

ANSWERS: Formula writing and nomenclature of inorganic compounds

1. Determine the oxidation number of S in each of the following compounds:

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|--------------------------------------|------------|
| a) $\text{Na}_2\text{S}_2\text{O}_3$ | ans. a) +2 |
| b) H_2SO_3 | b) +4 |
| c) SO_2 | c) +4 |
| d) $\text{K}_2\text{S}_2\text{O}_4$ | d) +3 |
| e) Al_2S_3 | e) -2 |
| f) BaS_2O_8 | f) +7 |

2. Name the following compounds.

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| a) PbI_2 | ans. a) lead(II) iodide or lead iodide |
| b) FeSO_4 | b) iron(II) sulfate |
| c) Ag_2CO_3 | c) silver carbonate |
| d) NaCN | d) sodium cyanide |
| e) $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$ | e) calcium acetate |
| f) $\text{Cu}(\text{NO}_3)_2$ | f) copper(II) nitrate |
| g) $\text{K}_2\text{C}_2\text{O}_4$ | g) potassium oxalate |
| h) HgCl | h) mercury(I) chloride |

3. Write formulas for the following compounds.

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|----------------------------|-----------------------------------|
| a) ammonium sulfide | ans. a) $(\text{NH}_4)_2\text{S}$ |
| b) magnesium phosphate | b) $\text{Mg}_3(\text{PO}_4)_2$ |
| c) mercury(II) thiocyanate | c) $\text{Hg}(\text{CNS})_2$ |
| d) sodium iodate | d) NaIO_3 |
| e) chromium(III) chloride | e) CrCl_3 |
| f) potassium permanganate | f) KMnO_4 |
| g) zinc bromide | g) ZnBr_2 |
| h) cobalt(II) perchlorate | h) $\text{Co}(\text{ClO}_4)_2$ |

4. Determine the oxidation number of Cr in each of the following compounds.

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|---------------------------------------|------|-------|
| a) CaCrO_4 | ans. | a) +6 |
| b) CrBr_2 | | b) +2 |
| c) $\text{Ag}_2\text{Cr}_2\text{O}_7$ | | c) +6 |
| d) $\text{Cr}_2(\text{SO}_4)_3$ | | d) +3 |
| e) Li_2CrO_4 | | e) +6 |

5. Name the following binary non-metal compounds.

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|----------------------------|------|--------------------------|
| a) PBr_3 | ans. | a) phosphorus tribromide |
| b) CO | | b) carbon monoxide |
| c) N_2O_4 | | c) dinitrogen tetraoxide |
| d) CCl_4 | | d) carbon tetrachloride |
| e) SiO_2 | | e) silicon dioxide |
| f) BCl_3 | | f) boron trichloride |
| g) CS_2 | | g) carbon disulfide |
| h) S_2Cl_2 | | h) sulfur monochloride |

Note: Normally, you would write the formula SCl , however, the actual formula for sulfur monochloride is S_2Cl_2

6. Write formulas for the following binary non-metal compounds.

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|-----------------------------|------|---------------------------|
| a) phosphorus pentachloride | ans. | a) PCl_5 |
| b) oxygen difluoride | | b) OF_2 |
| c) sulfur trioxide | | c) SO_3 |
| d) dinitrogen pentoxide | | d) N_2O_5 |
| e) silicon tetrabromide | | e) SiBr_4 |
| f) carbon dioxide | | f) CO_2 |
| g) boron triiodide | | g) BI_3 |
| h) sulfur hexafluoride | | h) SF_6 |

7. Name the following acids and bases.

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|--------------------------------------|------|------------------------|
| a) H_2SO_3 | ans. | a) sulfurous acid |
| b) $\text{Sn}(\text{OH})_4$ | | b) tin(IV) hydroxide |
| c) HNO_3 | | c) nitric acid |
| d) KOH | | d) potassium hydroxide |
| e) HIO_4 | | e) periodic acid |
| f) HF | | f) hydrofluoric acid |
| g) $\text{Fe}(\text{OH})_3$ | | g) iron(III) hydroxide |
| h) H_2SO_4 | | h) sulfuric acid |
| i) H_3PO_3 | | i) phosphorous acid |
| j) $\text{HC}_2\text{H}_3\text{O}_2$ | | j) acetic acid |
| k) HClO | | k) hypochlorous acid |
| l) HBr | | l) hydrobromic acid |

8. Write formulas for the following acids and bases.

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|-----------------------|------|-------------------------------------|
| a) nitrous acid | ans. | a) HNO_2 |
| b) phosphoric acid | | b) H_3PO_4 |
| c) sodium hydroxide | | c) NaOH |
| d) bromic acid | | d) HBrO_3 |
| e) tin(II) hydroxide | | e) $\text{Sn}(\text{OH})_2$ |
| f) hydroiodic acid | | f) HI |
| g) hypobromous acid | | g) HBrO |
| h) aluminum hydroxide | | h) $\text{Al}(\text{OH})_3$ |
| i) zinc hydroxide | | i) $\text{Zn}(\text{OH})_2$ |
| j) oxalic acid | | j) $\text{H}_2\text{C}_2\text{O}_4$ |
| k) perchloric acid | | k) HClO_4 |
| l) hydrosulfuric acid | | l) H_2S |

9. Name the following compounds.

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|--|--|
| a) BaCrO_4 | ans. a) barium chromate |
| b) $\text{Ni}_2\text{Fe}(\text{CN})_6$ | b) nickel ferrocyanide |
| c) HIO | c) hydroiodous acid |
| d) KCNO | d) potassium cyanate |
| e) H_2O_2 | e) hydrogen peroxide |
| f) AlPO_4 | f) aluminum phosphate |
| g) CuO | g) copper(II) oxide |
| h) $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$ | h) lead acetate |
| i) KH_2PO_3 | i) potassium dihydrogen phosphite |
| j) NH_4CN | j) ammonium cyanide |
| k) NiC_2O_4 | k) nickel(II) oxalate |
| l) Na_2SiO_3 | l) sodium silicate |
| m) $\text{Ca}(\text{BrO}_4)_2$ | m) calcium perbromate |
| n) AgMnO_4 | n) silver permanganate |
| o) SnF_2 | o) tin(II) fluoride |
| p) As_2S_3 | p) arsenic(III) sulfide |
| q) Na_2O | q) sodium oxide |
| r) $\text{Mg}(\text{IO}_3)_2$ | r) magnesium iodate |
| s) Hg_2SO_4 | s) mercury(I) sulfate |
| t) H_3AsO_4 | t) arsenic acid |
| u) CoCl_2 | u) cobalt(II) chloride |
| v) NaClO | v) sodium hypochlorite |
| w) NaHCO_3 | w) sodium hydrogen carbonate
sodium bicarbonate |
| x) $(\text{NH}_4)_2\text{SO}_3$ | x) ammonium sulfite |
| y) $\text{Bi}(\text{OH})_3$ | y) bismuth(III) hydroxide |
| z) FeS_2O_3 | z) iron(II) thiosulfate |

10. Write formulas for the following compounds.

a) chromium(III) nitrate	ans.	a) $\text{Cr}(\text{NO}_3)_3$
b) manganese(II) hydroxide		b) $\text{Mn}(\text{OH})_2$
c) nitrogen trichloride		c) NCl_3
d) sodium tetraborate		d) $\text{Na}_2\text{B}_4\text{O}_7$
e) zinc carbonate		e) ZnCO_3
f) ammonium nitrite		f) NH_4NO_2
g) magnesium oxalate		g) MgC_2O_4
h) copper(II) sulfite		h) CuSO_3
i) sodium hydrogen sulfite		i) NaHSO_3
j) lead(II) chromate		j) PbCrO_4
k) silver cyanide		k) AgCN
l) sodium bicarbonate		l) NaHCO_3
m) calcium dithionate		m) CaS_2O_4
n) antimony(III) sulfide		n) Sb_2S_3
o) potassium oxide		o) K_2O
p) boron trifluoride		p) BF_3
q) tin(IV) nitrate		q) $\text{Sn}(\text{NO}_3)_4$
r) barium chloride		r) BaCl_2
s) aluminum acetate		s) $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$
t) copper(I) oxide		t) Cu_2O
u) manganese(II) pyrophosphate		u) $\text{Mn}_2\text{P}_4\text{O}_7$
v) chromium(III) sulfate		v) $\text{Cr}_2(\text{SO}_4)_3$
w) lithium hydride		w) LiH
x) iron(II) phosphate		x) $\text{Fe}_3(\text{PO}_4)_2$
y) ammonium oxalate		y) $(\text{NH}_4)_2\text{C}_2\text{O}_4$
z) mercury(II) iodate		z) $\text{Hg}(\text{IO}_3)_2$

11. Name the following compounds.

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|------------------|-------------------------------|
| a) $K_2S_2O_8$ | ans. a) potassium persulfate |
| b) Mg_3N_2 | b) magnesium nitride |
| c) HIO | c) hydroiodous acid |
| d) $Sr(OH)_2$ | d) strontium hydroxide |
| e) Na_3PO_3 | e) sodium phosphite |
| f) $Ag_2Cr_2O_7$ | f) silver dichromate |
| g) $CdCO_3$ | g) cadmium carbonate |
| h) $HC_2H_3O_2$ | h) acetic acid |
| i) $LiHSO_4$ | i) lithium hydrogen sulfate |
| j) $Ni_2P_2O_7$ | j) nickel(II) pyrophosphate |
| k) AsP | k) arsenic(III) phosphide |
| l) $KHSO_4$ | l) potassium hydrogen sulfate |
| m) $HBrO_4$ | m) perbromic acid |
| n) MnC_2O_4 | n) manganese(II) oxalate |
| o) $Co(ClO_4)_2$ | o) cobalt(II) perchlorate |
| p) Sb_2S_3 | p) antimony(III) sulfide |
| q) $Ca(HCO_3)_2$ | q) calcium hydrogen carbonate |
| r) $NaClO_2$ | r) sodium chlorite |
| s) $PbSO_4$ | s) lead sulfate |
| t) $H_2C_2O_4$ | t) oxalic acid |
| u) CuCl | u) copper(I) chloride |
| v) BaO_2 | v) barium peroxide |
| w) HClO | w) hypochlorous acid |
| x) RbOH | x) rubidium hydroxide |
| y) CO | y) carbon monoxide |
| z) PI_3 | z) phosphorus triiodide |