Lots of Ionic Naming Practice Problems

Name the following ionic compounds:

1) $NaBr$ sodium bromide

2) $Sc(OH)_3$ scandium (III) hydroxide

3) $V_2(SO_4)_3$ vanadium (III) sulphate

4) NH_4F ammonium fluoride

5) $CaCO_3$ calcium carbonate

6) $NiPO_4$ nickel (III) phosphate

7) Li_2SO_3 lithium sulphite

8) Zn_3P_2 zinc phosphide

9) $Sr(C_2H_3O_2)_2$ strontium acetate OR Strontium ethanoate

10) Cu_2O copper (I) oxide

11) Ag_3PO_4 silver phosphate

12) $YClO_3$ yttrium (I) chlorate

13) SnS_2 tin(IV) sulphide

14) $Ti(CN)_4$ titanium (IV) cyanide

15) $KMnO_4$ potassium permanganate

16) Pb_3N_2 lead(II) nitride

17) $CoCO_3$ cobalt(II) carbonate

18) $CdSO_3$ cadmium (II) sulphite

19) $Cu(NO_2)_2$ copper (II) nitrite

20) $Fe(HCO_3)_2$ iron(II) bicarbonate OR iron (II) hydrogen carbonate

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Write the formulas for the following ionic compounds:

21) lithium acetate _____ $LiCH_3COO$

22) iron (II) phosphate $Fe_3(PO_4)_2$

23) titanium (II) selenide $TiSe$

24) calcium bromide $CaBr_2$

25) gallium chloride $GaCl_3$

26) sodium hydride NaH

27) beryllium hydroxide $Be(OH)_2$

28) zinc carbonate $ZnCO_3$

29) manganese (VII) arsenide Mn_3As_7

30) copper (II) chlorate $Cu(ClO_3)_2$

31) cobalt (III) chromate $Co_2(CrO_4)_3$

32) ammonium oxide $(NH_4)_2O$

33) potassium hydroxide KOH

34) lead (IV) sulfate $Pb(SO_4)_2$

35) silver cyanide $AgCN$

36) vanadium (V) nitride V_3N_5

37) strontium acetate $Sr(CH_3COO)_2$

* 38) molybdenum (VI) sulfate $Mo(SO_4)_3$

39) platinum (II) sulfide PtS

40) ammonium sulfate $(NH_4)_2SO_4$

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Naming Ionic Compounds Practice Worksheet

Name the following ionic compounds:

1) NH_4Cl ammonium chloride

2) $Fe(NO_3)_3$ iron (III) nitrate

3) $TiBr_3$ titanium (III) bromide

4) Cu_3P copper(I) phosphide

5) $SnSe_2$ tin (IV) selenide

6) GaAs gallium arsenide

7) $Pb(SO_4)_2$ lead (IV) sulphate

8) $Be(HCO_3)_2$ beryllium bicarbonate OR beryllium hydrogen carbonate

9) $Mn_2(SO_3)_3$ manganese (III) sulphite

10) $Al(CN)_3$ aluminum cyanide

Write the formulas for the following compounds:

11) chromium (VI) phosphate $Cr(PO_4)_2$

12) vanadium (IV) carbonate $V(CO_3)_2$

13) tin (II) nitrite $Sn(NO_2)_2$

14) cobalt (III) oxide Co_2O_3

15) titanium (II) acetate $Ti(CH_3COO)_2$

16) vanadium (V) sulfide V_2S_5

17) chromium (III) hydroxide $Cr(OH)_3$

18) lithium iodide LiI

19) lead (II) nitride Pb_3N_2

20 silver bromide $AgBr$

Compound, Molecule, Acid, or Hydrate?	Name	Formula
Ex: compound	**Sodium chloride**	**NaCl**
Ex: hydrate	**Copper(II) sulfate pentahydrate**	**$CuSO_4 \cdot 5H_2O$**
Ex: molecule	**Dinitrogen pentoxide**	**N_2O_5**
compound	**Lead (IV) hydroxide**	
compound	sodium hydrogen phosphate	**Na_2HPO_4**
molecule	phosphorus hexachloride	**PCl_6**
compound	**Calcium thiocyanate**	$Ca(SCN)_2$
hydrate	manganese(IV) oxide monohydrate	**$MnO_2 \cdot H_2O$**
acid	nitric acid.	**HNO_3**
acid	**Hydroselenic acid**	H_2Se
compound	**Tin (IV) dichromate**	$Sn(Cr_2O_7)_2$
hydrate	**Iron (III) hydroxide dihydrate**	$Fe(OH)_3 \cdot 2H_2O$
compound.	copper (I) acetate	**$CuC_2H_3O_2$**

compound.	chromium (III) phosphate	$Cr_3(PO_4)_2$
compound.	**Magnesium hydroxide**	$Mg(OH)_2$
molecule	carbon monoxide	**CO**
acid.	**Dichromic acid**	$H_2Cr_2O_7$
compound.	sodium hydrogen sulphite sodium bisulphite	**$NaHSO_3$**
acid.	**Sulfurous acid**	H_2SO_3
acid.	**Hydrosulfuric acid**	H_2S
acid	hydrocyanic acid.	**HCN**
acid.	acetic acid OR ethanoic acid.	**CH_3COOH**
hydrate	**Zinc hydroxide hexahydrate**	$Zn(OH)_2 \cdot 6H_2O$
hydrate	barium hydroxide octahydrate	**$Ba(OH)_2 \cdot 8H_2O$**
compound.	potassium permanganate	**$KMnO_4$**
acid.	**Perchloric acid**	$HClO_4$
compound.	**Potassium monohydrogen phosphate**	K_2HPO_4
molecule	**Dicarbon decahydride**	C_2H_{10}
molecule	tetra phosphorus deca hydride	**P_4O_{10}**

compound.	**Lithium carbonate**	Li_2CO_3
acid.	**Chlorous acid**	$HClO_2$.
molecule.	**Dihydrogen monoxide**	H_2O
compound.	**Ammonium chloride**	NH_4Cl
compound.	potassium chromate.	**K_2CrO_4**
compound	**Aluminum permanganate**	$Al(MnO_4)_3$
molecule	sulphur hexafluoride	**SF_6**
compound	**Aluminum sulphate**	$Al_2(SO_4)_3$
acid.	carbonic acid.	**H_2CO_3**
compound.	silver chromate	**Ag_2CrO_4**
acid.	hydroiodic acid	**HI**
acid	hydroxic acid.	**H_2O**
acid.	**Nitrous acid**	HNO_2
hydrate	manganese(IV) hydroxide heptahydrate	**$Mn(OH)_4 \cdot 7H_2O$**
molecule	xenon hexafluoride	**XeF_6**
molecule	**Dinitrogen tetroxide**	N_2O_4

molecule	dinitrogen monoxide.	N_2O
compound	**Lithium sulfide**	Li_2S
compound.	**Rhodium (III) oxide**	Rh
compound.	**Molybdenum (VII) oxide**	Mo_2O_7

Naming Acids and Bases

Name the following acids and bases:

1) NaOH Sodium hydroxide

2) H_2SO_3 Sulphurous acid.

3) H_2S hydro sulphuric acid.

4) H_3PO_4 phosphoric acid

5) ~~NH_3~~

6) HCN hydrocyanic acid

7) $Ca(OH)_2$ calcium hydroxide

8) $Fe(OH)_3$ iron(III) hydroxide

9) H_3P hydrophosphoric acid

Write the formulas of the following acids and bases:

10) hydrofluoric acid HF

11) hydroselenic acid H_2Se

12) carbonic acid H_2CO_3

13) lithium hydroxide LiOH

14) nitrous acid HNO_2

15) cobalt (II) hydroxide $Co(OH)_2$

16) sulfuric acid H_2SO_4

17) beryllium hydroxide $Be(OH)_2$

18) hydrobromic acid HBr

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Name:_____

Acid/Base Names and Formulas

Provide the best complete detailed yet concise response for each of the following questions or problems.

What element is present in all acids? H

Complete the following table.

Acid Formula	Anion in Acid		Acid Name
XXXXXXXXXXX	Formula	Name	XXXXXXXXXXX
$HBr_{(aq)}$	Br^{1-}	Bromide	Hydrobromic Acid
$H_3BO_{3(aq)}$	BO_3^{3-}	borate	boric acid
$HClO_{2(aq)}$	ClO_2^-	chlorite	chlorous acid.
$H_2SO_{3(aq)}$	SO_3^{2-}	sulphite	sulphurous acid
$H_3PO_{4(aq)}$	PO_4^{3-}	phosphate	phosphoric acid.

Complete the following table.

Acid Name	Anion in Acid		Acid Formula
XXXXXXXXXX	Name	Formula	XXXXXXXXXXX
Hydrophosphoric acid	phosphide	P^{3-}	H_3P
Sulfuric acid	Sulphate	SO_4^{2-}	H_2SO_4
Nitrous acid	nitrite	NO_2^-	HNO_2
Chromic acid	chromate	CrO_4^{2-}	H_2CrO_4
Hydrosulfuric acid			

Name the following acids:

1) $H_3PO_{4(aq)}$ – phosphoric acid
2) $H_2Te_{(aq)}$ – hydrotelluric acid
3) $HI_{(aq)}$ – hydroiodic acid
4) $HNO_{3(aq)}$ – nitric acid
5) $H_2CO_{3(aq)}$ – carbonic acid
6) $HClO_{(aq)}$ - hypochlorous acid
7) $HClO_{4(aq)}$ - perchloric acid
8) $HCl_{(aq)}$ - hydrochloric acid.
9) $H_2SO_{4(aq)}$ - sulphuric acid
10) $HC_2H_3O_{2(aq)}$ - acetic acid OR ethanoic acid
11) $HClO_{3(aq)}$ - chloric acid

Write formulas for the following acids.

1) [redacted]
2) arsenic acid – H_3AsO_4
3) nitrous acid – HNO_2
4) hydroselenic acid – H_2Se
5) perchloric acid – $HClO_4$
6) bromous acid – $HBrO_2$
7) sulfuric acid - H_2SO_4
8) phosphorous acid - H_3PO_4
9) hydrofluoric acid - HF
10) [redacted]
11) iodic acid - HIO_3

Name the following bases.

1) $Ca(OH)_2$ – calcium hydroxide
2) KOH – potassium hydroxide
3) $Al(OH)_3$ – aluminum hydroxide
4) LiOH – lithium hydroxide

Write formulas for the following bases.

1) sodium hydroxide – $NaOH$
2) barium hydroxide – $Ba(OH)_2$
3) cesium hydroxide – $CsOH$
4) magnesium hydroxide – $Mg(OH)_2$

~~What is the format for naming an oxyacid (acids containing 1 or more oxygens)?~~

~~What is the format for naming a non-oxyacid?~~

~~Identify or distinguish at least three properties different between acids and bases.~~

WORKSHEET #7: NOMENCLATURE OF HYDRATED IONIC COMPOUNDS

Use Latin prefixes to indicate # of water molecules present

1 = mono 2 = di 3 = tri 4 = tetra 5 = penta
6 = hexa 7 = hepta 8 = octa 9 = nona 10 = deca

#	Name of Hydrate	Chemical Formula
Eg.	copper(II)sulfate pentahydrate	$CuSO_4 \cdot 5H_2O$
1	magnesium sulphate heptahydrate	$MgSO_4 \cdot 7H_2O$
2	sodium carbonate decahydrate	$Na_2CO_3 \cdot 10H_2O$
3	magnesium chloride hexahydrate	$MgCl_2 \cdot 6H_2O$
4	barium chloride dihydrate	$BaCl_2 \cdot 2H_2O$
5	cadmium(II) nitrate tetrahydrate	$Cd(NO_3)_2 \cdot 4H_2O$
6	zinc chloride hexahydrate	$ZnCl_2 \cdot 6H_2O$
7	zinc sulfate heptahydrate	$ZnSO_4 \cdot 7H_2O$
8	lithium chloride tetrahydrate	$LiCl \cdot 4H_2O$
9		$Na_2S_2O_3 \cdot 5H_2O$
10	cobalt(II)chloride hexahydrate	$CoCl_2 \cdot 6H_2O$
11	aluminum chloride hexahydrate	$AlCl_3 \cdot 6H_2O$
12	calcium chloride dihydrate	$CaCl_2 \cdot 2H_2O$
13	barium hydroxide octahydrate	$Ba(OH)_2 \cdot 8H_2O$
14	nickel(II)chloride hexahydrate	$NiCl_2 \cdot 6H_2O$
15	sodium sulphate decahydrate	$Na_2SO_4 \cdot 10H_2O$
16	iron(III)phosphate tetrahydrate	$FePO_4 \cdot 4H_2O$
17	iron(II) sulphate heptahydrate	$FeSO_4 \cdot 7H_2O$
18	calcium sulfate dihydrate	$CaSO_4 \cdot 2H_2O$
19	tin(IV) chloride pentahydrate	$SnCl_4 \cdot 5H_2O$
20	barium bromide tetrahydrate	$BaBr_2 \cdot 4H_2O$

Hydrate Nomenclature

hydrate – a compound that releases water when heated

Example: $CuSO_4 \cdot 5H_2O$

Cu	SO_4	·	5	H_2O
copper(II)	sulfate	part of the compound	penta	hydrate

Example: $MgSO_4 \cdot 7H_2O$ magnesium sulfate heptahydrate

Example: aluminum chloride hexahydrate $AlCl_3 \cdot 6H_2O$

mono-	one
di-	two
tri-	three
tetra-	four
penta-	five
hexa-	six
hepta-	seven
octa-	eight
nona-	nine
deca-	ten

Name the following hydrates:

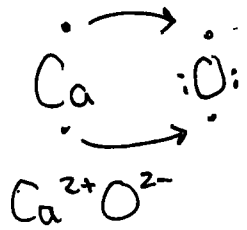
1. $MgCl_2 \cdot 6H_2O$ magnesium chloride hexahydrate
2. $Cd(NO_3)_2 \cdot 4H_2O$ cadmium(II) nitrate tetrahydrate
3. $ZnCl_2 \cdot 6H_2O$ zinc chloride hexahydrate
4. [redacted]
5. $CaCl_2 \cdot 2H_2O$ calcium chloride dihydrate

Write the formulas for the following hydrates:

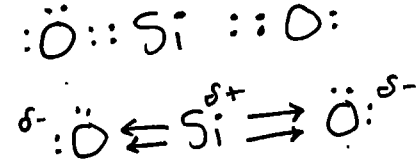
6. barium hydroxide octahydrate $Ba(OH)_2 \cdot 8H_2O$
7. sodium sulfate decahydrate $Na_2SO_4 \cdot 10H_2O$
8. lithium chloride tetrahydrate $LiCl \cdot 4H_2O$
9. cobalt(II) chloride hexahydrate $CoCl_2 \cdot 6H_2O$
10. sodium carbonate decahydrate $Na_2CO_3 \cdot 10H_2O$

Electron Dot Diagram Practice

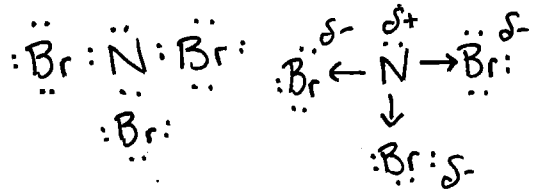
a) Ca ⁞ O CaO



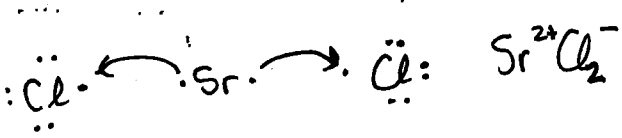
b) Si ⁞ O SiO_2



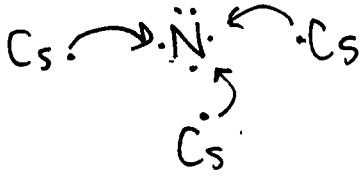
c) N ⁞ Br NBr_3



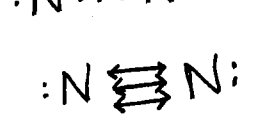
d) Sr ⁞ Cl $SrCl_2$



e) Cs ⁞ N Cs_3N

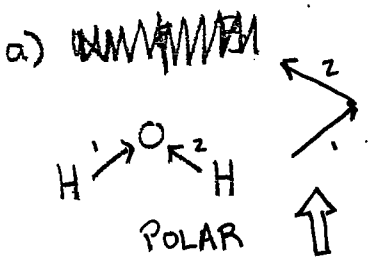


f) N ⁞ N N_2

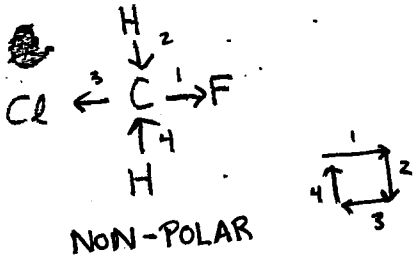


Molecule Polarity

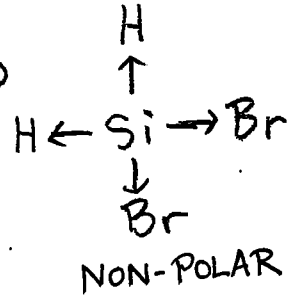
a)



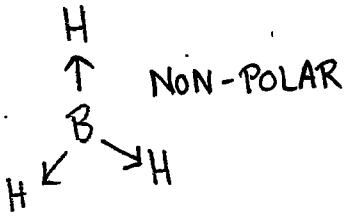
b)



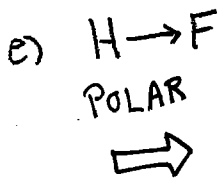
c)



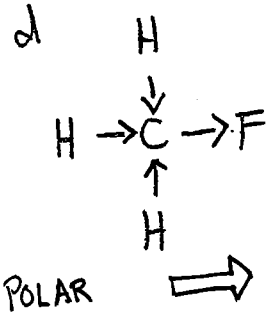
d)



e)



d



Even More Bonding Review

Review– Naming Chemical Compounds

The following are a good mix of naming and formula writing problems to help you get some practice.

Name the following chemical compounds:

1) NaBr sodium bromide

2) $Ca(C_2H_3O_2)_2$ calcium acetate calcium ethanoate $Ca(CH_3COO)_2$

3) P_2O_5 diphosphorus pentoxide

4) $Ti(SO_4)_2$ titanium (IV) sulphate

5) $FePO_4$ iron (III) phosphate

6) K_3N potassium nitride

7) SO_2 sulphur dioxide

8) CuOH copper (I) hydroxide

9) $Zn(NO_2)_2$ zinc nitrite

10) V_2S_3 vanadium (III) sulphide

Write the formulas for the following chemical compounds:

11) silicon dioxide SiO_2

12) nickel (III) sulfide Ni_2Si_3

13) manganese (II) phosphate $Mn_3(PO_4)_2$

14) silver acetate $AgCH_3COO$

15) diboron tetrabromide B_2Br_4

16) magnesium sulfate heptahydrate $MgSO_4 \cdot 7H_2O$

17) potassium carbonate K_2CO_3

18) ammonium oxide $(NH_4)_2O$

19) tin (IV) selenide $SnSe_2$

20) carbon tetrachloride CCl_4

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Mixed Ionic/Covalent Compound Naming

For each of the following questions, determine whether the compound is ionic or covalent and name it appropriately.

1) Na_2CO_3 sodium carbonate

2) P_2O_5 diphosphorus pentoxide

3) NH_3 nitrogen trihydride

4) $FeSO_4$ iron(II) sulphate

5) SiO_2 silicon dioxide

6) $GaCl_3$ gallium chloride

7) $CoBr_2$ cobalt (II) bromide

8) B_2H_4 diboron tetrahydride

9) CO carbon monoxide

10) P_4 phosphorus

For each of the following questions, determine whether the compound is ionic or covalent and write the appropriate formula for it.

11) dinitrogen trioxide N_2O_3

12) nitrogen N_2

13) ~~methane~~ carbon tetrahydride CH_4

14) lithium acetate $LiCH_3COO$

15) phosphorus trifluoride PF_3

16) vanadium (V) oxide V_2O_5

17) aluminum hydroxide $Al(OH)_3$

18) zinc sulfide ZnS

19) silicon tetrafluoride SiF_4

20) silver phosphate Ag_3PO_4

Write the names of the following *covalent* compounds:

21) SO_3 sulphur trioxide

22) N_2S dinitrogen mono sulphide

23) PH_3 phosphorus trihydride

24) BF_3 boron trifluoride

25) P_2Br_4 diphosphorus tetrabromide

26) CO carbon monoxide

27) SiO_2 silicon dioxide

28) SF_6 sulphur hexafluoride

29) NH_3 nitrogen trihydride

30) NO_2 nitrogen dioxide

Write the formulas of the following *covalent* compounds:

31) nitrogen trichloride NCl_3

32) ~~boron carb~~ide B

33) dinitrogen trioxide N_2O_3

34) phosphorus pentafluoride PF_5

35) ~~methane~~

36) sulfur dibromide SBr_2

37) diboron tetrahydride B_2H_4

38) oxygen difluoride OF_2

39) carbon disulfide CS_2

40) nitrogen monoxide NO

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Mixed Ionic and Covalent Naming

Name the following compounds:

1) $NaOH$ sodium hydroxide
2) PBr_3 phosphorus tribromide
3) K_2SO_3 potassium sulphite
5) F_2 fluorine
6) Li_2CO_3 lithium carbonate
7) GaF_3 gallium fluoride
8) $Ba_3(PO_4)_2$ barium phosphate
9) B_2O_2 diboron dioxide
10) Co_4C_3 cobalt (III) carbide
11) CaF_2 Calcium fluoride
12) P_2O_3 diphosphorus trioxide
13) $AgNO_3$ silver nitrate
14) $Al_2(CO_3)_3$ aluminum carbonate
15) $NaBr$ Sodium bromide
16) H_2SO_4 Sulphuric acid
17) NH_3 nitrogen trihydride
18) $Ti(SO_4)_2$ titanium (IV) sulphate
19) SO_2 Sulphur dioxide
20) $Ca(OH)_2$ calcium hydroxide
21) BaF_2 barium fluoride
22) $Fe(NO_3)_2$ iron(II) nitrate
23) CF_4 carbon tetrafluoride

24) N_2O_3 dinitrogen trioxide

25) MnS_2 manganese (IV) sulphide

26) Li_3P lithium phosphide

27) $CuSO_4$ copper (II) sulphate

28) CH_4 carbon tetrahydride

29) Br_2 bromine

30) $(NH_4)_2SO_4$ ammonium sulphate

31) $Pb(CO_3)_2$ lead (IV) carbonate

32) N_2O dinitrogen monoxide

33) ZnF_2 zinc fluoride

34) CCl_4 carbon tetrachloride

35) $Al(OH)_3$ aluminum hydroxide

36) K_2O potassium oxide