.026} = 2$$

$$14.01 + 2(1.008) = 16.026$$

35. Find the percent composition of all the elements of the following compound:



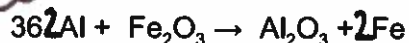
C: $\frac{96.08}{194.2} = 49.47\%$

H: $\frac{1.008(10)}{194.2} = 5.19\%$

N: $\frac{56.04}{194.2} = 28.86\%$

O: $\frac{32.00}{194.2} = 16.48\%$

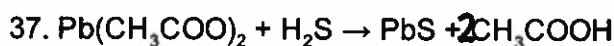
Balance:



Single replacement

How many grams of Fe can be produced when 10.0g of Al is reacted with an excess supply of Fe_2O_3 ?

10.0g Al	mol Al	2 mol Fe	55.85 g Fe	= 20.7g
	26.98g Al	2 mol Al	1 mol Fe	



How many grams of PbS is produced when 5.00g of H_2S is reacted with an excess supply of $\text{Pb}(\text{CH}_3\text{COO})_2$?

5.00g H_2S	mol H_2S	1 mol PbS	239.27g	= 35.1g
	34.086g H_2S	1 mol H_2S	1 mol PbS	

38. Xenon gas occupies a volume of 45 mL at 400 K. What volume will it occupy at 850. K?

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \frac{45}{400} = \frac{V_2}{850} \quad V_2 = 95.6 \text{ mL}$$

39. A sample of gas at 1.5 atm and 35 degrees Celsius occupies a volume of 200 mL. What volume will the gas occupy at STP conditions?

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \quad \frac{1.5(200)}{308} = \frac{1 V_2}{273} \quad 266 \text{ mL}$$

40. Argon exerts a pressure of 1000 torr. When the pressure is changed to 1.7 atm, its temperature is 55 degrees Celsius. What was the original temperature?

$$\frac{1000 \text{ torr}}{760 \text{ torr}} = 1.32 \text{ atm} = P_1 \quad P_2 = 1.7 \text{ atm} \quad T_2 = 55 + 273 = 328 \text{ K}$$

41. What volume of 3.00 M CaCl_2 would one use to create 0.8 L of 0.400M CaCl_2 ?

$$3.00(V) = 0.400(.8)$$

$$0.107 \text{ L}$$

$$\frac{1.32}{T_1} = \frac{1.7}{328} \quad 255 \text{ K}$$

42. What color does bromothymol blue turn when an acid is placed into it? yellow

43. Find the pH of 0.01 M HNO_3

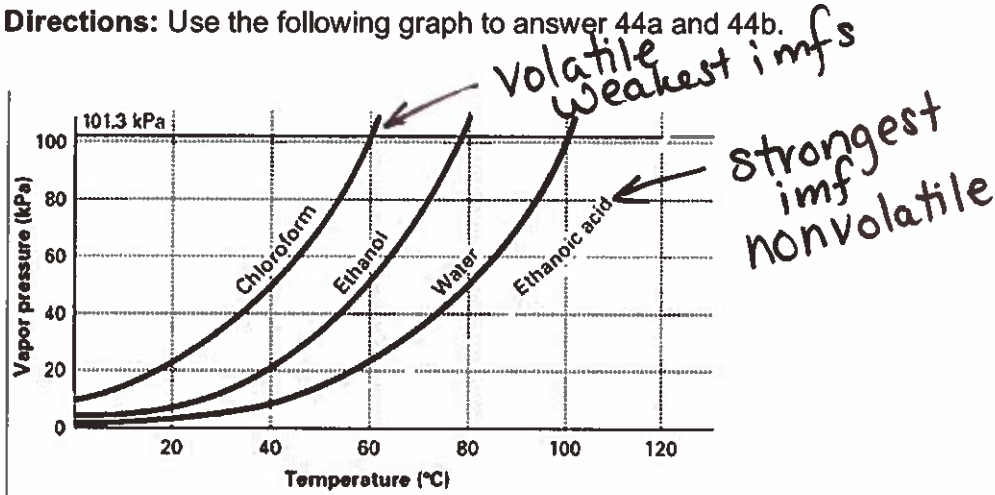
↑
strong

$$[\text{H}^+] = 0.01 \text{ M}$$

$$\text{pH} = -\log 0.01$$

$$2$$

Directions: Use the following graph to answer 44a and 44b.



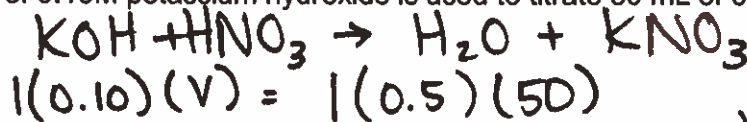
44a. What is the vapor pressure of Chloroform at 50 degrees Celsius?

$\sim 72 \text{ kPa}$

44b. What is the boiling point of Water when the external pressure is 35 kPa?

$\sim 72^\circ\text{C}$

45. What volume of 0.10M potassium hydroxide is used to titrate 50 mL of 0.50M nitric acid?



$V = \boxed{250 \text{ mL}}$

46. What is the molarity of a solution containing 5.85 g of KI in a 12 mL solution?

$$\frac{0.0352 \text{ mol}}{0.012 \text{ L}} = \boxed{2.9 \text{ M}} \quad \frac{5.85 \text{ g KI}}{166 \text{ g/mol}} = 0.0352 \text{ mol}$$

47. Which of the following substances has the greatest colligative effect on a liquid?

- a. $\text{C}_6\text{H}_{12}\text{O}_6$ 1 particle
- b. Cu_2SO_4 3 particles $2\text{Cu}^{2+} + \text{SO}_4^{2-}$
- c. Ca_3N_2 5 particles $3\text{Ca}^{2+} + 2\text{N}^{3-}$
- d. HCl 2 particles $\text{H}^+ + \text{Cl}^-$

48. A 20.0 g piece of metal at a temperature of 90.0°C is dropped into an insulated container holding 125 g of water at 20.0°C . If the final temperature is 23.0°C , what is the specific heat of the metal?

more complex than what will probably be on the test

$$Q_{\text{lost}} = -Q_{\text{gained}}$$

$$-20 C_p (-67) = 125 (4.184) (3)$$

$C_p = \boxed{1.17 \text{ J/g}^\circ\text{C}}$

metal	water
$m = 20.0 \text{ g}$	125 g
$C_p = ?$	4.184 g
$\Delta T = 23 - 90 = -67^\circ\text{C}$	$23 - 20 = 3^\circ\text{C}$

most stable

49. There are three substances. One has a negative heat of formation value one has a positive heat of formation value, and one has a value of 0. Which is the most stable?

50. Do the reactants or the products represent more entropy in the following reaction?



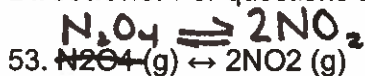
more entropy \rightarrow more moles!

51. A measure of the average kinetic energy of the atoms or molecules of substance. temperature

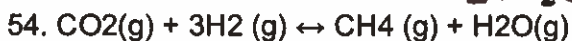
52. During a phase change from liquid to gas what happens to potential energy?

increases for $s \rightarrow l$ or $l \rightarrow g$
decreases for $l \rightarrow s$ or $g \rightarrow l$

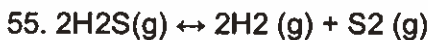
Directions: For questions 53-55, write the equilibrium expression (K_{eq}).



$$K_{eq} = \frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]}$$



$$K_{eq} = \frac{[\text{H}_2\text{O}][\text{CH}_4]}{[\text{CO}_2][\text{H}_2]^3}$$



$$K_{eq} = \frac{[\text{S}_2][\text{H}_2]^2}{[\text{H}_2\text{S}]^2}$$

56. $\text{CH}_4(\text{g}) + 2\text{H}_2\text{S}(\text{g}) \rightleftharpoons \text{CS}_2(\text{g}) + 4\text{H}_2(\text{g})$ what side does it shift if there is an increase in pressure? 3 moles \leftarrow 5 moles

Shifts to the left

57. $2\text{SO}_3(\text{g}) \rightleftharpoons 2\text{SO}_2(\text{g}) + \text{O}_2(\text{g})$ What side does it shift if there is a decrease of SO_3 ? right

58. Any particle found in the nucleus. It includes protons and neutrons.

- A. Nuclide
- B. Ion
- C. Nucleon
- D. Positrons

59. Compare and contrast fission and fusion.

Fission - breaks apart large atoms

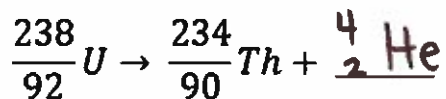
- releases energy
- doesn't require a lot of energy
- produces waste
- nuclear power plants and weapons

Fusion - combines atoms

- releases more energy
- requires a ton of energy
- does NOT produce waste
- stars and weapons (NOT in power plants)

No subscripts = yucky!

60. What type of emission is occurring in the following equation?



alpha emission

61. Order the three different radiation particles (beta, gamma, and alpha) from strongest penetrating power to lowest penetrating power.

gamma, beta, alpha

62. U-238 has a half-life of 4.32×10^9 years. How much U-238 should be left in a sample 2.25×10^9 years later, if 2.00 grams was present initially?

$$\frac{2.25 \times 10^9}{4.32 \times 10^9} = \sim .5 \text{ half-life}$$

↑
don't worry since not a whole number