INDIAN SCHOOL AL WADI AL KABIR

CLASS: IX	**DEPARTMENT: SCIENCE 2025-26** **SUBJECT: SCIENCE(CHEMISTRY)**	**DATE: 10/02/2026**
WORKSHEET NO: 04 WITH ANSWERS	**CHAPTER / UNIT: ATOMS AND MOLECULES**	**NOTE:** **A4 FILE FORMAT**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I.OBJECTIVE TYPE QUESTIONS

1. Which of the following is NOT a monoatomic molecule?
   (a) Oxygen (O_2)
   (b) Sodium (Na)
   (c) Potassium (K)
   (d) Magnesium (Mg)
2. The valency of aluminium in aluminium sulphate is
   (a) 3
   (b) 4
   (c) 2
   (d) 1
3. How many atoms are present in a water molecule?
   (a) 2
   (b) 1
   (c) 4
   (d) 3
4. An element X has a valency of 1, while another element Y has a valency of 2. What compound will form when these elements combine?
   (a) XY
   (b) XY_2
   (c) X_2Y
   (d) XY_4

5. The law of conservation of mass was proposed by----------
   (a) Antoine Lavoisier
   (b) joseph Proust
   (c) John Dalton

(d) Rutherford

6. Which among the following is the correct symbol for gold?
   (a) Ag
   (b) Ge
   (c) As
   (d) Au

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:

Both A and R are true, and R is the correct explanation of the Assertion.
Both A and R are true, but R is not the correct explanation of the Assertion.
A is true, but R is false.
A is false, but R is true.

7. Assertion: On burning magnesium in oxygen, the mass of magnesium oxide formed is equal to the total mass of magnesium and oxygen.
Reason: In a chemical substance, the elements are always present in a definite Proportion.

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**: Water molecules always contain hydrogen and oxygen in the ratio 1:8.
Reason: Water has hydrogen and oxygen as constituent elements.

10. **Assertion**: Ions are always positively charged.
Reason: Ions are formed by losing or gaining electrons.

II -SHORT ANSWER TYPE QUESTIONS (2M)

11. A chlorine atom is electrically neutral, but a chloride is a charged ion. Explain.
12. Write the formulae of:
    (a) Calcium hydroxide (b) Hydrogen chloride (c) Potassium sulphate
    (d) Magnesium oxide (e) Ammonium chloride (f) Sodium carbonate
13. (a) Write the symbol and Latin name of the following.
    (i)Potassium (ii) gold
    (b) Write the chemical formula of quicklime
14. Write down the differences between a cation and an anion with the help of examples.
15. Give the names of the elements present in the following compounds.
    (a) Hydrogen bromide
    (b) Baking powder
    (c) Potassium sulphate
16. Write down the name of the compound from the molecular formula given.
    (a) $CuBr_2$ (b) $Al(NO_3)_3$ (C) $Ca_3(PO_4)_2$ (d) $HgCl_2$

III- SHORT ANSWER TYPE QUESTIONS (3M)

17. (a) Define an atomic mass unit. (b) Define molecular mass
    (c) The atomic numbers of three elements A, B, and C are 10, 11, and 17. Which of them Will it form an anion?

18 (i) Write the name of the compound $(NH_4)_2CO_3$ and mention the ions present in it.
(ii) Write the chemical formulae of: (a) Copper(I) chloride, (b) Magnesium bromide

19. An element X has valency 3+
(i) Write the formula of its phosphide.
(ii) Write the formula of its carbonate.

20. An element Z forms the following compound when it reacts with hydrogen, chlorine, oxygen, and phosphorus. What will be the valency of Z?
ZH_3, ZCl_3, Z_2O_3, ZP

IV-CASE STUDY BASED QUESTIONS

21. Atoms and molecules are the building blocks of matter. An atom is the smallest unit of an element that retains its chemical properties, while a molecule is a group of two or more atoms held together by chemical bonds. Atoms consist of a positively charged nucleus, which contains protons and neutrons, surrounded by negatively charged electrons in energy levels or shells. The number of protons in an atom determines its atomic number and defines its unique identity as an element. The electrons in an atom occupy specific energy levels, and the outermost shell is known as the valence shell. Atoms gain, lose, or share electrons to achieve a stable electron configuration, forming chemical bonds and giving rise to molecules. Understanding the concept of atoms and molecules is crucial for comprehending various chemical reactions and the composition of substances.

(a)What is the smallest unit of an element that retains its chemical properties?
a) Proton
b) Electron
c) Nucleus
d) Atom

(b)What is a group of two or more atoms held together by chemical bonds called?
a) Element
b) Compound
c) Molecule
d) Nucleus

(c)What are the positively charged particles present in the nucleus of an atom called?
a) Electrons
b) Protons
c) Neutrons
d) Valence electrons

(d)What do atoms do to achieve a stable electron configuration?
a) Gain, lose, or share electrons
b) Absorb protons
c) Increase their atomic number
d) Create chemical bonds

V-LONG ANSWER TYPE QUESTIONS (5M)

22.(i) Give an example of a triatomic molecule of an element.
(ii)Define atomicity.

23.(i) Name the elements present in the following

(a) Calcium oxide (b) Water (c) Carbon monoxide

(ii)Give one word for the following.

a) A group of atoms carrying a charge

b) Sum of atomic masses of all atoms in a molecule.

24. Write the molecular formulae of all the compounds that the combination of the following ions can form.

$Cu^{2+,}$ Na^{+}, $Fe^{3+,}$ Cl^{-}, SO_4^{2-}

25. Give the chemical formulae for the following compounds.

Ammonia

Carbon monoxide

Hydrogen chloride

Aluminum fluoride

Magnesium sulphide

ANSWERS

1	(a)Oxygen (O_2)
2	(a) 3
3	(d) 3
4	(c) X_2Y
5	(a)Antoine Lavoisier
6	(d) Au
7	(ii) Both A and R are true, and R is not the correct explanation of the Assertion
8	(iii)A is true, but R is false.
9	(ii) Both A and R are true, and R is not the correct explanation of the Assertion.
10	(iv)A is false and R is true.
11	In a chlorine atom, the number of electrons is equal to the number of protons, hence it is neutral. In a chloride ion, one electron is gained in the valence shell to attain the octet, so the protons are 17, but the number of electrons is 18,hence it carries a charge of -1 and thus is negatively charged.
12	(a) $Ca(OH)_2$ (b) HCl (c) K_2SO4 (d) MgO (e) NH_4Cl (f) Na_2CO_3
13	(i) K – Kalium (ii) Au- Aurum Quick lime- CaO
14	When an atom loses an electron, it forms a cation. It is positively charged. Eg : Na^{+}, K^{+}…etc When an atom gains an electron, it forms an anion. It is negatively charged. Eg : Cl^{-},O^{2} etc..
15	(a) Hydrogen and bromine (b) Sodium, hydrogen, carbon, oxygen (c) Potassium, Sulphur, oxygen

16	(a) Copper bromide (b) Aluminum nitrate (c)Calcium phosphate (d)Mercury chloride
17	(a)Atomic mass unit: It is defined as $1/12^{th}$ of the mass of 1 atom of carbon-12. (b)Molecular mass: the total mass of one molecule, calculated by summing the average atomic masses of all the atoms in its chemical formula (c)Element C will form an anion.
18	(i)Ammonium carbonate: ions present are $NH4^{+}$ and CO_3^{2-} (a) CuCl (b) $MgBr_2$
19	(i) XP (ii) $X_2(CO_3)_3$
20	Valency will be 3. (Explain the method followed in each case)
21	a) Atom. b) Molecule. c) Protons. d) Gain, lose, or share electrons
22	(i)Ozone (O_3) (ii)Atomicity: It is the total number of atoms present in the molecule.
23	(i)(a) Calcium oxide – calcium, oxygen (b) Water – hydrogen, oxygen (c) Carbon monoxide – Carbon, oxygen (ii) a) Polyatomic ion b) Molecular mass
24	$CuSO_4$, $CuCl_2$, NaCl , Na_2SO4, $FeSO_4$, $FeCl_2$
25	Ammonia -NH_3 Hydrogen chloride – HCl Aluminium fluoride – AlF_3 Magnesium sulphide – Mg_2S

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