

## ANSWERS: Formula writing and nomenclature of inorganic compounds

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

- |                                      |            |
|--------------------------------------|------------|
| a) $\text{Na}_2\text{S}_2\text{O}_3$ | ans. a) +2 |
| b) $\text{H}_2\text{SO}_3$           | b) +4      |
| c) $\text{SO}_2$                     | c) +4      |
| d) $\text{K}_2\text{S}_2\text{O}_4$  | d) +3      |
| e) $\text{Al}_2\text{S}_3$           | e) -2      |
| f) $\text{BaS}_2\text{O}_8$          | f) +7      |

2. Name the following compounds.

- |  |  |
|--|--|
| a) $\text{PbI}_2$                                | ans. a) lead(II) iodide or lead iodide |
| b) $\text{FeSO}_4$                               | b) iron(II) sulfate                    |
| c) $\text{Ag}_2\text{CO}_3$                      | c) silver carbonate                    |
| d) $\text{NaCN}$                                 | 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) $\text{HgCl}$                                 | h) mercury(I) chloride                 |

3. Write formulas for the following compounds.

- |                            |                                   |
|----------------------------|-----------------------------------|
| 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) $\text{NaIO}_3$                |
| e) chromium(III) chloride  | e) $\text{CrCl}_3$                |
| f) potassium permanganate  | f) $\text{KMnO}_4$                |
| g) zinc bromide            | g) $\text{ZnBr}_2$                |
| h) cobalt(II) perchlorate  | h) $\text{Co}(\text{ClO}_4)_2$    |

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

- |                                       |      |       |
|---------------------------------------|------|-------|
| a) $\text{CaCrO}_4$                   | ans. | a) +6 |
| b) $\text{CrBr}_2$                    |      | 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) $\text{Li}_2\text{CrO}_4$          |      | e) +6 |

5. Name the following binary non-metal compounds.

- |                            |      |                          |
|----------------------------|------|--------------------------|
| a) $\text{PBr}_3$          | ans. | a) phosphorus tribromide |
| b) $\text{CO}$             |      | b) carbon monoxide       |
| c) $\text{N}_2\text{O}_4$  |      | c) dinitrogen tetraoxide |
| d) $\text{CCl}_4$          |      | d) carbon tetrachloride  |
| e) $\text{SiO}_2$          |      | e) silicon dioxide       |
| f) $\text{BCl}_3$          |      | f) boron trichloride     |
| g) $\text{CS}_2$           |      | g) carbon disulfide      |
| h) $\text{S}_2\text{Cl}_2$ |      | h) sulfur monochloride   |

Note: Normally, you would write the formula  $\text{SCl}$ , however, the actual formula for sulfur monochloride is  $\text{S}_2\text{Cl}_2$

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

- |                             |      |                           |
|-----------------------------|------|---------------------------|
| a) phosphorus pentachloride | ans. | a) $\text{PCl}_5$         |
| b) oxygen difluoride        |      | b) $\text{OF}_2$          |
| c) sulfur trioxide          |      | c) $\text{SO}_3$          |
| d) dinitrogen pentoxide     |      | d) $\text{N}_2\text{O}_5$ |
| e) silicon tetrabromide     |      | e) $\text{SiBr}_4$        |
| f) carbon dioxide           |      | f) $\text{CO}_2$          |
| g) boron triiodide          |      | g) $\text{BI}_3$          |
| h) sulfur hexafluoride      |      | h) $\text{SF}_6$          |

7. Name the following acids and bases.

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

8. Write formulas for the following acids and bases.

- |                       |      |                                     |
|-----------------------|------|-------------------------------------|
| a) nitrous acid       | ans. | a) $\text{HNO}_2$                   |
| b) phosphoric acid    |      | b) $\text{H}_3\text{PO}_4$          |
| c) sodium hydroxide   |      | c) $\text{NaOH}$                    |
| d) bromic acid        |      | d) $\text{HBrO}_3$                  |
| e) tin(II) hydroxide  |      | e) $\text{Sn}(\text{OH})_2$         |
| f) hydroiodic acid    |      | f) $\text{HI}$                      |
| g) hypobromous acid   |      | g) $\text{HBrO}$                    |
| 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) $\text{HClO}_4$                  |
| l) hydrosulfuric acid |      | l) $\text{H}_2\text{S}$             |

9. Name the following compounds.

- |  |  |
|--|--|
| a) $\text{BaCrO}_4$                              | ans. a) barium chromate                            |
| b) $\text{Ni}_2\text{Fe}(\text{CN})_6$           | b) nickel ferrocyanide                             |
| c) $\text{HIO}$                                  | c) hydroiodous acid                                |
| d) $\text{KCNO}$                                 | d) potassium cyanate                               |
| e) $\text{H}_2\text{O}_2$                        | e) hydrogen peroxide                               |
| f) $\text{AlPO}_4$                               | f) aluminum phosphate                              |
| g) $\text{CuO}$                                  | g) copper(II) oxide                                |
| h) $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$ | h) lead acetate                                    |
| i) $\text{KH}_2\text{PO}_3$                      | i) potassium dihydrogen phosphite                  |
| j) $\text{NH}_4\text{CN}$                        | j) ammonium cyanide                                |
| k) $\text{NiC}_2\text{O}_4$                      | k) nickel(II) oxalate                              |
| l) $\text{Na}_2\text{SiO}_3$                     | l) sodium silicate                                 |
| m) $\text{Ca}(\text{BrO}_4)_2$                   | m) calcium perbromate                              |
| n) $\text{AgMnO}_4$                              | n) silver permanganate                             |
| o) $\text{SnF}_2$                                | o) tin(II) fluoride                                |
| p) $\text{As}_2\text{S}_3$                       | p) arsenic(III) sulfide                            |
| q) $\text{Na}_2\text{O}$                         | q) sodium oxide                                    |
| r) $\text{Mg}(\text{IO}_3)_2$                    | r) magnesium iodate                                |
| s) $\text{Hg}_2\text{SO}_4$                      | s) mercury(I) sulfate                              |
| t) $\text{H}_3\text{AsO}_4$                      | t) arsenic acid                                    |
| u) $\text{CoCl}_2$                               | u) cobalt(II) chloride                             |
| v) $\text{NaClO}$                                | v) sodium hypochlorite                             |
| w) $\text{NaHCO}_3$                              | w) sodium hydrogen carbonate<br>sodium bicarbonate |
| x) $(\text{NH}_4)_2\text{SO}_3$                  | x) ammonium sulfite                                |
| y) $\text{Bi}(\text{OH})_3$                      | y) bismuth(III) hydroxide                          |
| z) $\text{FeS}_2\text{O}_3$                      | 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) $\text{NCl}_3$                                |
| d) sodium tetraborate          |      | d) $\text{Na}_2\text{B}_4\text{O}_7$             |
| e) zinc carbonate              |      | e) $\text{ZnCO}_3$                               |
| f) ammonium nitrite            |      | f) $\text{NH}_4\text{NO}_2$                      |
| g) magnesium oxalate           |      | g) $\text{MgC}_2\text{O}_4$                      |
| h) copper(II) sulfite          |      | h) $\text{CuSO}_3$                               |
| i) sodium hydrogen sulfite     |      | i) $\text{NaHSO}_3$                              |
| j) lead(II) chromate           |      | j) $\text{PbCrO}_4$                              |
| k) silver cyanide              |      | k) $\text{AgCN}$                                 |
| l) sodium bicarbonate          |      | l) $\text{NaHCO}_3$                              |
| m) calcium dithionate          |      | m) $\text{CaS}_2\text{O}_4$                      |
| n) antimony(III) sulfide       |      | n) $\text{Sb}_2\text{S}_3$                       |
| o) potassium oxide             |      | o) $\text{K}_2\text{O}$                          |
| p) boron trifluoride           |      | p) $\text{BF}_3$                                 |
| q) tin(IV) nitrate             |      | q) $\text{Sn}(\text{NO}_3)_4$                    |
| r) barium chloride             |      | r) $\text{BaCl}_2$                               |
| s) aluminum acetate            |      | s) $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$ |
| t) copper(I) oxide             |      | t) $\text{Cu}_2\text{O}$                         |
| 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) $\text{LiH}$                                  |
| 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.

- |                  |                               |
|------------------|-------------------------------|
| 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       |