QB365 Question Bank Software Study Materials

Atoms and Molecules Important 2 Marks Questions With Answers (Book Back and Creative)

10th Standard

Science Reg.No. : | | | | | | |

Total Marks : 60

2 Marks

30 x 2 = 60

1) Define: Relative atomic mass.

Answer : (i) Relative atomic mass of an element is the ratio between the average mass of its isotopes to $\frac{1}{12^{th}}$ part of the mass of a carbon-12 atom.

(ii) It is denoted as A_r.

(iii) It is otherwise called "Standard atomic weight".

2) Write the different types of isotopes of oxygen and its percentage abundance.

Answer : lsotopes of oxygen and its percentage abundance

ISOTOPE	% ABUNDANCE
$_8O^{16}$	99.757 %
$_8O^{17}$	0.038 %
$_8O^{18}$	0.205 %

3) Define: Atomicity

Answer : The total number of atoms present in the molecule is called its atomicity.

$$\text{Atomicity} = \frac{\text{Molecular mass}}{\text{Atomic mass}}$$

4) Give any two examples for heterodiatomic molecules.

Answer : Hydrogen chloride (HCl), Hydrogen iodide (HI) are two examples for heterodiatomic molecules.

5) What is Molar volume of a gas?

Answer : (i) One mole (6.023×10^{23} of entities) of any gas occupies 22.4 litre or 22400 ml at S.T.P.

(ii) This volume is called as molar volume of gas.

6) Find the percentage of nitrogen in ammonia.

Answer : Molar mass of ammonia (NH_3) = 14 + 3

= 17

Mass percentage of Nitrogen = $\frac{Mass\ of\ nitrogen\ in\ ammonia}{Molar\ mass\ of\ the\ ammonia}$ x 100

= $\frac{14}{17}$ x 100 = $\frac{1400}{17}$ = 82.35 %

The Mass percentage of nitrogen in ammonia is 82.35%

7) Measurement of atomic mass of an element is very difficult? Give reason.

Answer : (i) Measurement of atomic mass of an element is somewhat more complicated since most of the elements exist as a mixture of isotopes, each of which has its own mass.

(ii) Thus, it is essential to consider this isotopic mixture while calculating atomic mass of an element.

8) Relative atomic mass has no unit. Explain.

Answer : Relative atomic mass is the ratio between the of average mass of its isotopes to $\frac{1}{12^{th}}$ part of mass of Carbon - 12 atom.

Relative Atomic Mass (A_r)

= $\frac{Average\ mass\ of\ isotopes\ of\ the\ element}{\frac{1}{12^{th}} mass\ of\ one\ Carbon-12 atom}$

Since RAM is a ratio, it has no unit.

9) What is a homo atomic molecule? Give two examples.

Answer : If the molecule is made of similar kind of atoms, then it is called homoatomic molecule.

Examples: N_2, O_2

10) What is a hetero atomic molecule? Give two examples

Answer : The molecules that consists of atoms of different elements are called heteroatomic molecule.

Examples: HCl, H_2O

11) Pick out the heteronuclear polyatomic molecules among the following and classify them based on their atomicity.

$C_6H_{12}O_6$, Cl_2, NH_3, HCl, N_2CO, O_3, NH_4Cl, $CaCO_3$, O_2, SO_2

Answer :

Heteronuclear	Diatomic HCl CO	Triatomic SO_2	Polyatomic NH_4Cl $CaCO_3$ $C_6H_{12}O_6$ NH_3

12) How many grams are there in

(i) 3 moles of HCl

(ii) 2 moles of H_2O

(iii) 4 moles of Glucose

Answer : (i) 3 moles of HCl

No of moles = $\frac{Mass}{MolarMass}$

Molar Mass of HCl = 1 + 35.5 = 36.5

Mass = No of moles x molar mass

= 3 x 36.5 = 109.5 g

(ii) 2 moles of H_2O

No of moles = $\frac{Mass}{MolarMass}$

Mass = No of moles x Molar Mass

Molar mass of H_2O = (2 x 1) + 16 = 18

Mass = 2 x 18 = 36 g

(iii) 4 moles of glucose

Glucose = $C_6H_{12}O_6$

No of moles = $\frac{Mass}{MolarMass}$

Mass = No of moles x Molar Mass

Molar mass of glucose $C_6H_{12}O_6$

= (12 x 6) + (1 x 12) + (16 x 6) = 180

Mass = 4 x 180 = 720 g

13) How will you deduced atomicity of Homoatomic molecule?

Answer : For any homo atomic molecule atomicity and be deduced using the formula.

Atomicity = $\frac{Molecular\ mass}{Atomic\ mass}$

14) Define mole.

Answer : Mole is defined as the amount of substance that contains as many specified elementary entities as the number of atoms in 12g of carbon 12 isotope. one mole is also defined as the amount of substance which contains. Avogadro number (6.023×10^{23}) of particles.

15) Oxygen is the most abundant element in both the Earth's crust and the human body. It exists as a mixture of three stable isotopes in nature as shown in Table :

Answer :

ISOTOPE	MASS (AMU)	% ABUNDANCE
$_8O^{16}$	15.9949	99.757 %
$_8O^{17}$	16.999	0.038 %
$_8O^{18}$	17.9992	0.205 %

The atomic mass of
oxygen = (15.9949 × 0.99757) + (16.9991 × 0.00038) + (17.9992 × 0.00205)
= 15.999 amu.

16) Define Mass number.

Answer : The sum of the number of protons and neutrons of an atom is called its mass number.

17) Define RAM.

Answer : Relative atomic mass of an element is the ratio between the average mass of its isotopes to 1/12th part of the mass of a Carbon-12 atom. It is denoted as A. It is otherwise called as Standard Atomic Weight.

$$AR = \frac{Average\ mass\ of\ the\ Isotopes\ of\ the\ element}{1/12th\ of\ the\ mass\ of\ one\ carbon\ atom}$$

18) Calculate the abundance of C-12 and C-13 are 98.90% and 1.10% respectively.

Answer : Average atomic mass of Carbon $= 12 \times \left(\frac{98.9}{100}\right) + 13 \times \left(\frac{1.1}{100}\right)$
=12 x 0.989 + 13 x 0.011
=11.868 + 0.143
=12.011 amu.

19) Differentiate Homo and Hetero atomic molecule.

Answer :

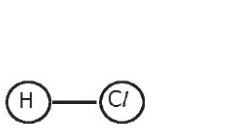
S.No.	Homo Atomic	Hetero Atomic
i)	The molecule is made of similar kind of atoms, then it is called Homo atomic molecule.	The molecule that consist of atoms of different elements is called Hetero atomic molecule.
ii)	eg: H_2 ,Cl_2, N_2	eg: NH_3, HCl

20) Define homotriatomic molecule. Give an example.

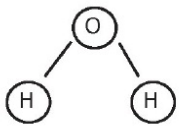
Answer : Ozone contains three oxygen atoms and hence it is called homo triatomic molecule. Eg. O_3

21) Draw the structure of HCl and H_2O.

Answer :



HCl (Hydrogen Chloride)



Water (H_2O)

22) Define Relative Molecular Mass.

Answer : The Relative Molecular Mass of a molecule is the ratio between the mass of one molecule of the substance to 1/12th mass of an atom of Carbon-12.

23) Define Mole of molecules.

Answer : One mole of matter contains 6.023 x 10^{23}. molecules and its equal to its gram molecular mass. Eg: One mole of oxygen contains 6.023 x 10^{23} molecules of oxygen and its gram molecular mass is 32g.

24) Calculate the number of moles by different modes.

Answer : Number of moles = Mass / Atomic mass.
= Mass / Molecular mass.
= Number of atoms / 6.023 x 10^{23}.
= Number of molecules / 6.023 x 10^{23}.

25) Define Percent composition.

Answer : The percentage composition of the compound represents the mass of each element present is 100g of the compound.

26) State Avogadro's law.

Answer : " Equal volumes of all gases under similar conditions of temperature and pressure contain equal number of molecules."

27) Calculate the gram molar mass of CH_3COOH.

Answer : The atomic mass of C-12, H-1, 0-16

Gram molar mass of CH_3COOH = C x 1 + H x 3 + C x 1 + O x 2+ H x 1

= 12 x 1 + 1 x 3 +12 x 1 + 16 x 2 + 1 x 1

= 12 + 3 + 12 + 32 + 1

Gram molar mass = 60 g

Gram molar mass of CH_3COOH is 60 g.

28) Under same conditions of temperature and pressure if you collect 3 litre of O_2, 5 litre of Cl_2 and 6 litre of H_2,

i) Which has the highest number of molecules?

ii) Which has the lowest number of molecules?

Answer : Under same conditions of temperature and pressure all atoms and molecules have same number of molecules in 1 litre,so

i) 6 litres of H_2 has the highest number of molecules.

ii) 3 litres of O_2 has the lowest number of molecules.

29) Mention any two applications of Avogadro's Law.

Answer : (i) Avogadro's law explains Gay - lussac's law.

(ii) It helps in the determination of atomicity of gases.

30) Define Average atomic mass.

Answer : The average atomic mass of an element is the average weight of the masses of its naturally occurring isotopes.