Exercise 1A

1. What is a symbol? What information does it convey?
Solution:

Short form of atom of specific element or the abbreviations used to refer names of the element is known as symbol.
1. It represents a specific element.
2. It represents one atom of an element.
3. A symbol represents how many atoms are present in its one gram (gm) atom.
4. It represents the number of times an atom is heavier than one atomic mass unit (amu) taken as a standard.

2. Why is the symbol S for Sulphur, but Na for Sodium and Si for Silicon.
Solution:

While naming an element first letter of the element is taken and written in capital (e.g. for sulphur, we use the symbol S). In case if the letter is already adopted. We use a symbol derived from Latin word of the element name (e.g., for sodium/Natrium, we use the symbol Na). In some cases, we use the initial letter in capital together with a small letter from its name (e.g., for silicon, we use the symbol Si).

3. Write the full form of IUPAC. Name the elements represented by the following Symbols: Au, Pb, Sn, Hg
Solution:

IUPAC stands for The International Union of Pure and Applied Chemistry (IUPAC)
Au - Gold
Pb - Lead
Sn - Tin
Hg - Mercury

4. If the symbol for cobalt, Co was written as CO. What would be wrong with it?
Solution:

If we write CO it means it consist of two non-metals namely Carbon and Oxygen and it would represent Carbon- monoxide but not Cobalt.

5. What do the following symbols stand for?
a) H b) H_2 c) 2H d) $2H_2$
Solution:

a) H stands for one atom of Hydrogen
b) H_2 stands for one molecule of Hydrogen
c) 2H stands for 2 atoms of Hydrogen
d) $2H_2$ stands for 2 molecules of Hydrogen.

6. What is meant by atomicity? Name a diatomic element.
Solution:

A set of atoms of the same type together forms a molecule of the element. The number of atoms in a molecule of an element is called its atomicity.
Examples of diatomic elements are H_2 – Hydrogen, O_2 – Oxygen, N_2 – Nitrogen

7. a) Explain the terms valency and variable valency
b) How are the elements with variable valency named? Explain with an example.
Solution:

a) Valency is the capacity of an atom to lose, gain or share atoms during a chemical reaction is called its valency. Sometimes atom of an element can lose more electron than they are present which means they lose electron from its penultimate shell. Such an element is said to exhibit variable valency.
b) If an element exhibits two different positive valencies, then
1. For the lower valency, use the suffix -OUS at the end of the name of the metal
2. For the higher valency, use the suffix -IC at the end of the name of the metal.

8. Give the formula and valency of
a) aluminate
b) chromate
c) aluminium
d) cupric
Solution:

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Name	Formula	Valency
Aluminate	AlO_2	-2
Chromate	CrO_4	-2
Aluminium	Al	+3
Cupric	Cu	+2

9. a) What is a chemical formula?
b) What is the significance of a formula? Give an illustrate.
Solution:

a) Chemical formula is a symbolic representation of the number of atoms present in a molecule of that substance.
b) Significance of Chemical Formula

Chemical formula is very important in finding information about chemical compounds as it tells us about the elements and the number of atoms in a substance
Example - Salt - NaCl, ethanol C_2H_6O because the molecule of ethanol contains two Carbon, 6 Hydrogen and 1 Oxygen atom.

10. What do you understand by following terms?
a) Acid radical b) Basic radical
Solution:

a) Negatively charged radical is called as acidic radical.
b) Positively charged radical is called as basic radical.

11. Select the basic radical in the following compounds
a) $MgSO_4$
b) $(NH_4)_2$
c) $Al2(SO_4)_3$
d) $ZnCO_3$
e) $Mg(OH)_2$
Solution:

	Acid Radical	Basic radical
a) $MgSO_4$	SO_4^{2-}	Mg^{2+}
b) $(NH_4)_2SO_4$	SO_4^{2-}	NH_4^{+}
c) $Al_2(SO_4)_3$	SO_4^{2-}	Al^{3+}
d) $ZnCO_3$	CO_3^{2-}	Zn^{2+}
e) $Mg(OH)_2$	OH^{-}	Mg^{2+}

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12. Write the chemical formulae of sulphates of Aluminium, Ammonium and Zinc.
Solution:

Valencies of aluminium, ammonium and zinc are 3, 1 and 2, respectively. The valency of sulphate is 2. Hence, chemical formulae of the sulphates of aluminium, ammonium and zinc are $Al_2(SO_4)_3$, $(NH_4)_2SO_4$, $ZnSO_4$

13. The valency of element A is 3 and that of element B is 2. Write the formula of the compound formed by the combination of A and B.
Solution:

Formula of compound having valency of elements are 3 and 2 is A_2B_3.

14. Match the following

Compound	Formula
Boric acid	NaoH
Phosphoric acid	SiO_2
Nitrous acid	Na_2CO_3
Nitric acid	KOH
Sulphorous acid	$CaCO_3$
Sulphuric acid	$NaHCO_3$
Hydrochloric acid	H_2S
Silica (Sand)	H_2O
Caustic soda (Sodium Hydroxide)	PH_3
Caustic potash (Potassium hydroxide)	CH_4
Washing soda (Sodium carbonate)	NH_3
Baking Soda (Sodium bi carbonate)	HCl
Lime stone (Calcium carbonate)	H_2SO_3
Water	HNO_3
Hydrogen Sulphide	HNO_2
Ammonia	H_3BO_3
Phosphine	H_3PO_4
Methane	H_2SO_4

Solution:

Compound	Formula
Boric acid	H_3BO_3
Phosphoric acid	H_3PO_4
Nitrous acid	HNO_2
Nitric acid	HNO_3
Sulphorous acid	H_2SO_3
Sulphuric acid	H_2SO_4
Hydrochloric acid	HCl
Silica (Sand)	SiO_2
Caustic soda (Sodium Hydroxide)	NaOH
Caustic potash (Potassium hydroxide)	KOH
Washing soda (Sodium carbonate)	Na_2CO_3
Baking Soda (Sodium bi carbonate)	$NaHCO_3$
Lime stone (Calcium carbonate)	$CaCO_3$
Water	H_2O
Hydrogen Sulphide	H_2S
Ammonia	NH_3
Phosphine	PH_3
Methane	CH_4

15. Write the basic and acidic radicals of the following and then write the chemical formulae of these

compounds.

a) Barium sulphate
b) Bismuth nitrate
c) calcium bromide
d) Ferrous sulphide
e) Chromium sulphate
f) Calcium silicate
g) Stannic oxide
h) Sodium Zincate
i) Magnesium phosphate
j) Sodium thiosulphate
k) Stannic phosphate
l) Nickel-bi-silphate
m) Potassium mangnate
n) Potassium ferrocynide

Solution:

Compounds	Acidic radical	Basic radical	Chemical formulae
a) Barium sulphate	SO_4^{-2}	Ba^{+2}	$BaSO_4$
b) Bismuth nitrate	NO_3^-	Bi^{+3}	$Bi(NO_3)_3$
c) calcium bromide	Br^-	Ca^{+2}	$CaBr_2$
d) Ferrous sulphide	S^{2-}	Fe^{+2}	FeS
e) Chromium sulphate	SO_4^{2-}	Cr^{+3}	$Cr_2(SO_4)_3$
f) Calcium silicate	SiO_4^{2-}	Cr^{+3}	$Cr_2(SO_4)_3$
g) Stannic oxide	O^{2-}	Sn^{+2}	SnO_2
h) Sodium Zincate	ZnO^{2-}	Na^{+1}	Na_2ZnO_2
i) Magnesium phosphate	PO_4^{3-}	Mg^{+2}	$Mg_3(PO_4)_2$
j) Sodium thiosulphate	$(S_2O_3)^{2-}$	Na^{+1}	$Na_2S_2O_3$
k) Stannic phosphate	$(PO_4)^{3-}$	Sn^{+4}	$Sn_3(PO_4)_4$
l) Nickel-bi-silphate	H_2SO^{4-}	Ni^{+3}	$NiH(SO_4)_3$
m) Potassium mangnate	MnO_4^{2-}	K^{+1}	K_2MnO_4
n) Potassium ferrocynide	$[Fe(CN)_6]^{4-}$	K^{+1}	$K_4[Fe(CN)_6]$

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16. Write chemical names of the following compounds:
a) $Ca_3(PO_4)_2$
b) K_2CO_3
c) K_2MnO_4
d) $Mn_3(BO_3)_2$
e) $Mg(HCO_3)_2$
f) $Na_4Fe(CN)_6$
g) $Ba(Cl_3)_2$
h) Ag_2SO_3
i) $(CH_3COO)_2Pb$
j) Na_2SiO_3

Solution:

a) Calcium phosphate
b) Potassium carbonate
c) Potassium manganate
d) Manganese(II) Borate
e) Magnesium bicarbonate.
f) Sodium ferrocyanide
g) Barium Chlorate
h) Silver sulfite
i) Lead(II) acetate
j) Sodium silicate

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17. Give the names of the following compounds
a) KClO
b) $KClO_2$
c) $KClO_3$
d) $KClO_4$

Solution:

a) Potassium hypochlorite
b) Potassium chlorite
c) Potassium chlorate
d) Potassium per chlorate

18. Complete the following statements by selecting the correct option.
a) The formula of a compound represents
i) an atom
ii) a particle
iii) a molecule
iv) a combination

b) The correct formula of aluminium oxide is
i) AlO_3

ii) AlO_2
iii) Al_2O_3
iv) Al_3O_2

c) The valency of Nitrogen in Nitrogen di oxide (NO_2) is
i) One
ii) Two
iii) Three
iv) Four

Solution:

a) The formula of a compound represents a molecule
b) The correct formula of aluminium oxide is Al_2O_3
c) The valency of Nitrogen in Nitrogen di oxide (NO_2) is four

19. Give the names of the elements and number of atoms of those elements, present in the following compounds.
a) Sodium sulphate
b) Quick lime
c) Baking soda (NaHCO3)
d) Ammonia
e) Ammonium dichromate

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Solution:

a) Sodium sulphate
Chemical formula is Na_2SO_4
Atoms - 2 sodium, one Sulphur and 4 oxygen atoms.

b) Quick lime
Chemical formula is CaO
Atoms - one Calcium atom and 1 oxygen atom

c) Baking soda ($NaHCO_3$)
Chemical formula of is $NaHCO_3$
Atoms - 1 Sodium, 1 hydrogen, 1 carbon and 3 oxygen atoms.

d) Ammonia
Chemical formula is NH_3
Atoms - 3 hydrogen and 1 nitrogen atom.

e) Ammonium dichromate
Chemical formula is $(NH_4)_2Cr_2O_7$.
Atoms - 2 ammonium, 2 chromium and 7 oxygen atoms.

20. The formula of the sulphate of an element M is $M_2(SO_4)_3$. Write the formula of it.

a) Chloride
b) Oxide
c) Phosphate
d) Acetate
Solution:

Answer is a) Chloride

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