

PHYSICAL SCIENCES

GR 10 RESOURCE



EXERCISE 1.2

MODULE 1 TOPIC 1 Unit 4, p. 10
Gr 10 Physical Sciences 3-in-1

QUESTION 1

- 1.1 How are ionic compounds formed?
- 1.2 What is the significance of naming ionic compounds?
- 1.3 How are covalent bonds in small molecules formed?
- 1.4 Describe the method used to name covalent compounds.

QUESTION 2

Complete 2.1 to 2.12 in the table.

Compound	Name of the metal cation	Name of the non-metal anion	Name of the compound
Ag ₂ O	2.1	2.2	2.3
HgBr ₂	2.4	2.5	2.6
Zn ₃ N ₂	2.7	2.8	2.9
Li ₂ S	2.10	2.11	2.12

QUESTION 3

Fill in the empirical formula and name (3.1 to 3.8) for each ionic compound.

Cation	Anion	Empirical formula	Name of the compound
Fe ³⁺	S ²⁻	3.1	3.2
Pb ²⁺	I ⁻	3.3	3.4
NH ₄ ⁺	NO ₃ ⁻	3.5	3.6
Ni ²⁺	F ⁻	3.7	3.8

QUESTION 4

4.1 Give the chemical name and formula when the following substances react and bond:

- | | |
|-----------------------------|------------------------------|
| 4.1.1 K and O ₂ | 4.1.2 Li and H ₂ |
| 4.1.3 Mg and N ₂ | 4.1.4 Zn and Cl ₂ |

4.2 Give the chemical name of the following substances:

- | | | | |
|------------------------|------------------------|----------|-----------------------|
| 4.2.1 H ₂ O | 4.2.2 NBr ₃ | 4.2.3 CO | 4.2.4 SO ₃ |
|------------------------|------------------------|----------|-----------------------|

QUESTION 5

5.1 Write the formula for each of the following chemical compounds:

5.1.1 manganese(II)phosphate 5.1.2 tin(II)sulphate

5.1.3 silver chloride 5.1.4 lithium hydroxide

5.2 Give the scientific name for each of the following chemical compounds:

5.2.1 $\text{Ti}(\text{SO}_4)_2$ 5.2.2 Cu_2CO_3 5.2.3 CBr_4 5.2.4 Na_3P

5.3 Write the formula for the following metal sulphide and iodide compounds/salts:

5.3.1 aluminium 5.3.2 lead(IV) 5.3.3 potassium

EXERCISE ANSWERS

QUESTION 1

- 1.1
 - Ionic compounds form by means of ionic bonds. This involves atoms of one element donating (losing) one or more electrons and forming positive ions (cations) and
 - atoms of another element accepting (gaining) one or more electrons and forming negative ions (anions)
 - The oppositely charged ions attract each other via electrostatic forces (Coulomb forces) and pack together in a crystal lattice.
- 1.2 Naming ionic compounds helps us know exactly which ions are in the compound, which charge they have, and in what ratio they have bonded, so that chemists, by applying international rules, can identify the same substance.
- 1.3 Covalent bonds are formed when two non-metal atoms share one or more pairs of electrons so that each atom can achieve a stable outer (valence) electron configuration.
- 1.4 Prefixes are used in the naming of covalent compounds to indicate the number of atoms of each element, particularly the second element.

QUESTION 2

- | | | |
|-----------------|---------------|-------------------------|
| 2.1 silver | 2.2 oxide | 2.3 silver oxide |
| 2.4 mercury(II) | 2.5 bromide | 2.6 mercury(II) bromide |
| 2.7 zinc | 2.8 nitride | 2.9 zinc nitride |
| 2.10 lithium | 2.11 sulphide | 2.12 lithium sulphide |

QUESTION 3

- | | | |
|-----------------------------|------------------------------|----------------------|
| 3.1 Fe_2S_3 | 3.2 iron(III) sulphide | 3.3 PbI_2 |
| 3.4 lead(II) iodide | 3.5 NH_4NO_3 | 3.6 ammonium nitrate |
| 3.7 NiF_2 | 3.8 nickel(II) fluoride | |

QUESTION 4

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|--|--------------------------------------|
| 4.1.1 potassium oxide; K_2O | 4.1.2 lithium hydride; LiH |
| 4.1.3 magnesium nitride; Mg_3N_2 | 4.1.4 zinc chloride; ZnCl_2 |
| 4.2.1 dihydrogen monoxide | 4.2.2 nitrogen tribromide |
| 4.2.3 carbon monoxide | 4.2.4 sulphur trioxide |

QUESTION 5

- | | | |
|--|---------------------------------------|--|
| 5.1.1 $\text{Mn}_3(\text{PO}_4)_2$ | 5.1.2 SnSO_4 | |
| 5.1.3 AgCl | 5.1.4 LiOH | |
| 5.2.1 titanium(IV) sulphate | 5.2.2 copper(I) carbonate | |
| 5.2.3 carbon tetrabromide | 5.2.4 sodium phosphide | |
| 5.3.1 Al_2S_3 ; AlI_3 | 5.3.2 PbS_2 ; PbI_4 | 5.3.3 K_2S ; KI |

QUESTION 3

- | | |
|---------------------|-------------------|
| 3.1.1 homogeneous | 3.1.2 homogeneous |
| 3.1.3 heterogeneous | |
- 3.2 Add carbon bisulphide (CS_2) to the mixture:
- The sulphur dissolves in the carbon bisulphide, forming a solution.
 - The iron filings remain as an insoluble solid.
 - Filter the mixture: the iron filings stay on the filter paper, while the sulphur solution passes through.
 - Finally, evaporate the carbon bisulphide to recover the sulphur.