INDIAN SCHOOL AL WADI AL KABIR		
Class: IX	**Department: SCIENCE 2023-24**	**Date: 11/02/2024**
Worksheet No: 04 with answers	**CHAPTER: ATOMS AND MOLECULES**	**Note: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

1. Which of the following is the correct pair of atoms and its atomic symbol?
   (a) Sulphur – Su
   (b) Potassium – P
   (c) Phosphorus -P
   (d) Sodium- S
2. Choose the correct statement
   (a) Two atoms of hydrogen combine with one atom of oxygen to give water molecule.
   (b) One atom of hydrogen combines with one atom of chlorine to form hydrogen chloride.
   (c) One atom of nitrogen combines with 3 atoms of hydrogen to form 1 molecule of ammonia.
   (d) One atom of carbon combines with one molecule of oxygen to form one molecule of carbon dioxide.
3. The chemical formula of Aluminium oxide is:
   (a) AlO_2 (b) Al_2O (c) Al_2O_4 (d)Al_2O_3
4. How many atoms are present in one molecule of sulphur?
   (a) 8 (b) 4 (c) 2 (d) 1
5. In water, the proportion of oxygen and hydrogen by mass is:
   (a) 1:4 (b) 1:8 (c) 4:1 (d) 8:1
6. When an atom loses electrons, it is called a (an) _____ and has a _____ charge.
   (a) Anion, positive
   (b) Cation, positive
   (c) Anion, negative
   (d) Cation, negative

ASSERTION-REASONING QUESTIONS

For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options

(i) , (ii), (iii) and (iv)as given below:

(i)Both A and R are true and R is the correct explanation of the Assertion.

(ii)Both A and R are true but R is not the correct explanation of the Assertion.

(iii)A is true but R is false.

(iv)A is false but R is true.

7. Assertion: Atoms always combine to form molecule and ions.
   Reason: Atoms of most element are not able to exist independently.
8. Assertion: The valency of Aluminium is 3 and oxygen is 2.
   Reason: The chemical formula of Aluminium oxide is Al_3O_2.
9. Assertion: A sodium ion has positive charge.
   Reason: Sodium ion has more protons than a neutral atom.
10. Assertion: Atomicity is the number of atoms present in a molecule.
    Reason: Same type of atoms join together to form molecules of elements.

ONE MARK QUESTIONS

11. Atoms of most elements are not able to exist independently'. Name two atoms which exist as independent atoms.
12. What is the number of electrons in Mg atom and Mg^{2+} ion?
13. Name the elements present in the following:
    (a) Water (b) Ammonia (c) Sulphur dioxide
14. (i) State the law of constant proportions.
    (ii)Define molecular mass of a substance.
15. Explain the difference between 2N and N_2

TWO MARK QUESTIONS

16. Write the differences between an atom and molecule

17. Write the formulae of:
    (a) Magnesium hydroxide (b) Hydrogen sulphide (c) Potassium chloride
    (d) Calcium oxide (e) Barium chloride (f) Sodium carbonate
18. (a) Write the symbol and Latin name of the following elements:
    (i) Sodium
    (ii) Potassium
    (b) Write the chemical formula of baking soda.
19. (a) What are polyatomic ions?
    (b)Write the formulae and names of the compounds formed by combination of
    (i) Fe^{3+} and SO_4^{2-} (ii) NH_4+ and CO_3^{2-}

THREE MARK QUESTIONS

20. (a) Define atomic mass unit.
    (b)Define molecular mass.
    (c) The atomic number of three elements A, B, and C are 9, 10, and 13 respectively. Which of them will form a cation?
21. State two examples in each case and write their chemical formulae:
    (a) Molecules having one kind of atoms only.

(b) Molecules having two different kinds of atoms.
(c) Molecules having three different kinds of atoms.

22. (a) What is an ion? Write the symbol for Calcium ion and Aluminium ion.
(b)Give the difference between an anion and a cation.
(c)How many atoms are present in one molecule of ozone?
23. (i) Write the name of the compound $(NH_4)_2SO_4$ and mention the ions present in it.
(ii) Write the chemical formulae of: (a) Sodium carbonate (b) Ammonium chloride.

PREVIOUS YEAR BOARD QUESTIONS

24. Calculate the formula unit mass of $CuSO_4.5H_2O$
[Atomic mass of Cu=63.5u, S=32u, O=16u, H=1u]
25. (a) Hydrogen and oxygen combine in the ratio of 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas?
(b)How many atoms are present in (i) H_2S molecule (ii) PO_4^{3-} ions?
(c) Write the names of elements present in (i) Quick lime (ii) Hydrogen bromide.
26. Calculate the molecular mass of the following:
(i) H_2SO_4 (ii) C_2H_5OH
27. Calculate the formula unit masses of ZnO, Na_2O, K_2CO_3 [Zn=65u, Na=23u, K=39u, C=12u,O=16u]
28. Write the names and symbols of five elements where the symbols are taken from their name in English.

EXEMPLAR QUESTIONS

29. Write the molecular formulae of all the compounds that can be formed by the combination of following ions.
Cu^{2+}, Na^+, Fe^{3+}, Cl^-, SO_4^{2-}, PO_4^{3-}
30. Give the chemical formulae for the following compounds and compute the ratio by mass of the combining elements in each one of them.
(a) Ammonia
(b) Carbon monoxide
(c) Hydrogen chloride
(d) Aluminium fluoride
(e) Magnesium sulphide.

CASE STUDY BASED QUESTIONS

31. A molecule is in general a group of two or more atoms that are chemically bonded together, that is, tightly held together by attractive forces. A molecule can be defined as the smallest particle of an element or a compound that is capable of independent existence and shows all the properties of that substance. Atoms of the same element or of different elements can join together to form a molecule. The number of atoms constituting a molecule is known as its atomicity. Metals and some other elements, such as carbon, do not have a simple structure but consist of a very large and indefinite number of atoms bonded together.
(a) How do you differentiate between a molecule of an element and a molecule of a compound? Write one example of each.
(b) Classify the following compounds as diatomic, triatomic and polyatomic molecules.
HCl, H_2, H_2O, NH_3

OR

Give an example each of diatomic and triatomic molecule of compounds.

ANSWERS

OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

Q.No.	Answers
1	(c) Phosphorus -P
2	(d)One atom of carbon combines with one molecule of oxygen to form one molecule of carbon dioxide.
3	(d)Al_2O_3
4	(a)8
5	(d) 8:1
6	(b) Cation, positive

ASSERTION-REASONING QUESTIONS

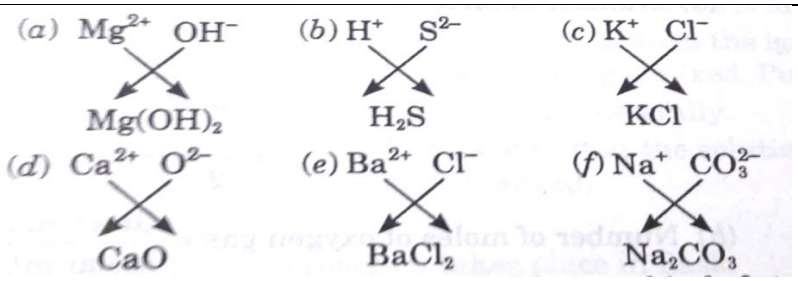
7	(iv)A is false but R is true.
8	(iii)A is true but R is false.
9	(iii)A is true but R is false.
10	(ii)Both A and R are true and R is not the correct explanation of the Assertion.

ONE MARK QUESTIONS

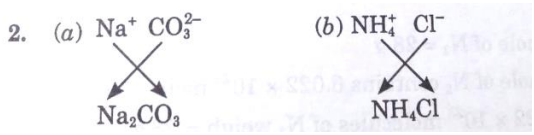
11	Noble gases such as argon (Ar), helium (He) exist as independent atoms.
12	Mg- 12 electrons Mg2+ - 10 electrons.
13	(a)Water-Hydrogen and oxygen (b) ammonia-Nitrogen and hydrogen (c) sulphur dioxide- sulphur and oxygen
14	(i)In a chemical substance, the elements are always in a definite proportion by mass. (ii)Molecular mass is the sum of atomic masses of all atoms present in a molecule.
15	2N- two atoms of nitrogen, N_2- one molecule of nitrogen.

TWO MARK QUESTIONS

16	An atom is the smallest particle of an element which may or may not have independent existence. For example, Helium is an atom which exists as such. On the other hand, molecule is the smallest particle of an element or compound capable of independent existence. For example, hydrogen atom exists as H_2, which is a molecule.
17	

	
18	(a) (i)Sodium, Latine name-Natrium and the symbol is Na (ii)Potassium, Latin name- Kalium and the symbol is K (b) $NaHCO_3$ is the chemical formula of baking soda.
19	(a) Those ions which contain two or more atoms are called polyatomic ions. (b) (i) $Fe_2(SO_4)_3$ (ii) $(NH_4)_2CO_3$

THREE MARK QUESTIONS

20	(a) It is defined as 1/12 th of the mass of 1 atom of carbon-12. (b) Molecular mass is the mass of one molecule. (It is the sum of atomic masses of all atoms present in a molecule.) (c) C with atomic number 13.
21	(a)Hydrogen-H_2, Oxygen-O_2 (b)Hydrogen chloride-HCl, Water-H_2O (c)Nitric acid-HNO_3, Sulphuric acid-H_2SO_4
22	(a) Charged atom is called an ion. Calcium ion is Ca^{2+} and Aluminium ion is Al^{3+} (b) Anion-negatively charged ion. Cation-positively charged ion. (c) 3 oxygen atoms.
23	(i) Ammonium sulphate. NH_4^+ and SO_4^{2-} ions. 

PREVIOUS YEAR BOARD QUESTIONS

24	Formula unit mass of $CuSO_4.5H_2O$= 1x63.5+1x32+4x16+5[2x1+1x16] =63.5+32+64+90 =249.5u
25	(a) 24g (b) (i) H_2S molecule has 3 atoms (ii)5 atoms. (d) Quick lime-CaO- Calcium and oxygen HBr-(hydrogen bromide)- Hydrogen and bromine.

26	(i) H_2SO_4 2x1+1x32+4x16= 98u (ii) C_2H_5OH 2x12+5x1+1x16+1x1=46u
27	ZnO 65+16=81u Na_2O 23x2+16=62u K_2CO_3 39x2+12x1+16x3=138u
28	Hydrogen-H Oxygen-O Aluminium-Al Magnesium-Mg Carbon-C

EXEMPLAR QUESTIONS

29	$CuCl_2$, $CuSO_4$, $Cu_3(PO_4)_2$, NaCl, Na_2SO_4, Na_3PO_4, $FeCl_3$, $Fe_2(SO_4)_3$, $FePO_4$
30	

Compound	Chemical formulae	Ratio by mass
Ammonia	NH_3	14:3
Carbon monoxide	CO	3:4
Hydrogen chloride	HCl	1:35.5(2:71)
Aluminium fluoride	AlF_3	9:19
Magnesium sulphide	MgS	3:4

CASE STUDY BASED QUESTIONS

31	(a) Molecule of an element contains same kind of atoms. Eg:-P_4 is a molecule of element which contains four atoms of phosphorus. Molecule of a compound contains different kinds of atoms. Eg:- H_2O- is a molecule of compound which contains 2 atoms of hydrogen and one atom of oxygen. (b)Diatomic- HCl, H_2 Triatomic- H_2O Polyatomic- NH_3 OR (i) HCl is a diatomic molecule of compound. (ii) H_2O is a triatomic molecule of compound.

PREPARED BY **Ms ASHA JOHN**	**CHECKED BY** **HoD SCIENCE**