Q1W5-H.W-Ch. Types of compounds.

True/False
Indicate whether the statement is true or false.

____ 1. A monatomic ion always has one unit of charge on the species.

____ 2. The charge of a monatomic ion is its oxidation number.

____ 3. An ionic crystal results from packing the constituent ions such that there is net zero force of attraction and repulsion.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 4. A formula unit of calcium bromide has two bromide ions corresponding to each calcium ion in the compound. What is the formula of calcium bromide?
a. CaBr
b. $CaBr_2$
c. Ca_2Br
d. Ca_2Br_2

____ 5. What are the different forms of an element in the same physical state but with different structures and properties called?
a. Metals
b. Minerals
c. Ores
d. Allotropes

____ 6. Which allotrope of carbon has a three-dimensional solid structure?
a. Coal
b. Diamond
c. Graphite
d. Granite

____ 7. A formula unit of magnesium chloride has two chloride ions corresponding to each magnesium ion in the compound. What is the formula of magnesium chloride?
a. MgCl
b. $MgCl_2$
c. Mg_2Cl
d. Mg_2Cl_2

____ 8. A substance will conduct an electric current if it _____.
a. is wet
b. forms ions in solution
c. is covalent
d. consists of ions in the dry state

____ 9. Which of the following is the correct chemical formula for a formula unit of aluminum bromide?
a. $AlBr_3$
b. Al_2Br_6
c. Al_3Br_9
d. Al_4Br_{12}

____ 10. Based on its position in the periodic table, the most likely charge of an iodide ion is _____.
a. 1+
b. 1-
c. 2+
d. 7-

____ 11. Which of the following formulas is incorrect?
a. $Al_2(SO_4)_3$
b. $AlOH_3$
c. $Ca(OH)_2$
d. $(NH_4)_2S$

____ 12. The correct name for Fe_2S_3 is _____.
a. iron(III) sulfide
b. iron sulfide
c. iron(II) sulfide
d. iron(I) sulfide

____ 13. Which of the following compounds can be used as a drying agent?
a. $CuSO_4 \cdot 5H_2O$
b. hygroscopic alum
c. calcium chloride dihydrate
d. the dihydrate of calcium sulfate

____ 14. In order to separate two liquids from each other by distillation, they must _____.
a. evaporate at the same temperature
b. evaporate at different temperatures
c. both be molecular substances
d. both be inorganic compounds

____ 15. Which of the following pairs of compounds are allotropes?
a. sulfuric acid and nitric acid
b. ozone and O_3
c. Cl_2 and Cl
d. O_2 and O_3

____ 16. _____ is an allotrope of carbon.
a. Diamond
b. Carbon monoxide
c. Ozone
d. Black phosphorus

Completion
Complete each statement.

A. trifluoride
B. heat and light
C. perchlorate
D. phosphate
E. penta

17. The name of the anion ClO_4^- is _____.

18. The name of the anion PO_4^{3-} is _____

19. Forest fire releases energy in the form of _____.

20. In naming the compound PCl_5, the prefix used with the second element is _____ _____.

21. The second part of the name of the compound NF_3 is _____.

A. binary compound
B. polyatomic ion
C. distillation
D. hydrate
E. oxidation number

22. The sulfate ion is an example of a(n) _____ because it contains two different elements.

23. A(n) _____ is one that contains two, and only two, elements.

24. $CaSO_4 \cdot 2H_2O$ is a(n) _____ because it always contains a fixed ratio of water molecules to calcium and sulfate ions.

25. A chemist can often use the process of _____ to separate two liquids from each other.

26. The sodium ion (Na^+) is said to have a(n) _____ of 1+ because that is the charge on a sodium ion.

A. allotropes
B. hygroscopic
C. hydrocarbons
D. anhydrous
E. organic compound

27. A compound such as methane that contains carbon is generally classified as a(n) _____.
28. Sodium carbonate is a(n) _____ substance because it takes on water molecules, to which it becomes chemically bonded.
29. Oxygen and ozone are _____, or different forms of the same element.
30. When copper sulfate pentahydrate is heated, water is driven off, leaving behind _____ copper sulfate.
31. Methane and propane are examples of _____ because they contain only carbon and hydrogen.

A. inorganic compounds
B. deliquescent
C. formula unit
D. molecular substance

32. If left outside on a table long enough, a(n) _____ substance, such as calcium chloride, will take on enough water to form a liquid solution.
33. In the compound Al_2O_3, the simplest ratio of atoms in the compound, called the _____, is two atoms of aluminum to three atoms of oxygen.
34. A(n) _____ is one in which atoms are held together by covalent rather than ionic bonds.
35. In general, compounds that do not contain carbon are classified as _____.

Matching

Match each item with the correct item below.
A. ionic B. molecular

____ 36. potassium nitrite
____ 37. selenium dioxide
____ 38. pentane
____ 39. diphosphorus pentasulfide
____ 40. nickel(II) bromide

Match each item with the correct item below.
A. common B. formal

____ 41. magnesium iodide octahydrate
____ 42. anhydrous gypsum
____ 43. nitric acid
____ 44. calcined magnesia
____ 45. lithium hydroxide

Short Answer

46. Elements in groups 1A and 2A in the periodic table form positively charged ions by loss of electrons. What will be the charge on an atom, if it belongs to group 1A?

A- 1+ B- 2+ C- 1- D- 2-

47. Elements in groups 5A, 6A, and 7A in the periodic table form negatively charged ions by gain of electrons. What will be the charge on an atom, if it belongs to group 6A?

A- 1+ B- 2+ C- 1- D- 2-

48. The charge on the polyatomic ion, NO_2, is 1–. What will be the formula of one formula unit of a compound between NO_2 and Be?

A- $Be(NO_2)$ B- $Be(NO_2)_2$ C- $Be(NO_2)_3$ D- $Be(NO)_2$

49. A metal, magnesium, forms an ion by losing three electrons. What will be the formula of one formula unit of the ionic compound between magnesium and oxygen?

A- MgO B- MgO2 C- Mg2O D- Mg2O2

50. The charge on the polyatomic ion, NO_2, is 1–. What will be the formula of one formula unit of a compound between NO_2 and Be?

A- $Be(NO_2)$ B- $Be(NO_2)_2$ C- $Be(NO_2)_3$ C- $Be(NO)_2$

51. When the dihydrate of calcium chloride $CaCl_2 \cdot 2H_2O$ is heated gently, it loses one molecule of water of hydration. Write the formulas for the final compounds in this change.
Final:

A- $CaCl \cdot H_2O$ B- $CaCl_2 \cdot HO$ C- $CaCl_2 \cdot H_2O$ D- $Ca2Cl_2 \cdot H_2O$

52. When copper sulfate $CuSO_4$ is used as a desiccant, it takes on five molecules of water of hydration. Write the formulas for the final compounds in this change.
Final: _____

A- $CuSO_4 \cdot 4H_2O$ B- $CuSO_4 \cdot 3H_2O$ C- $CuSO_5 \cdot 5H_2O$ D- $CuSO_4 \cdot 5H_2O$

53. Write the formulas for sodium sulfate decahydrate and its anhydrous form.
Hydrate: $Na_2SO_4 \cdot 10H_2O$; Anhydrous form: _____

A- $Na_2SO_4 \cdot 10H_2O$ B- $Na_2SO_4 \cdot 5H_2O$ C- $Na_2SO_4 \cdot H_2O$ D- Na_2SO_4

Problem

Write the number of the formula formed when the following atoms or groups of atoms combine with each other.

54	sodium and oxygen	**A**	Mg_3P_2
55	aluminum and fluorine	**B**	$CaSO_4$
56	magnesium and phosphorus	**C**	NH_4NO_3
57	calcium and sulfate	**D**	$Al_2(CO_3)_3$
58	ammonium and nitrate	**E**	AlF_3;
59	aluminum and carbonate	**F**	Na_2O

60	copper (2+) and acetate	**A**	$Cu(C_2H_3O_2)_2$
61	iron (3+) and sulfate	**B**	Si_3P_4
62	sodium hydride	**C**	NaH
63	xenon hexafluoride	**D**	XeF_6
64	silicon and phosphorus	**E**	$Fe_2(SO_4)_3$

65	sodium aluminum sulfate	**A**	BrF_7
66	bromine heptafluoride	**B**	$NaAl(SO_4)_2$
67	dihydrogen difluoride	**C**	H_2F_2
68	calcium sulfate hemihydrate	**D**	SO_3;
69	sulfur (6+) and oxygen	**E**	$CaSO_4 \cdot {}^1/_2H_2O$

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