Name: _____ Class: _____ Date: _____ ID: A

FINAL EXAM Review Package - Chemistry

Completion
Complete each statement.

1. Early chemists believed that if a substance broke down into components with fixed _____ it was a compound.
2. U is the symbol for the element _____.
3. The element nitrogen has the symbol _____.
4. _____ was named for the special property it has - it glows in the dark.
5. A molecule of methane, CH_4, contains _____ part(s) carbon and _____ part(s) hydrogen.
6. Elements can be divided into three groups: metals, _____, and _____.
7. Non-metals generally have a(n) _____ lustre.
8. Gold, compared to all other metals, is the best _____ of electricity.
9. _____ are found along the staircase of the periodic table of the elements.
10. A horizontal row on the periodic table is called a(n) _____.
11. Moving from top to bottom down any group, atomic mass _____.
12. Three examples of the noble gases are _____, _____, and _____.
13. _____ and _____ sit side by side on the periodic table, but are unusual because their atomic masses do not increase from left to right.
14. Most metals do not react violently when they get wet. Group _____ metals, however, do.
15. According to the Rutherford model of the atom, most of the space that an atom occupies is _____.
16. _____ discovered the electron.
17. According to the _____ model, the atom is like a raisin bun, with the raisins representing the electrons, and the dough of the bun the rest of the atom
18. According to _____ Atomic Theory, all elements are made up of atoms, which are like tiny, indivisible spheres.
19. The particles that make up most of the mass in an atom are the _____ and _____.
20. Atomic number is the number of _____ in an atom.
21. Magnesium-26 has two more_____ than magnesium-24.
22. Bohr stated that as elements move to higher shells they _____ energy, and as they move to lower shells they _____ energy.

23. $^{19}_{9}F$ is the standard atomic notation for the _____ atom.
24. A nitrogen ion contains _____ electrons and _____ protons.
25. When sulphur forms the 2- ion, it has a full outer shell like the noble gas, _____.
26. The _____ shell of electrons is involved in chemical reactions.
27. Ionic compounds do not form molecules, they form _____.
28. The chemical formula HCl represents _____ atom(s) of hydrogen and _____ atom(s) of chlorine.
29. A group of elements that occur in compounds, and as a group have a positive or negative charge is called a(n) _____.
30. The nitrate ion contains _____ atoms of oxygen.
31. The phosphate ion has a _____ charge.
32. Positive ions are attracted to negative ions through _____ attraction.
33. Iron is _____ because it has two ion charges, 2+ and 3+.
34. The names of the two ions in the ionic compound, $Al_2(SO_4)_3$ are _____ and _____.
35. The chemical formula for the compound ammonium bromide is _____.
36. The chemical formula for the compound tin(II) chloride is _____.
37. The name of the ionic compound, Au_2O_3, is _____.
38. Magnesium is used in flash powder and fireworks because it _____.
39. The most reactive elements on the periodic table are found in Groups _____ and _____.
40. Elements with two electrons in their outermost shell belong to the _____.

Matching

Match the symbol with the best description of the element.

a. Hg
b. Pb
c. Au
d. Fe
e. W

____ 41. used in fine jewellery
____ 42. liquid at room temperature
____ 43. tungsten
____ 44. magnetic
____ 45. used by the Romans to make pipes to carry water

Identify the following properties as metallic or non-metallic.

a. metallic
b. non-metallic

____ 46. high density
____ 47. brittle, shatters when struck
____ 48. poor conductor of electricity
____ 49. shiny lustre
____ 50. often a gas at room temperature

Match the compound formulas with the best description of the elements and their proportions.

a. K_2CrO_4
b. HCl
c. SO_2
d. $KClO_3$
e. H_2SO_4
f. SF_6

____ 51. hydrogen - 2, sulphur - 1, oxygen - 4
____ 52. potassium -1, chlorine- 1, oxygen - 3
____ 53. hydrogen - 1, chlorine - 1
____ 54. sulphur - 1, fluorine - 6
____ 55. potassium -2, chromium - 1, oxygen - 4
____ 56. sulphur - 1, oxygen - 2

Match each of the ideas with the name of the theory that it supports.

a. Bohr's Theory
b. Dalton's Theory
c. Thompson's Revisions
d. Rutherford's Revisions

____ 57. Each element has atoms with a particular mass.
____ 58. The nucleus of the atom is positively charged.
____ 59. Electrons can be removed from atoms.
____ 60. Electrons are located in energy shells.
____ 61. Most of an atom is empty space.
____ 62. Electrons are small with a negative charge.

Match the element with the correct standard atomic notation for the atom or ion.

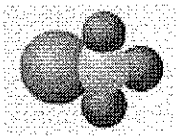
a. copper-63
b. copper-65
c. gallium-69
d. gallium-71

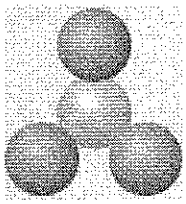
____ 63. $^{69}_{31}Ga$
____ 64. $^{65}_{29}Cu$
____ 65. $^{71}_{31}Ga$
____ 66. $^{69}_{31}Ga^{3+}$
____ 67. $^{63}_{29}Cu^{+}$
____ 68. $^{63}_{29}Cu$

Match the chemical formula with a possible visual representation.

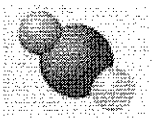
a. $LiClO_3$
b. KHS
c. NaBr
d. $AlBr_3$
e. F_2

____ 69. 

____ 70. 

____ 71. 

____ 72. 

____ 73. 

Match the ions of manganese with the symbols and formulae.

a. manganese(II)
b. manganese(III)
c. manganese(IV)
d. manganese(VII)

____ 74. Mn^{3+}
____ 75. MnO_2
____ 76. MnO
____ 77. Mn^{7+}
____ 78. Mn_2O_7
____ 79. Mn^{4+}
____ 80. Mn_2O_3

Essay

81. You are riding your bicycle on a cold day. You notice that when you touch any metallic part of your bike, your hands get cold very quickly, but when you touch a plastic or rubber part, your hand does not feel as cold. These different parts are at the same temperature. Using your knowledge of the properties of metals, explain this observation.

82. What occurrences made it necessary to reject or change the models of the atom proposed by Dalton, Thomson, and Rutherford?

83. Aluminum has 13 electrons in its shells. Describe how the electrons are normally distributed in the shells. (1 point)
Occasionally, aluminum might have only one electron in the first shell. Describe how the 13 electrons would now be distributed and suggest what has happened to the electron that used to be in the first shell. (2 points)
Would this new situation last for a long period? (1 point)

84. Sodium carbonate and potassium carbonate are both white powders that dissolve readily in water. When hydrochloric acid is added to samples of both compounds, carbon dioxide is given off. The properties just described do not allow you to distinguish between the two compounds. Suppose that you are given a sample of a white powder known to be either sodium carbonate or potassium carbonate. Design an experiment that would allow you to identify the compound in your sample. Describe the procedure you would follow, along with the observations that would allow you to identify the compound.

85. The density of hydrogen is 0.000090g/mL (lowest of all the elements), and the density of helium is 0.00018g/mL. Early blimps (large balloon-like airships) used hydrogen rather than helium. Suggest why helium would have been a better choice.

86. Your teacher has found a sample of a substance in the science storeroom and has asked you to help identify it. It is marked osmium, which you know is an element.
(a) What test would you do to find out whether osmium is a metal or a non-metal? Explain what you would do and describe the results you would expect for either possibility.
(b) If osmium is a metal, state at least three other properties you would expect it to have.

87. Outline Rutherford's experiment. Use a diagram to help with your explanation.
List two revisions to the Thomson model that were made based on Rutherford's observations.

88. A common type of street lamp is the sodium vapour lamp, which always gives off a yellow light. This is not because of the colour of the light bulb or the colour of the glass lens. Use what you have learned in this chapter to suggest an explanation for the yellow light given off by these lamps.

89. Describe semiconductors by answering the following questions:
(a) Which element forms the crystal lattice for semiconductors?
(b) Why are phosphorus and arsenic added to the crystal lattice?
(c) What type of semiconductor does this produce?
(d) Why are boron and gallium added to the crystal lattice?
(e) What type of semiconductor does this produce?
(f) What is the advantage of sandwiching these two types of semiconductors?