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JMS

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[Individual exercise]

Section: PM group
Exercise Date: 2/8/2002

Chemical Nomenclature

Write the names and formulas for the following inorganic compounds in the spaces provided.

Part 1: Ions and Ionic Compounds

Write formulas/charges or names as appropriate for each of the following monatomic ions.

1. Calcium ion — Ca^{2+}
2. Phosphide ion — P^{3-}
3. Iodide ion — I^-
4. Gallium ion — Ga^{3+}
5. Titanium(IV) ion — Ti^{4+}
6. C^{-4} — Carbide ion
7. Rb^{+1} — Rubidium ion
8. Pb^{+4} — lead ion
9. S^{-2} — Sulfide ion
10. Cr^{+2} — Chromium ion

Write formulas or names as appropriate for each of the following ionic compounds.

1. Magnesium nitride — Mg_3N_2
2. Lithium oxide — Li_2O
3. Aluminum sulfite — $Al_2(SO_3)_3$
4. Copper(II) bicarbonate — $Cu(HCO_3^-)_2$
5. Sodium nitrate — $Na(NO_3^-)$
6. SrI_2 — Strontium iodide
7. $Ba_3(PO_4)_2$ — Barium phosphate
8. $(NH_4)_2O$ — Ammonia oxide
9. $Fe(ClO)_3$ — Iron ~~chlorate~~ hypochlorite
10. $ZnCrO_4$ — Zinc chromate

Part 2: Covalent Compounds

Write formulas or names as appropriate for each of the following covalent compounds.

1. Dichlorine monoxide — Cl_2O
2. Disulfur dichloride — S_2Cl_2
3. Carbon tetrafluoride — CF_4
4. Phosphorus pentachloride — PCl_5
5. Nitrogen tribromide — NBr_3
6. AsI_3 — Arsenic triiodide
7. P_4O_{10} — Tetraphosphorus decaoxide
8. Cl_2O_7 — Dichlorine heptoxide
9. $SeCl_6$ — Selenium hexachloride
10. NO — Nitrogen ~~oxi~~ monoxide

Part 3: Acids

Write formulas or names as appropriate for each of the following acids.

1. Hydroiodic acid — HI
2. Carbonic acid — H_2CO_3
3. Chlorous acid — $HClO_2$
4. Sulfuric acid — H_2SO_4
5. Phosphorous acid — H_3PO_4
6. $HCN\ (aq)$ — Cyanic acid ~~Hydrocyanic acid~~
7. $H_2C_2O_4\ (aq)$ — Oxalic acid
8. $HNO_2\ (aq)$ — ~~Nitrous acid~~ Nitric acid
9. $H_2Cr_2O_7\ (aq)$ — Dichromic acid
10. $HMnO_4\ (aq)$ — Permanganic acid

+ 3H2

Part 4: Hydrates (optional – check with your instructor to see if you are responsible for this section)

Write formulas or names as appropriate for each of the following hydrates.

1. Magnesium sulfate heptahydrate $MgSO_4 \cdot 7H_2O$
2. Copper(I) sulfate pentahydrate $Cu_2SO_4 \cdot 5H_2O$
3. Potassium phosphate decahydrate $K_3PO_4 \cdot 10H_2O$
4. Calcium chloride hexahydrate $CaCl_2 \cdot 6H_2O$
5. Iron(III) nitrate nonahydrate $Fe(NO_3)_3 \cdot 9H_2O$
6. $CoSO_4 \cdot H_2O$ Cobalt sulfate monohydrate
7. $Na_2CrO_4 \cdot 4H_2O$ Sodium chromate tetrahydrate
8. $CuF_2 \cdot 2H_2O$ Copper flouride dihydrate
9. $Sr(NO_3)_2 \cdot 6H_2O$ Strontium nitrate hexahydrate
10. $ZnSO_4 \cdot 7H_2O$ Zinc sulfate heptahydrate

Part 5: Nomenclature of Ionic Compounds, Covalent Compounds and Acids

	Classification	Name or Formula
1. C_3O_2	Covalent	Tricarbon dioxide
2. IF_7	Covalent	Iodine heptaflouride
3. Rb_2CO_3	Ionic	Rubidium carbonate
4. SnS_2	Ionic	Tin sulfide
5. $Au(CN)_3$	Ionic	Gold cyanide
6. H_2CrO_4 (*aq*)	Acid	chromic acid
7. H_3P (*aq*)	Acid	Hydrophosphoric acid
8. Li_3PO_4	Ionic	Lithium phosphate
9. Mg_3N_2	Ionic	Magnesium nitride
10. $Ti(C_2H_3O_2)_4$	Ionic	Titanium acetate
11. Fe_2O_3	Ionic	Iron (III) oxide
12. NaH	Ionic	Sodium hydride
13. Br_3O_8	Covalent	Bromine octoxide
14. MnS_2O_3	Ionic	Manganese thiosulfate
15. NH_4NO_2	Ionic	ammonia nitrite
16. $Cd(ClO_2)_2$	Ionic	Cadmium (II) chlorite
17. $Ba(HSO_3)_2$	Ionic	Barium bisulfate
18. Cu_2O	Ionic	Copper monoxide
19. $NiBr_3$	Ionic	Nickel bromide
20. $Sr(OH)_2$	Ionic	Strontium hydroxide
21. Perchloric acid	Acid	$HClO_4$
22. Potassium permanganate	Ionic	$K(MnO_4)$
23. Calcium hydride	Ionic	CaH
24. Vanadium(II) bicarbonate	Ionic	$V(HCO_3)_2$
25. Bismuth(V) nitrate	Ionic	$Bi_3(NO_3)_5$
26. Rubidium peroxide	Ionic	Rb_2O_2

27. Strontium hydrogen phosphite	Ionic	$Sr_2(HPO_3)_2$
28. Hydrofluoric acid	Acid	HF
29. Chromium(III) thiocyanate	Ionic	$Cr(SCN)_3$
30. Acetic acid	Acid	$HC_2H_3O_2$
31. Molybdenum(IV) carbonate	Ionic	$MO_2(CO_3)_4$
32. Tetraiodine nonaoxide	Covalent	I_4O_9
33. Diphosphorus tetrafluoride	Covalent	P_2F_4
34. Aluminum sulfate	Ionic	$Al_2(SO_4)_3$
35. Ammonium hydroxide	Ionic	$NH_4(HO)$
36. Sodium dichromate	Ionic	$Na_2(Cr_2O_7)_2$
37. Carbon disulfide	Covalent	C_2S_2
38. Nickel(II) oxalate	Ionic	$Ni_2(C_2O_4)_2$
39. Barium selenide	Ionic	Ba_2Se_2
40. Silver bisulfate	Ionic	$Ag(HSO_4)_2$

Questions

1. How are the following types of compounds recognized from their *formulas*?

   Ionic — metal and non metal

   Covalent — non metal and non metal

   Acid — always has hydrogen (starting off)

2. When do *parentheses* appear in the formulas of ionic compounds?

   when there is more than one polyatomic ion in formula

3. Do *Roman Numerals* appear in the names of ionic or covalent compounds? Explain why they are used.

   Ionic compounds

   They are used to determine which element you are using when that element has more than one charge.

4. Do *Greek Prefixes* appear in the names of ionic or covalent compounds? Explain why they are used.

   Covalent compounds

   They are used to determine the number of atoms on that element

5. What is the relationship between the *number of hydrogens* in an acid and the *charge on the anion* that they are combined with?

   A one-to-one relationship because for every hydrogen in the acid is equal to one negative charge on the anion,

   ex. if there is H_2 in acid, then anion would be $(anion)^{2-}$