

Final Study Guide - Questions

Lab Safety:

True and False:

1. Hot glass looks the same as cold glass.
2. All chemicals in the lab are to be considered dangerous.
3. Return all unused chemicals to their original containers.
4. Work areas should be kept clean and tidy.
5. Pipets are used to measure and dispense small amounts of liquids.
6. Never remove chemicals or other equipment from the laboratory.

Explain the steps of action for the following situations:

7. Your lab partner catches on fire.
8. You notice you spilt a chemical on your clothes and lab coat.
9. You are heating a chemical in a test tube.
10. Come into contact with an unknown chemical in a beaker above a Bunsen Burner.
11. Explain proper lab clothing, consider: jewelry, shirt, pants, shoes, etc.
12. How do you become best prepared for a lab?
13. An acid is best cleaned on your skin with _____.
14. Explain what can happen if lab safety is not followed. Give real examples.
15. What is Chemistry?

Give a description of each of the following types of Chemistry:

16. Organic chemistry
17. Inorganic chemistry
18. Physical chemistry
19. Analytical chemistry
20. Biochemistry
21. Theoretical chemistry
22. Compare and contrast Basic and Applied Research.
23. What is matter that can be separated?
24. What is matter that can't be separated and can't be broken down by chemical means?
25. Explain the differences between homogenous and heterogeneous mixtures?
26. What is a Change of State? Give an example of each state.
27. What is a Chemical Change?
28. Explain how reactants and products relate to each other?
29. What is Mass, Volume, and Density? How do they relate to each other? Which is an intensive/extensive property?
30. How could you calculate density?
31. Why is it best to use the results of three trials rather than a single trial for determining the density?
32. Atom and Elements, which one is smaller? What is the difference?

Define each term and show there location on the periodic table. Give chemical and physical characteristics of each.

33. Actinide
34. Alkali Metals
35. Alkaline Earth Metals
36. Lanthanide
37. Halogens
38. Metalloid
39. Transition Elements
40. Noble gases

*Lanthanide series

**Actinide series

41. Describe Periodic Law
42. How is a periodic table helpful?
43. What do elements in the same column have in common?
44. What are the columns and rows in a periodic table called?
45. What do atoms of the same element have the same number of?
46. How can someone identify the number of valence electrons for elements within the s and p block by looking at the periodic table?
47. Describe relationship between atomic number and other atomic properties.
48. What is the characteristic property of Noble Gasses?
49. Describe the location of an atom's nucleus, electrons, protons, and neutrons.
50. Describe the properties of an atom's electrons, protons, and neutrons.
51. Fill out the table for the following molecules.

Molecules	Number of atoms for EACH element	Lewis Structure	Bonds Involved
H			

O ₂			
CCl ₄			
CH ₃ OH			

52. Compare and Contrast the different bonds Ionic and Covalent.
 53. What do the arrows stand for in orbital notation?
 54. Why is the valence shell so important in studying chemical reactions?
 55. What are the maximum number of electrons per shell?
 56. Explain how to determine whether an element is likely to form a cation or anion?
 57. Elements having same number of valence electrons in their atoms possess _____ chemical properties.
 58. Elements in the same _____ have the same number of _____ in their outermost shell.
 59. Cations are ions with a net _____ charge and have _____ an electron.
 60. Anions are ions with a net _____ charge and have _____ an electron.
 61. Fill out the table for the following molecules.

Atomic Number	Name	Abbreviation	Dot Notation	Electron Notation
4				
7				
13				
16				
19				
56				

62. Fill out the table for the following molecules.

Atomic Number	Name	Abbreviation	Dot Notation	Orbital Notation
2				
8				
11				
14				
20				
27				

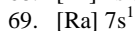
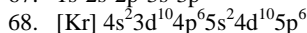
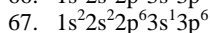
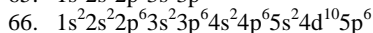
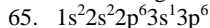
63. Fill out the table for the following molecules.

Atomic Number	Name	Abbreviation	Dot Notation	Noble Gas Notation

3				
9				
15				
18				
35				

64. Explain, based on electron configuration, why are the noble gases so unreactive. Use one as an example to illustrate your explanation.

Correct the following notations.



70. Define chemical formula and explain simplest form (may use examples if necessary).

71. What are the charges for the ions in the following:

i. Group 1

ii. Group 2

iii. Group 13

iv. Group 15

v. Group 16

vi. Group 17

72. Ions that have a positive charge are known as _____ and have _____ electrons.

73. Ions that have a negative charge are known as _____ and have _____ electrons.

74. Explain why elements in Group 1 have a 1+ charge while Group 2 have a 2+ charge and Group 15 has a 3- charge.

75. Latin prefixes are used in _____ compounds.

76. List the Latin Prefixes for 1-10.

77. What does the Latin prefix represent?

78. Covalent compounds are also known as _____ compounds.

79. What determines the order for a molecular compound?

80. Ionic compounds are also known as _____ compounds.

81. The suffix "ide" is added to _____ ions.

82. The word _____ is added after the name of a cation.

83. In an ionic compound the _____ ion is written first.

84. Compare and contrast Binary and Ternary Compounds.

85. Roman numerals represent the _____ of the ion.

86. Roman numerals are only written for _____ ions.

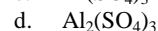
87. Compare and contrast monatomic and polyatomic ions.

88. If a polyatomic ion with suffix "ate", loses an oxygen then the suffix becomes _____.

89. In a compound formula, put the polyatomic ion in _____ if needs to be represented with more than one atom.

90. What is the ion of bromine with a single negative charge (symbol and the name)

91. What is the formula for the compound made of aluminum ions and sulfate ions?



92. How many atoms are present in one formula unit of barium acetate, $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$?

93. What is the formula for the compound dinitrogen tetroxide?

94. The salt calcium nitrate, $\text{Ca}(\text{NO}_3)_2$, contains the anion

95. What is the molar mass of water?

96. What is the molar mass of pure tin?

97. How many moles of compound are there in 15.0 g of potassium dichromate, $\text{K}_2\text{Cr}_2\text{O}_7$? (The molar mass of $\text{K}_2\text{Cr}_2\text{O}_7$ is 294.2 g.)

98. What is the mass percentage of cobalt in cobalt(II) fluoride, CoF_2 ?

99. What is the mass of 4.80 mol of barium hydride, BaH_2 ?

100. What is the molecular formula for the compound with a formula mass of 58.12 amu and contains C and H?

101. Name the following symbols

a. (aq).

b. (g)

c. (l)

d. (s).

102. In the expression 3CO_2 , the numbers 3 and 2 are, respectively,

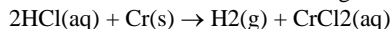
103. Balance the formula equation below?



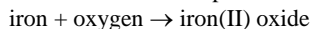
104. Formula mass of any compound is described in units of:

105. Which type of reaction do two or more compounds react to form one product?

106. What type of chemical reaction does the following chemical equation represent?

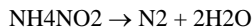


107. What type of chemical reaction is represented by the following word equation?



108. A mixture of propane and oxygen react to form carbon dioxide and water. What type of chemical reaction is this?

109. What is the total number of molecules that is represented by the following chemical equation?



110. When can the term molecular mass be used instead of formula mass?

111. What is the molar mass of tetraethyl lead, $\text{Pb}(\text{C}_2\text{H}_5)_4$?

112. What is the formula mass of copper(II) chloride, CuCl_2 ?

113. What is the percentage composition of copper in CuCl_2 by mass?

114. What is the mass of 0.240 mol glucose, $\text{C}_6\text{H}_{12}\text{O}_6$?

115. What is the formula for a sample of a compound that contains 259.2 g F and 40.8 g C?

116. Describe a chemical equation is balanced.

117. What amount of hydrochloric acid, HCl is found in 5.5 grams?

118. Compare how the term mole relates to the term dozen.

119. When calculating the amount of product produced in a chemical reaction, would it be better base your calculation on the amount of limiting reactant or on the amount of excess reactant? Justify your answer.

120. Explain the similarities and difference between limiting and excess reactants, how it is useful to be aware of each in a reaction, and how examples of these are found every day.

Determine the molar mass of the following compounds:

121. CuCl_2

122. NaNO_3

123. $\text{Cu}(\text{NO}_3)_2$

124. NaCl

125. CoF_2

126. What is the molecular formula for the compound with a formula mass of 87.18 amu and contains C and H?

127. How many moles of compound are there in 150.0 g of potassium dichromate, $\text{K}_2\text{Cr}_2\text{O}_7$?

128. Suppose you are going to make sandwiches that contain specifically 2 slices of bread and 1 slice of ham. If you have a total of 23 slices of ham and 50 slices of bread, how many sandwiches can you make?

Consider the following reaction: $\text{CaCN}_2 + 3\text{H}_2\text{O} \rightarrow \text{CaCO}_3 + 2\text{NH}_3$

77.0 grams of CaCN_2 and an excess of water produces 27.1 grams of NH_3 after the reaction.

129. Identify the excess reactant.

130. Identify the limiting reactant.

131. Determine the molar mass of the limiting reactant.

132. What is the amount of moles in the given mass of the limiting reactant?

133. Determine the mole ratio of the limiting reactant to the product.

134. Using the moles of the reactant, determine the moles of the product.

135. Determine the molar mass of the considered product.

136. What is the mass that theoretically will be produced of the product?

137. What is the percent yield of the reaction?

138. Is the percent yield determined reasonable? Explain if this is a quality value of a percent yield. Support your answer.

139. What is the molarity of a solution made by dissolving 20.0 g of H_3PO_4 in 50.0 mL of solution?

140. What weight (in grams) of KCl is there in 2.50 liters of 0.50 M KCl solution?

141. What is the molarity of a solution containing 12.0 g of NaOH in 250.0 mL of solution?

142. A stock solution of 1.00 M NaCl is available. How many milliliters are needed to make 100.0 mL of 0.750 M

143. Concentrated H_2SO_4 is 18.0 M. What volume is needed to make 2.00 L of 1.00 M solution?

144. A 0.500 M solution is to be diluted to 500.0 mL of a 0.150 M solution. How many mL of the 0.500 M solution are required?

145. Reactions occur on a _____ to _____ basis. Pure reactants, we measure _____ (grams). Reactants that are added to a reaction as aqueous solutions, we measure the _____.