Name _____ Class _____ Date _____ Key

Chemical Formulas and Chemical Compounds

Chapter 7 Test

DIRECTIONS: Write on the line at the right of each statement the letter preceding the word or expression that best completes the statement.

1. The result of changing a subscript in a correctly written chemical formula is to (a) change the number of moles represented by the formula; (b) change the charges on the other ions in the compound; (c) change the formula so that it no longer represents the compound it had represented; (d) have no effect on the formula. C 1
2. The formula for carbon dioxide, CO_2, can represent (a) one molecule of carbon dioxide; (b) one mole of carbon dioxide molecules; (c) one molar mass of carbon dioxide; (d) all of the above. D 2
3. The correct name for the Hg_2^{2+} ion is (a) mercury(I); (b) dimercury(I); (c) mercury(II); (d) dimercury(II). A 3
4. Under the new system of nomenclature, stannic phosphate, $Sn_3(PO_4)_4$, would be called (a) stannous phosphate; (b) tin(IV) phosphate; (c) tin(III) phosphate; (d) tin(II) phosphate. B 4
5. Name the acid with the formula HNO_3. (a) nitrous acid (b) nitric acid (c) hydronitrous acid (d) acid trioxide B 5
6. Identify the common acid among the following compounds. (a) $ZnCl_2$ (b) CCl_4 (c) HCl (d) NaCl C 6
7. What is the oxidation number of oxygen in peroxides? (a) −2 (b) −1 (c) 0 (d) +2 B 7
8. In a polyatomic ion, the algebraic sum of the oxidation numbers of all atoms is equal to (a) 0; (b) the number of atoms in the ion; (c) 10; (d) the charge of the ion. D 8
9. What is the oxidation number of magnesium in MgO? (a) −1 (b) 0 (c) +1 (d) +2 D 9
10. What is the oxidation number of sulfur in SO_2? (a) 0 (b) +1 (c) +2 (d) +4 D 10
11. The sum of the atomic masses of all the atoms in a formula for a compound would most properly be called the (a) molecular mass; (b) formula mass; (c) atomic mass; (d) actual mass. B 11
12. The molar mass of CS_2 is 76.13 g. How many grams of CS_2 are present in 10.00 mol? (a) 0.13 g (b) 7.6 g (c) 10 g (d) 761.3 g D 12
13. How many moles of ClO_3^- are present in 0.5 moles of $KClO_3$? (a) 0.5 (b) 1 (c) 1.5 (d) 2 A 13
14. The simplest formula may not represent the actual composition of a unit of a(n) (a) ionic compound; (b) molecular compound; (c) salt; (d) crystal. B 14
15. Knowing the simplest formula and the formula mass of a compound permits the determination of the compound's (a) molecular formula; (b) bond energy; (c) lattice structure; (d) toxicity. A 15

DIRECTIONS: Write the formulas to the following compounds on the lines provided.

16. compound formed between calcium and chlorine $CaCl_2$ 16
17. compound formed between lead(II) ions and chromate ions $PbCrO_4$ 17
18. aluminum sulfate $Al_2(SO_4)_3$ 18
19. silicon dioxide SiO_2 19
20. carbon tetraiodide CI_4 20

DIRECTIONS: Write the names to the following compounds on the lines provided. Use either the preferred [redacted]system or [redacted].

21. $Zn_3(PO_4)_2$, [redacted] Zinc Phosphate 21
22. $Fe(NO_2)_2$, Stock system Iron II Nitrite 22
23. N_2O_4, prefixes Dinitrogen Tetroxide 23
24. SO_3, prefixes Sulfur Trioxide 24
25. CCl_4, [redacted]system Carbon Tetra Chloride 25

DIRECTIONS: Write the answer to questions 26–37 on the line to the right, and show your work in the space provided. Questions 26–37 refer to the following table.

TABLE OF ATOMIC MASSES		
Element	**Symbol**	**Atomic Mass (*u*)**
Copper	Cu	63.546
Chlorine	Cl	35.453
Nitrogen	N	14.0067
Hydrogen	H	1.007 94
Sulfur	S	32.06
Oxygen	O	15.9994
Carbon	C	12.0111
Chromium	Cr	51.996
Lead	Pb	207.2
Aluminum	Al	26.981 54
Magnesium	Mg	24.305
Sodium	Na	22.989 77
Fluorine	F	18.998 403
Lithium	Li	6.941
Bromine	Br	79.904

26. What is the formula mass of magnesium chloride, $MgCl_2$? 95.211 g 26

27. What is the molar mass of tetraethyl lead, $Pb(C_2H_5)_4$? 323.4 g 27

28. What is the formula mass of copper(II) chloride, $CuCl_2$? 134.452 g 28

29. What is the percent composition of $CuCl_2$? 47.263% Cu, 52.737% Cl 29

30. What is the percent composition of CO? 42.8807% C, 57.1193% O 30

31. What is the percent composition of CF_4? 13.6482% C, 86.3518% F 31

32. What is the simplest formula of a compound containing 259.2 g of F and 40.8 g of C? CF_4 32

33. What is the simplest formula of a compound that is 7.9% Li and 92.1% Br? LiBr 33

34. A compound has the simplest formula CH. If the formula mass is 26 *u*, what is the molecular formula? C_2H_2 34

35. A compound with the simplest formula N_2O_5 has a formula mass of 108 *u*. What is the molecular formula? N_2O_5 35

36. A compound's simplest formula is C_2H_5. If the formula mass is 58 *u*, what is the molecular formula? C_4H_{10} 36

37. A compound is found to be 80% carbon and 20% hydrogen. If the formula mass is 30 *u*, what is the molecular formula? C_2H_6 37