

DR. M.K.K. ARYA MODEL SCHOOL

ASSIGNMENT

Atoms and molecules (class-IX)

Q1. Define atom.

Ans. Atom is the smallest unit of matter which can take part in a chemical reaction. for ex- hydrogen, iron etc.

Q2. Define molecule.

Ans. Molecule is made up of two or more atoms chemically combined to each other. for ex—H₂O, CO₂ etc.

Q3. Define atomicity.

Ans. The number of atoms present in one molecule of an element or compound is known as its atomicity.

Q4. Define atomic mass unit.

Ans. It is equal to 1/12th of mass of C-12 atom.

Q5. Why is it not possible to see an atom with naked eye?

Ans . Because the size of atom is too small. The atomic radii of an atom is of the order of 10⁻¹⁰metre.

Q6. How many atoms are present in (a) H₂S molecule (b) PO₄³⁻ ion

Ans. (a) 3 atoms are present

(b) 5 atoms are present

Q7. What is meant by avogadro's constant?

Ans. Avogadro's constant is equal to 6.022×10²³ particles

Q8. How many atoms are there in one gram of hydrogen?

Ans. 1 gram of hydrogen contains 6.022×10²³ atoms.

Q9. State law of conservation of mass.

Ans. It states that matter can never be created nor be destroyed in a chemical reaction.

Q10. Define law of constant proportions.

Ans. It states that in a pure chemical substance the elements are always combined in a fixed proportions by mass.

Q11. What are polyatomic ions? Give two examples

Ans. A group of atoms having a charge is known as polyatomic ion. Ex.- NH_4^+ , SO_4^{2-}

Q12. Calculate the molar mass of sulphuric acid.

Ans. Formula of sulphuric acid= H_2SO_4

Molar mass of $\text{H}_2\text{SO}_4 = 2 \times \text{mass of H} + 1 \times \text{mass of S} + 4 \times \text{mass of O}$

Molar mass of $\text{H}_2\text{SO}_4 = 2 \times 1 + 1 \times 32 + 4 \times 16$

Molar mass of $\text{H}_2\text{SO}_4 = 2 + 32 + 64$

Molar mass of $\text{H}_2\text{SO}_4 = 98 \text{g/mol}$

Q13. Give one example each of 1. Monovalent cation 2. Bivalent cation 3. Monovalent anion 4. Bivalent anion

Ans. 1. K^+ or Na^+

2. Mg^{2+} or Ca^{2+}

3. F^- or Cl^-

4. O^{2-} or S^{2-}

Q14. How many molecules are present in 1 ml of water?

Ans. we know that density of water is 1gm/ml.

Hence, 1 gm water will = 1 ml water.

Now, we have molecular mass of water $\text{H}_2\text{O} = 1 \times 2 + 16 = 18 \text{ gm}$

18 gm of water contain 6.022×10^{23} molecules

1 gm of water will contain = $(6.022 \times 10^{23})/18$ molecules = 0.33×10^{23} particles

So, the no. of molecules of water in 1ml of water = 3.3×10^{23} particles

Q 15. Calculate the molecular mass of glucose, $C_6H_{12}O_6$.

Ans molecular mass of $C_6H_{12}O_6 = (12 \times 6) + 12 + (16 \times 6)$
 $= 180u$.

Q16. H_2O is the formula for water. What information do you get from this formula?

Ans. H_2O represents water

- H_2O is a single molecule of water
- H_2O is a single mole of water. Thus, it contains 6.022×10^{23} molecules of water.
- H_2O contains 2 atoms of hydrogen and 1 atom of oxygen.
- H_2O has a molar mass of 18g

Q 17. What is the formula unit mass of $CaCl_2$ and $NaCl$.

(Na = 23, Cl=35.5, Ca=40)

Ans Formula Unit Mass of $NaCl = 23 + 35.5 = 58.5u$

Formula Unit Mass of $CaCl_2 = 40 + (2 \times 35.5) = 111u$.

Q18.(i) Name the body which approves the nomenclature of elements and compounds.

(ii) The symbol of sodium is written as Na and not as S. Give reason.

(iii) Name one element which form diatomic and one which form tetra atomic molecules.

Ans.(i) IUPAC (International Union of Pure and Applied Chemistry)

(ii) Latin name of sodium is Natrium. The first two letters (Na) of this name represents the symbol of sodium.

(iii) Oxygen forms diatomic molecules and phosphorus forms tetra atomic molecules.

Q19. What is meant by the term chemical formula ?

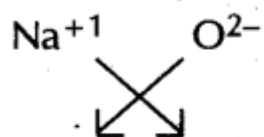
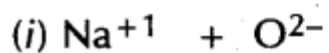
Ans. The chemical formula of a compound is a symbolic representation of its composition and actual number of atoms in one molecule of a pure substance, may be an atom or a compound.

Q20.. Write down the formula of

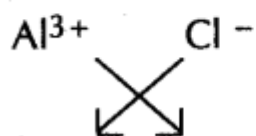
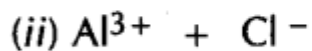
(i) Sodium oxide (ii) Aluminium chloride

(iii) Sodium sulphide (iv) Magnesium hydroxide

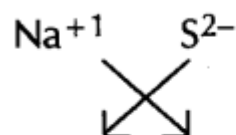
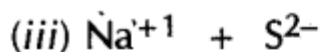
Answer.



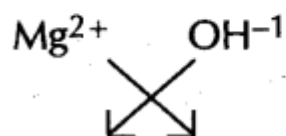
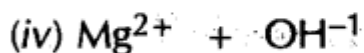
Na_2O (Sodium oxide)



AlCl_3 (Aluminium chloride)



Na_2S (Sodium sulphide)



$\text{Mg}(\text{OH})_2$ (Magnesium hydroxide)

Q21. Write the names of the following compounds:

(a). NiS (b). $\text{Mg}(\text{NO}_3)_2$ (c). Na_2SO_4 (d). $\text{Al}(\text{NO}_3)_3$ (e). K_3PO_4 (f). Ca_3N_2

Answer. (a) Nickel sulphide, (b) Magnesium nitrate,

(c) Sodium sulphate, (d) Aluminium nitrate,

(e) Potassium phosphate, (f) Calcium nitride

Q22. What is the difference between an atom and a molecule ?

Ans.

Atom	Molecule
<p>(i) Atom is the smallest particle of an element that takes part in a chemical reaction.</p> <p>(ii) An atom is usually not stable by itself.</p> <p>(iii) When similar atoms combine together in varying numbers, molecules of different properties can be formed e.g., O₂, O₃.</p>	<p>(i) Molecule is the smallest particle of an element or a compound that is capable of an independent existence.</p> <p>(ii) A molecule is usually stable by itself.</p> <p>(iii) When similar molecules combine together in any numbers, a simple similar product is formed.</p>