

Board – CBSE

Class – 9

Topic – Structure of Atoms

1. Define the term isobar with one example.
2. Valence of an element X is 3 while that of Y is 1. Write the formula of the compounds formed when each of them separately combines with oxygen.
3. If an atom of an element has atomic no.11 and mass no.23, find the no. of protons, electrons and neutrons.
4. Write the value of charge on electrons
5. Define mass number
6. State two main postulates of Thomson's model of atom
7. What were the limitations of Rutherford's model of an atom?
8. What is the number of valence electrons in
 - (a) Sodium (Na^+)
 - (b) Oxide ion (O^{-2})
9. Write difference between isotopes and isobars.
10. Given that natural sample of iron has an isotope ${}_{26}^{54}\text{Fe}$, ${}_{26}^{56}\text{Fe}$ and ${}_{26}^{57}\text{Fe}$ in the ratio of 5%, 90 % and 5% respectively. What will be the average atomic mass of iron (Fe)?
11. What is the nucleus of an atom?
12. (a) Both helium and beryllium have two electrons in the valence shells, Helium is a noble gas whereas Beryllium is a metal justify.
(b) Hydrogen exists in three isotopic forms. Why are the isotopes of hydrogen chemically?
13. An element is represented as ${}_{8}^{16}\text{X}$. Find
 - (a) The number of electrons in elements X
 - (b) Mass number of the element X
 - (c) The number of neutrons in element X
14. Given alongside is the atomic structure of an atom of element ${}_{11}^{23}\text{A}$. According to Bohr model of atom
 - (a) What is wrong with this structure of atom?
 - (b) Draw a correct representation of this atom.
 - (c) Write the chemical formula of the chloride of this elements.
15. The number composition of two atomic species X and Y is as follows.



- What are their
- Atomic numbers
 - Mass numbers?
 - What is the relation between these two atomic species? Name the element or elements which they represent.
- (a) Helium atom has an atomic mass of $4u$ and two protons in its nucleus. How many neutrons do it have?
(b) Write down the electronic configuration of oxygen.
(c) The atomic mass of an element X is $16.2u$. What are the percentages of isotopes of X having atomic numbers and mass number 16 and 18.
 - Explain the Rutherford model of atom and Bohr model of atom
 - Write the molecular formula of a diatomic gas and a triatomic gas.
 - Name the term used for the symbolic representation of a molecule of an element or a compound? Give an example of it.
 - In the reaction between copper sulphite and sodium sulphide solutions, when 15.9 g copper sulphate completely reacts with 7.8 g of sodium sulphide it is observed that 9.5 g of copper sulphide is formed. What is the mass of sodium sulphate solution formed?
 - Why, the symbol of gold is Au?
 - Calculate the formula unit mass of NaHCO_3 (At.mass of Na= $23u$, H= $1u$, C= $12u$, O= $16u$).
 - Define Avogadro's constant. Give its value.
 - What is the ratio between masses of carbon and oxygen in CO_2 ?
 - Define atomicity.
 - Nitrogen and hydrogen are present in ammonia in the ratio 14:3 by mass, what would be the mass of nitrogen if the actual mass of hydrogen is 9g .
 - Silver nitrate solution was mixed with 5g of sodium chloride solutions to verify law of conservation of mass. 8.1 gram of silver chloride was formed and sodium nitrate formed was equal to half of the amount of silver nitrate solution used. What is the amount of AgNO_3 used and NaNO_3 formed?
 - (i) Taking the example of water, explain the law of constant proportions.
(ii) Which postulate of Dalton's atomic theory explains this law?
 - What are polyatomic ions? Give any two examples.
 - Give the names of elements present in:-
(i) Phosphine (ii) Hydrogen bromide (iii) Quick lime (iv) Baking powder.
 - Write the formulae and names of compounds formed by combination of:

- i) Fe^{3+} and $(\text{SO}_4)^{2-}$ (ii) NH_4^+ and $(\text{CO}_3)^{2-}$
32. Using the valencies, write down the chemical formulae of the following compounds:
(i) Calcium nitrate (ii) Lead acetate (iii) Silica (iv) Baking soda
33. Write the chemical formulae of the following compounds.
(a) Magnesium chloride
(b) Calcium oxide
(c) Copper nitrate
(d) Aluminium chloride
34. Calculate the molar mass of the following substances
(a) Ethyne C_2H_2
(b) Sulphur molecule S_8
(c) Phosphorous molecule P_4
(d) Nitric acid HNO_3
(e) Hydrochloric acid HCl
35. What is the mass of
(a) 1 mole of nitrogen atoms
(b) 4 moles of aluminium atoms
(c) 10 moles of oxygen molecules
36. Convert into moles
(a) 12g of oxygen gas
(b) 20g of water
(c) 22g of carbon dioxide
37. Write the cation and anions in the following compounds
(a) CH_3COONa
(b) NaCl
(c) HNO_3
(d) MgCl_2
38. Verify by calculating that
(a) 5 moles of carbon dioxide and 5 moles of water do not have the same mass.
(b) 240g of calcium and 240g of magnesium elements have a mole ratio 3:5.
39. Compute the number of ions present in 5.85g of sodium chloride.
40. What are ionic and molecular compounds? Give examples.
41. Name the element which is used as the reference for atomic mass.
42. Write the formulae for the following and calculate the molecular mass for Caustic potash.

43. Atoms of most elements are not able to exist independently'. Name two atoms which exist as independent atoms.
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45. Write atomicity of the following: (i) Sulphur, (ii) Phosphorus
46. Distinguish between molecular mass and molar mass.
47. Give two drawbacks of Dalton's atomic theory.
48. How would you differentiate between a molecule of element and a molecule of compound? Write one example of each type.
49. Write the names of the following compounds:
- NiS
 - Ca_3Na_2
 - K_3PO_4
 - Na_3N
 - $\text{Mg}(\text{NO}_3)_2$
50. Calcium chloride when dissolved in water dissociates into its ions according to the following equation: $\text{CaCl}_2 (\text{aq}) \rightarrow \text{Ca}^{+2} (\text{aq}) + 2\text{Cl}^- (\text{aq})$ Calculate the number of ions obtained from CaCl_2 , when 222 g of it is dissolved in water.
51. Fill In The Blanks:-
- During a chemical reaction, the sum of the _____ of the reactants and products remain unchanged.
 - In a pure chemical compound, elements are always present in a _____ proportion by mass.
 - Clusters of atoms that act as an ion are called _____ ions.
 - The Avogadro constant _____ is defined as the number of atoms in exactly _____ of carbon-12
 - Mass of 1 mole of a substance is called its _____.
 - The abbreviation used for length names of elements are termed as their _____.
 - Those ions which are formed from single atoms are called _____.
 - Ionic compounds are formed by the combination between _____ an _____.
 - Mole is a link between the _____ and _____.
 - The SI unit of amount of a substance is _____