QB365
Important Questions - Atoms and Molecules
9th Standard CBSE

Science

Reg.No. :

Time : 01:00:00 Hrs

Total Marks : 50

Section-A

1) A mole does not signify

   (a) atomic mass unit   (b) 6.023×10^{23} ions   (c) 22.4 litres of a gas at STP   (d) gram molecular mass

   1

2) Which one of the following is not equal to gram molecular mass of hyderogen

   (a) 2 grams   (b) 6.022×10^{23} atoms of hydrogen   (c) 6.022×10^{23} molecules of hydrogen

   (d) 1 mole of hydrogen

   1

3) One atomic mass unit is equal to weight of

   (a) one atom of hydrogen   (b) $\frac{1}{16}$ th of oxygen atom   (c) $\frac{1}{12}$ th of natural carbon atom

   (d) $\frac{1}{12}$ of C-12 isotopes of carbon

   1

4) Molecules of the following element are made up of one atom of that element

   (a) Iron   (b) Sodium   (c) Helium   (d) Chlorine

   1

5) When 50 g of calcium carbonate is heated, 22g of CO_2 escapes out.What is the amount residue left?

   (a) Cannot be found   (b) More data is required   (c) 56 g   (d) 28 g

   1

6) Which of the following supports Dalton's atomic theory of matter?

   (a) Formation of isotopes   (b) Formation of isobars   (c) Law of definite proportions

   (d) Graphite and diamond though made from carbon, show different properties.

   1

7) Choose the correct statement

   (a) Two atoms of hydrogen combine with one atom of oxygen to give water molecule.

   (b) One atom of hydrogen combine with one atom of chlorine to from hydrogen chloride

   (c) One atom of nitrogen combine with 3 atoms of hydrogen to form 1 molecule of ammonia

   (d) One atom of carbon combines with one molecules of oxygen to form one molecule of carbon dioxide.

   1

8) Which one of the following compound is not made up of charged ions?

   (a) HCl   (b) NaCl   (c) $MgCl_2$ (d) CaO

   1

9) Which one of the following elements gives polyatomic molecules?

   (a) Ne   (b) P   (c) Ni   (d) Si

   1

10) Arrange the following compounds in the order of increasing number of molecules:

   2 g NH_3; 2 g H_2O; 2 g CO; 2 g HCl

   (a) CO<HCl<H_2O<NH_3 (b) HCl<CO<H_2O<NH_3 (c) NH_3<H_2O<CO<HCl   (d) NH_3<H_2O<CO<HCl

   1

Section-B

11) One mole of carbon atom weighs 12 g.Find the mass in grams of one atom of carbon (Given C = 12u, No=6.022 x 10²³ per mole) **2**

12) convert into mole 20 g of water (Atomic mass of hydrogen and oxygen are 1 and 16 respectively) **2**

13) Explain the law of multiple proportions. **2**

14) How will you explain the law of constant proportions on the basis of Dalton's atomic theory? **2**

15) In a reaction, 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid.The products were 2.2 g of carbon dioxide, 0.9 g water and 8.2 g sodium ethanoate.Show that these observations are in agreement with the law of conservation of mass. **2**

   sodium carbonate + ethanoic acid → sodium ethanoate + carbon dioxide + water

16) Hydrogen and oxygen combine in the ratio 0f 1 : 8 by mass to form water.What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas? **2**

17) Which postulate of Dalton's atomic theory is the result of the law of conservation of mass? **2**

18) Which postulate of Dalton's atomic theory can explain the law of definite proportions? **2**

19) What is an atom? **2**

20) In what form atoms of solid exists? **2**

Section-C

21) what is the present accepted or IUPAC (International Union Pure and Applied Chemistry) system of symbols of elements? **5**

22) With the help of an example, state the significance of a symbol of an element. **5**

23) The chemical symbol of sodium is NA.What is its significance? **5**

24) Define the atomic mass unit. **5**

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Section-A

1) (a) atomic mass unit **1**

2) (b) 6.022 x 10²³ atoms of hydrogen **1**

3) (d) $\frac{1}{12}$ of C-12 isotopes of carbon **1**

4) (c) Helium **1**

5) (d) 28 g **1**

6) (c) Law of definite proportions **1**

7) (d) One atom of carbon combines with one molecules of oxygen to form one molecule of carbon dioxide. **1**

8) (a) HCl **1**

9) (b) P **1**

10) (b) $HCl < CO < H_2O < NH_3$ **1**

Section-B

11) 1 Mole of Carbon atom = 6.022 x 10^{23} atoms   **2**

   6.022 x 10^{23} atoms of carbon weigh = 12 g

   1 atom of carbon weighs = $\dfrac{12}{6.022 \times 10^{23}}$

   　　　　　　　 = 1.99 x 10^{-23}

12) (i) Molecular mass of water (H_2O)   **2**

   　　　 =lx2+16=18u

   ∴ Number of moles in 20 g of water= $\dfrac{20}{18}$

13)   **2**

   According to law of multiple proportions, which two elements combine to form two or more compounds, then the weights of one of these elements which combine with a fixed weight of the other element, bear a simple ratio to one another.For example, hydrogen and oxygen combine to form water and hydrogen grams of oxygen while in hydrogen peroxide, 2 grams of hydrogen combine with 32 grams of oxygen.Now the weights of oxygen which combine with a fixed weight of hydrogen in water and hydrogen peroxide respectively are 16 and 32 grams which are in simple ratio of 16 : 32 or 1 : 2.

14)   **2**

   According to dalton's atomic theory, each element consists of atoms which are similar have same weights.Further atoms of one element combine with atoms of another element to form compounds.Let us suppose that x atoms of element A combine with y atoms of element B and the compound formed is AxBy.If 'a' stands for the atomic mass of A and 'b' for that of b. then

   Percentage of A in the compound= $\dfrac{ax \times 100}{ax+by}$

   Percentage of B in the compound= $\dfrac{by \times 100}{ax+by}$

   Now a and b are fixed x and y are also fixed whole numbers according to atomic theory.Therefore. percentage of A and B in the compound is also constant.This shows that the composition of various elements in a compound is also fixed.This is the law of constant proportion.

15)   **2**

   Mass of reactants = Mass of sodium carbonate + Mass of ethanoic acid

   =5.3 + 6.0 = 11.3 g

   Mass of products = Mass of carbon dioxide + Mass of water + Mass of sodium ethanoate

   = 2.2 + 0.9 + 8.2 = 11,3 g

   It is seen the mass of products is equal to mass of reactants.Thus mass is neither created nor lost during the given chemical change or the observation made is in agreement with law of conservation mass.

16)   **2**

   Sine hydrogen and oxygen combine in the ratio of 1 : 8 by mass, it means that for x g of hydrogen, 8 X x of oxygen will be required to form water.

   Oxygen required to react with 3 g hydrogen to form water = 3 X 8 = 24 g

17) "Atoms are indivisible particles, which cannot be created nor destroyed in a chemical reaction"   **2**

18) "The relative number and kinds of atoms are constant in a given compound"   **2**

19)
2

An atom is a building block of an element.It is very very small, so small that millions of atoms when stacked would hardly make a layer as thick as thin sheet of paper.The radius of an atom of hydrogen is 10^{-10} m or 10^{-1} nm, one molecule of water is 1 nm.Compared to it grain of sand is 10^{-4} m.

20)
2

A solid elements is a cluster of atoms.The properties of an element in the solid is not of single atom of that element but due to cluster of atoms.For example, diamond and graphite through both are composed of carbon atoms but due to different arrangements of carbon atoms in these, they differ in their physical and chemical properties.

Section-C

21)
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Many of the symbols are the first one or two letters of the elements name in English.The first letter of a symbol is always writeen as a capital letter (upper case) and the Second letter as a small letter.For example, hydrogen is written as H and Aluminium is written as Al.
Some symbols are formed from the first letter of the name and a letter, appearing later in the mane.Examples; Chlorine, Cl and Zinc, Zn

22) The symbol of oxygen is 'O'.As an example, let us give the significance of the symbol 'O'
5
   (i) 'O' represents oxygen element.
   (ii) 'O' represents one attom of oxygen element.
   (iii) 'O' represents 16 atomic mass unit.

23)
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We know that the symbol of an element represents one atom of that element. Nowadays the first letter or first two letters of the name in English.Latin or German is used as a symbol.It means that Latin name of sodium starts with 'N'

24) One atomic mass unit is a mass unit (u) which is equal to $\frac{1}{12}$ th of the mass of an atom of carbon-12.
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