
	INDIAN SCHOOL AL WADI AL KABIR	
Class: IX	Department: SCIENCE 2022 – 23 SUBJECT - CHEMISTRY	Date of completion: 05-02-23
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

- The chemical symbol for nitrogen gas is:
(a) Ni (b) N₂ (c) N⁺ (d) N
- 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.
- Choose the odd molecule
(a) Argon molecule (b) Chlorine molecule (c) Oxygen molecule (d) Fluorine molecule
- How many atoms are present in one molecule of ozone?
(a) 3 (b) 4 (c) 2 (d) 1
- In water, the proportion of oxygen and hydrogen by mass is:
(a) 1:4 (b) 1:8 (c) 4:1 (d) 8:1
- Identify the correct symbol of Sodium:
a) S b) Na c) So d) N

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: Isotopes are atoms of the same element with same atomic number but different mass numbers.
Reason: Isotopes differ in their number of protons.
8. Assertion: Ozone is triatomic molecule.
Reason: Ozone has three molecules of oxygen in it.
9. Assertion: The atomic mass of an element is same as mass of the ion of the element.
Reason: Atomic mass does not depend on number of electrons in an 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. What is a molecule?
12. Give two examples for cations.
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 N₂

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) How do you differentiate between a molecule of an element and a molecule of a compound? Write one example of each.
(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) Fe³⁺ and SO₄²⁻ (ii) NH₄⁺ and CO₃²⁻

THREE MARK QUESTIONS

20. (a) Define atomic mass unit.
(b) Define molecular mass
(c) Give an example of diatomic and triatomic molecule of compounds.
21. Classify the following compounds as diatomic, triatomic and polyatomic molecules.
HCl, H₂, H₂O, NH₃
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 sulphur?
23. (i) Write the name of the compound (NH₄)₂SO₄ 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 $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
[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) HNO_3 (ii) CH_3COOH
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. Atoms of most elements are not able to exist independently. Atoms of same elements or different elements combine to form molecules and ions. (atoms exist as molecules or ions) Atoms of the same element or of different elements can join together to form molecules. The molecules of an element are constituted by the same type of atoms. Atoms of different elements join together in definite proportions to form molecules of compounds.
- (i) What is the ratio between masses of carbon and oxygen in CO_2 ?
(a) 12:32
(b) 12:16
(c) 24:16
(d) 24:32
- (ii) Which of the following statements is not true about an atom.
(a) Atoms are not able to exist independently.
(b) Atoms are the basic unit from which molecules and ions are formed.
(c) Atoms are always neutral in nature.
(d) Atoms aggregate in large numbers to form the matter that we can see, feel or touch.
- (iii) 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 gram of hydrogen gas?
(a) 23g

- (b) 12g
(c) 24g
(d) 16g
- (iv) Select the atom which forms triatomic molecule.
(a) Hydrogen
(b) Oxygen
(c) Chlorine
(d) Bromine

ANSWERS

OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

Qn.No.	Answers
1	(b) N ₂
2	(d) One atom of carbon combines with one molecule of oxygen to form one molecule of carbon dioxide.
3	(a) Argon
4	(a) 3
5	(d) 8:1
6	(b) Na

ASSERTION-REASONING QUESTIONS

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

ONE MARK QUESTIONS

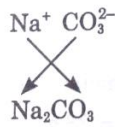
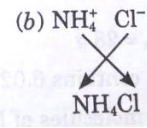
11	A molecule is the smallest particle of an element or a compound that is capable of an independent existence and shows all the properties of that substance.
12	Na ⁺ , Mg ²⁺
13	(a) Water-Hydrogen and oxygen (b) ammonia-Nitrogen and hydrogen (c) sulphur dioxide- sulphur and oxygen
14	(i) In a chemical 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	<p>(a) Mg^{2+} and OH^{-} combine to form $Mg(OH)_2$</p> <p>(b) H^{+} and S^{2-} combine to form H_2S</p> <p>(c) K^{+} and Cl^{-} combine to form KCl</p> <p>(d) Ca^{2+} and O^{2-} combine to form CaO</p> <p>(e) Ba^{2+} and Cl^{-} combine to form $BaCl_2$</p> <p>(f) Na^{+} and CO_3^{2-} combine to form Na_2CO_3</p>
18	(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 ₂ O- is a molecule of compound which contains 2 atoms of hydrogen and one atom of oxygen. (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) ₂ CO 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) (i) HCl is a diatomic molecule of compound. (ii) H ₂ O is a triatomic molecule of compound.
21	Diatomic- HCl, H ₂ Triatomic- H ₂ O Polyatomic- NH ₃
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) 8 Sulphur atoms.

23	(i) Ammonium sulphate. NH_4^+ and SO_4^{2-} ions. 2. (a) $\text{Na}^+ \text{CO}_3^{2-}$  (b) $\text{NH}_4^+ \text{Cl}^-$ 
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PREVIUOS YEAR BOARD QUESTIONS

24	Formula unit mass of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} = 1 \times 63.5 + 1 \times 32 + 4 \times 16 + 5[2 \times 1 + 1 \times 16]$ $= 63.5 + 32 + 64 + 90$ $= 249.5\text{u}$
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) HNO_3 $1 \times 1 + 1 \times 14 + 3 \times 16 = 63\text{u}$ (ii) CH_3COOH $1 \times 12 + 3 \times 1 + 1 \times 12 + 1 \times 16 + 1 \times 16 + 1 \times 1 = 60\text{u}$
27	ZnO $65 + 16 = 81\text{u}$ Na_2O $23 \times 2 + 16 = 62\text{u}$ K_2CO_3 $39 \times 2 + 12 \times 1 + 16 \times 3 = 138\text{u}$
28	Hydrogen-H Oxygen-O Aluminium-Al Magnesium-Mg Carbon-C

EXEMPLAR QUESTIONS

29	$\text{CuCl}_2, \text{CuSO}_4, \text{Cu}_3(\text{PO}_4)_2, \text{NaCl}, \text{Na}_2\text{SO}_4, \text{Na}_3\text{PO}_4, \text{FeCl}_3, \text{Fe}_2(\text{SO}_4)_3, \text{FePO}_4$		
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	<ul style="list-style-type: none">(i) (a) 12:32(ii) (a) Atoms are not able to exist independently.(iii) (c) 24g(iv) (b) Oxygen
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