ATOMS AND MOLECULES

QUESTION BANK

1	Name two scientists who established the laws of chemical combination? Answer: Antoine L. Lavoiser and Joseph L. Proust.
2	Give an example of a triatomic molecule of an element. Answer: Ozone (O_3)
3	Define atomicity. Answer: It is the number of atoms present in one molecule of a substance.
4	Write the atomicity of the following molecules: (i) Sulphur (ii) Phosphorus Answer: (i) 8 (ii) 4
5	What is an ion?. Answer: The negatively and positively charged particles are called ions.
6	Give one word for the following: (i) A group of atoms carrying a charge (ii) Positively charged ion Answer: (i) Ion (ii) Cation
7	The atomic number of three elements A, B and C are 9, 10 and 13 respectively. Which of them will form a cation? Answer: Electronic configuration of A : 2, 7 Electronic configuration of B : 2, 8 Electronic configuration of C : 2, 8, 3 'C' will form a cation because a cation is formed by the loss of one or more electrons by an atom.
8	What is wrong in saying 'one mole of nitrogen'? Answer: The statement does not clarify whether we are talking about atoms or molecules of nitrogen. We should say 'one mole of nitrogen atoms' or 'one mole of nitrogen molecule'.
9	How many times heavier is one atom of carbon than one atom of oxygen? Answer: Atomic mass of carbon = 12 u Atomic mass of oxygen = 16 u

	Therefore, one atom of carbon is 12u16u=34 times heavier than one atom of oxygen.
10	Give an example to show law of conservation of mass applies to physical changes also. Answer: Law of conservation of mass states that mass can neither be created nor destroyed in a chemical reaction. However, this law applies to physical changes also. For example, when ice melts into water, the mass of ice equals to the mass of water, i.e., the mass is conserved. This verifies the law of conservation of mass.
11	Which of the following are tri-atomic and tetra-atomic molecules? CH3Cl, CaCl2, NH3, PCl3, P2O5, H2O, C2H5OH Answer: (i) Tri-atomic molecules are CaCl2, H2O. (ii) Tetra-atomic molecules are NH3, PCl3.
12	Differentiate between the actual mass of a molecule and gram molecular mass. Answer: Actual mass of a molecule is obtained by dividing the molar mass by Avogadro's number whereas gram molecular mass represents the molecular mass expressed in grams, i.e., it is the mass of 1 mole of molecules, i.e., Avogadro's number of molecules.
13	Calculate the formula mass of sodium carbonate (Na2CO3.10H2O). Answer: Formula mass of sodium carbonate = (2 × atomic mass of Na) + (1 × atomic mass of C) + (3 × atomic mass of O) + 10 [(2 × atomic mass of H) + (1 × atomic mass of O)] = 2 × 23 + 1 × 12 + 3 × 16 + 10 [(2 × 1) + (1 × 16)] = 46 + 12 + 48 + 180 = 286 u
14	Which of the following represents a correct chemical formula? Name it. (a) CaCl (b) BiPO4 (c) NaSO4 (d) NaS Answer: (b), BiPO4 represents the correct formulae of bismuth phosphate.
15	Atomicity of Chlorine and Argon is a. Diatomic and Monoatomic b. Monoatomic and Diatomic c. Monoatomic and Monoatomic d. Diatomic and Diatomic Ans: (a) Diatomic and Monoatomic
16	What is the molecular formula for Calcium Hydroxide? a. CaOH2 b. Ca(OH)2 c. Ca2OH d. CaH2 Ans: (b) Ca(OH)2

17	Neutron is a. Chargeless and Massless b. Chargeless and has Mass c. Has charge and Mass d. Has charge and Massless. Ans: (b) Chargeless and has Mass
18	The maximum number of electrons in L shell is a. 88 b. 1818 c. 2828 d. 3838 Ans: (a) 8
19	Define law of conservation of mass. Answer: In a chemical reaction mass can neither be created nor destroyed.
20	Explain law of constant proportion. Answer: In a chemical substance the elements are always present in definite proportions by mass.
21	Who coined the term atom? Answer: John Dalton coined the term atom.
22	Define atom. Answer: The smallest particle of matter, which can take part in a chemical reaction is called atom.
23	Define molecule. Answer: The smallest particle of an element or compound which can exist independently is called molecule.
24	Define atomicity. Answer: The number of atoms constituting a molecule is known as its atomicity.
25	What is atomic mass unit? Answer: The sum of the atomic masses of all the atoms in a molecule of the substance is expressed in atomic mass unit.
26	What is an ion? Answer: Charged atom is called as an ion. The ion can be positively charged called cation or negatively charged called anion. Give one example of cation and anion. Answer: Cation = Na^+ Anion = Cl^-
27	Give one difference between cation and anion. Answer: Cations are positively charged ion. Anions are negatively charged ion.
28	Define valency and give the valency for the following elements: Magnesium, Aluminium, Chlorine and Copper. Answer: Valency: The combining capacity of an element is called its valency. Valency of the following elements: Magnesium – 2

	Aluminium – 3 Chlorine – 1 Copper – 2
29	The formula of carbon-dioxide is CO_2. What information do you get from this formula? Answer: (i) CO_2 represents carbon-dioxide. (ii) CO_2 is one molecule of carbon-dioxide. (iii) CO_2 is one mole of carbon-dioxide i.e., it contains 6.022×1023 molecules of carbon dioxide. (iv) CO_2 contains 1 atom of carbon and two atoms of oxygen. (v) CO_2 represents 44 g of molar mass.
30	What is polyatomic ton? Give one example. Answer: A group of atoms carrying a charge is known as a polyatomic ion.