

2012 1st Semester Exam Review

Short Answer

1. What is chemistry?
2. The branch of chemistry that is concerned with the identification and composition of materials is _____.
3. The study of substances containing carbon is _____.
4. Which statement is NOT true about applied research?
 - a. It is conducted to meet goals defined by specific needs.
 - b. It is usually carried out to solve a practical problem.
 - c. It is the study of how and why a specific reaction occurs.
 - d. It may not be driven primarily by scientific curiosity or a desire to know
5. Chemical properties
 - a. include changes of state of a substance.
 - b. include mass and color
 - c. include changes that alter the identity of a substance
 - d. can be observed without altering the identity of a substance.
6. One chemical property of matter is
 - a. boiling point
 - b. texture
 - c. reactivity
 - d. density
7. Which of the following is an intensive physical property?
 - a. volume
 - b. length
 - c. color
 - d. density
8. The state of matter in which particles are rigidly held in fixed position is the _____ state.
9. A substance classified as a fluid contains particles that
 - a. quickly expand into any available space.
 - b. are held in fixed positions.
 - c. may slide past each other
 - d. are very far from each other
10. The state of matter in which a material has a definite volume but no definite shape is the _____ state.
11. Elements in a group in the periodic table can be expected to have similar _____.

Name: _____

ID: A

12. A vertical column of blocks in the periodic table is called a(n) _____.
13. What are properties of metals?
14. Which statement is NOT true of most metalloids?
 - a. They are used in computers and calculators.
 - b. They are semiconductors of electricity.
 - c. They are generally unreactive.
 - d. They have characteristics of both metals and nonmetals.
15. List the steps in the scientific method.
16. List the SI base units.
17. A quantity that describes the concentration of matter is _____.
18. A change in the forces of Earth's gravity on an object will affect its _____.
19. To calculate density of an object divide _____.
20. The density of aluminum is 2.70 g/cm^3 . The volume of a solid piece of aluminum is 1.50 cm^3 . Find the mass.
21. These values were obtained as the mass of products from the he same reaction: 8.83 g, 8.84 g, 8.82 g. the known mass of products from that reaction is 8.60 g. Are the values, accurate, precise, both accurate and precise, neither accurate nor precise?
22. Know the rules for the number of significant digits in a measurement.
How many significant figures in
 - a. 100.
 - b. 0.001
 - c. 5005
 - d.565
 - e. 10 000 00
23. For numbers less than 0.1, such as 0.06, the zeros to the right of the decimal point but before the first nonzero digit _____.
24. In division and multiplication, the answer must not have more significant figures than the _____.
25. The measurement that has been expressed to three significant figures if
 - a. 0.075g
 - b. 0.402 g
 - c. 3.065 g
 - d. 7000 g
26. Using a metric rules with 1 mm divisions, you find the sides of a rectangular piece of plywood are 3.54 cm and 4.85 cm. You calculate that the area is 17.1609 cm^2 . To the correct number of significant figures, the result should be expressed as _____.

27. When 64.4 is divided by 2.00, the correct number of significant figures is the result is _____?
28. Three samples of 0.12 g, 1.8 g, and 0.562 g are mixed together. The combined mass of all three samples, expressed to the correct number of significant figures, should be recorded as _____.
29. When 1.92×10^{-6} kg is divided by 6.8×10^2 ml, the quotient in kg/ml equals?
30. If two or more compounds are composed of the same two elements, the ratio of the masses of one element that combine with a fixed mass of the other element is a simple whole number. This is a statement of the law of _____.
31. According to Dalton's atomic theory, atoms
- are destroyed in chemical reactions
 - can be divided
 - of each element are identical in size, mass, and other properties
 - of different elements cannot combine
32. Isotopes are atoms of the same element that have different _____.
33. Nickel-60 (atomic number 28) has _____ neutrons.
34. The atomic number of neon is 10. The atomic number of calcium is 20.. Compared with a mole neon, a mole of calcium contains _____ atoms
35. Define molar mass
36. A quantity of sodium (atomic mass 22.99 amu) contains 6.022×10^{23} atoms. The mass of the sodium is?
37. The mass of two moles of oxygen atoms (atomic mass 16 amu) is _____.
38. The mass of a sample containing 3.5 mol of silicon atoms (atomic mass is 28.0855 amu) is _____.
39. What is the number of moles of chemical units represent by 9.03×10^{24} units?
40. Experiments with cathode rays led to the discovery of the _____.
41. The deflection of cathode rays in Thomson's experiments was evidence of the _____ nature of electrons.
42. Because most particles fired at metal foil passed straight through Rutherford concluded that _____.
43. A nuclear particle that has about the same mass as a proton, but with no electrical charge, is called a(n) _____.
44. The mass of a neutron is equal to _____.

45. An atom is electrically neutral because _____.
46. As it travels through space, electromagnetic radiation exhibits _____.
47. If electromagnetic radiation A has a lower frequency than electromagnetic radiation B, then compared to B the wavelength of A is _____.
48. For an electron in an atom to change from the ground state to an excited state, what must happen?
49. The region outside the nucleus where an electron can most probably be found is the _____.
50. Describe Heisenberg's uncertainty principle.
51. How many quantum numbers are needed to describe the energy state of an electron in an atom?
52. The main energy levels of an atom are indicated by the _____ quantum number.
53. The number of sublevels within each energy level of an atom is equal to the value of the _____.
54. A spherical electron cloud surrounding an atomic nucleus would best represent _____.
55. The p orbitals are shaped like _____.
56. The number of possible orbital shapes for the third energy level is _____.
57. The statement that an electron occupies the lowest available energy orbital is the _____.
58. The Pauli exclusion principle states that no two electrons in the same atom can _____.
59. Which electron configuration is most stable? Why?
a. $3d^44s^2$ b. $3d^54s^1$ c. $3d^34s^3$ d. $3d^24s^4$
60. If the s and p sublevels of the highest main energy level of an atom are filled, how many electrons are in the main energy level?
61. The most useful source of general information about the elements for anyone associated with chemistry is a _____.
62. Argon, krypton, and xenon are _____.
63. The periodic law allows some properties of an element to be predicted based on its _____.
64. The most reactive group of the nonmetals are the _____.
65. The group of soft, silvery active metals, all of which have one electron in an s orbital, is known as the _____.

Name: _____

ID: A

66. The first member of the noble gas family, whose highest energy level consist of an octet of electrons, is _____.
67. The most characteristic property of the noble gases is that they are _____.
68. The energy required to remove an electron from an atom is the atom's _____.
69. A measure of the ability of an atom in a chemical compound to attract electrons is called _____.
70. The element that has the greatest electronegativity is _____.
71. A negative ion is known as a(n) _____.
72. In a row in the periodic table, as the atomic number increases, the atomic radius _____.
73. Within a group of elements, as the atomic number increases, the atomic radius _____.
74. In the alkaline-earth metals, atoms with the smallest radii _____.
75. As the atomic number of the metals of Group 1 increases, the ionic radius _____.
76. For each successive electron removed from an atom, the ionization energy _____.
77. The energy required to remove an electron from an atom _____ as you move left to right from potassium through ion.
78. A chemical bond results from the mutual attraction of the nuclei of atoms and _____.
79. Atoms are _____ when they are combined.
80. When atoms share electrons, the electrical attraction of an atom for the electrons is called the atoms's _____.
81. A covalent bond results when _____ are shared.
82. Nonpolar covalent bonds are NOT common because _____.
83. Bonds that are more than 50% ionic are considered _____.
84. The B-F bond in BF_3 (electronegativity for B is 2.0, electronegativity for F is 4.0) is what type of bond?
85. Which of the following is not an example of a molecular formula?
a. H_2O b. B c. NH_3 d. O_2

Name: _____

ID: A

86. The electron configuration of nitrogen is $1s^2 2s^2 2p^3$. How many more electrons does nitrogen need to satisfy the octet rule?
87. To draw a Lewis structure, one must know the _____.
88. The ions in an ionic compound are organized into a(n) _____.
89. Compared with nonmetals, the number of valence electrons in metals is generally
a. smaller b. greater c. about the same d. almost triple that of nonmetals.
90. In the electron sea model of a metallic bond, electrons are _____.
91. To appear shiny, a material must be able to _____.
92. The electron sea model of the metallic bond helps to explain why metals are _____.
93. Compared with metals, ionic crystals are _____.
94. The model for predicting the shape of a molecule that is based on the repulsion of electrons for each other is called _____.
95. According to VSEPR theory, the structure of the ammonia molecule, NH_3 , is ?
96. What is the formula for the compound formed by Mg ions and F ions?
97. When naming an ionic compound the _____ is written first and is usually a _____ and the anion is written second.
98. The overall charge on an ionic compound must be _____.
99. Name the compound $NiCl_2$ _____.
100. When naming molecular compounds you must use _____ to designate the subscripts in the molecular formulas