CBSE Class 11 Chemistry

Important Questions

Chapter 1

Some Basic Concepts of Chemistry

1 Marks Questions

1.What is chemistry?

Ans: Chemistry is the branch of science that studies the composition, properties and interaction of matter.

2.How has chemistry contributed towards nation's development?

Ans: chemical principles are important in diverse areas such as weather patterns, functioning of brain, operation of a computer, chemical industries, manufacturing , fertilizers, alkalis, acids, salts, dyes, polymers, drugs, soaps, detergents, metals, alloys, contribute in a big way to national economy.

3.Differentiate solids, liquids & gases in terms of volume & shapes.

Ans:

Property	**Solids**	**Liquids**	**Gases**
1. Volume	Definite	Definite	**Not definite**
2. Shape	**Fixed**	**Not fixed, take the shape of container,**	**Not fixed, takes the shape of the container**

4.Name the different methods that can be used for separation of components of a mixture. .

Ans: The components of a mixture can be separated by physical methods like handpicking, filtrations, crystallization, distillation etc.

5.Classify following as pure substances and mixtures – Air, glucose, gold, odium and milk.

Ans:

Pure Substances	Mixtures
Glucose	Air
Gold	Milk
Sodium	

6.What is the difference between molecules and compounds? Give examples of each.

Ans: Molecules consist of different atoms or same atoms. e.g. molecule of hydrogen contains two atoms of hydrogen where as molecule of water contain two atoms of hydrogen and one of oxygen.

Compound is formed when two or more than two different atoms combine in fire propo e.g. water –rtion carbondioxide, sugar etc.

7. How can we separate the components of a compound?

Ans: The constituents of a compound can not be separated by physical methods. They can only be separate by chemical methods.

8.How are physical properties different from chemical properties?

Ans: Physical properties are those properties which can be measured or observed without changing the identity or the composition of the substance whereas the measurement of chemical properties require a chemical change to occur e.g. colour, odour etc are physical properties and combustion, basicity etc are chemical properties.

9.What are the two different system of measurement?

Ans: The different system of measurement are English system and the metric system.

10.What is the SI unit of density?

Ans: The SI Unit of density is Kg m^{-3} or kg/m^3

11.What are the reference points in thermometer with Celsius scale?

Ans: The thermometers with Celsius scale are calibrated form 0^o to 100^o where there two temperatures are the freezing and boiling of water.

12.What is the SI unit of volume? What is the other common unit which in not an SI unit of volume.

Ans: The SI unit of volume is m^3 whereas litre (L) is the common unit which is not an SI unit.

13.What is the difference between precision and accuracy?

Ans: Precision means the closeness of various measurements for the same quantity. Accuracy is the agreement of a particular value to the true value of the result.

14.What do you understand by significant figures?

Ans: Significant figures are meaningful digits which are known with certainty. The uncertainty in experimental or the calculated value is indicated by mentioning the number of significant figures.

15.State law of definite proportions.

Ans: Law of definite proportions states that a given compound always contains exactly the same proportion of elements by weight.

16.State Avogadro's law.

Ans: According to Avogadro's law, equal volumes of gases at the same temperature and pressure should contain equal number of molecules.

17.Define one atomic mass unit (amu).

Ans: One atomic mass unit (amu) is defined as a mass exactly equal to one – twelfth the mass of one carbon – 12 atom.

18.What is formula mass?

Ans: When a substance does not contain discrete molecules as their constituent units and have a three dimensional structure, formula mass is used to calculate molecular mass which is sum of all the atomic masses of atom present in the formula.

19.What is the value of one mole?

Ans:1mole = 6.022×10^{23} atoms/ ions / entities

20.At NTP, what will be the volume of molecules of 6.022×10^{23} H_2?

Ans: 22.4 Litres.

21.Calculate the number of molecules present in 0.5 moles of CO_2?

Ans: The number of molecules present in 0.5 moles of $C0_2$ is

$6.022 \times 10^{23} \times 0.5 = 3.011 \times 10^{23}$.

22. 1L of a gas at STP weighs 1.97g. What is molecular mass?

Ans: 22.4 L of the gas at STP will weigh

$= 1.97 \times 22.4 = 44.1g$

i.e. molecular mass = 44.1

23.What is stoichiometry?

Ans: Stoichimetry deals with the calculations of masses of reactants and products involved in a chemical reactions.

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24. The substance which gets used up in any reaction is called ----------

Ans: The substance that gets used up in any reaction is called limiting reagent.

25.What is 1molal solution?

Ans: one molal solution is solution in which one mole of solute is present in 1000g of solvent.

CBSE Class 12 Chemistry

Important Questions

Chapter 1

Some Basic Concepts of Chemistry

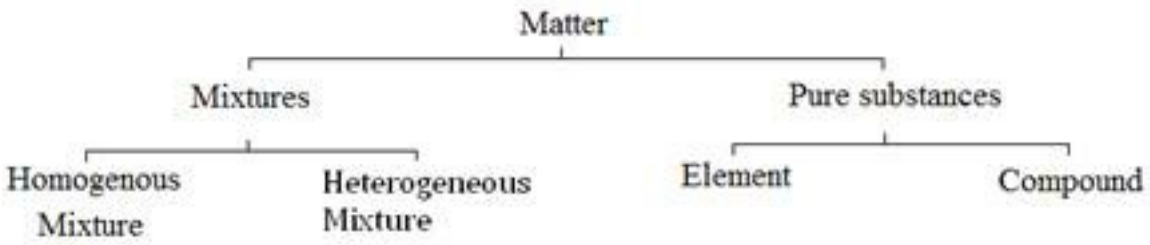
2 Marks Questions

1.How can we say that sugar is solid and water is liquid?

Ans: Sugar has close packing of constituent particles, have its own volume and shape therefore, it can be said to be solid whereas in water the constituent particles are not as closely packed as in solid. It has definite volume but not definite shape. Therefore it is a liquid.

2.How is matter classified at macroscopic level?

Ans: Macroscopic classification of matter –



3.Classify following substances as element, compounds and mixtures – water, tea, silver, steel, carbondioxide and platinum

Ans:

Compounds	Elements	Mixtures
Water	Silver	Tea
Carbondioxide	Platinum	Steel

4.Write seven fundamental quantities & their units.

Ans:

Physical Quantity	SI unit
1. Length (l)	Metre (m)
2. Mass (m)	Kilogram (kg)
3. Time (t)	Second (s)
4. Electric Current (I)	Ampere (A)
5. Thermodynamic Temperature (T)	Kelvin (K)
6. Amount of substance (n)	Mole (mol)
7. Luminous Intensity (I)	Candela (Cd)

5.What is the difference between mass & weight? How is mass measured in laboratory?

Ans: Mass of a substance is the amount of matter present in it while weight is the force exerted by gravity on an object the mass of a substance is determined with the help of an analytical balance in laboratory.

6.How is volume measured in laboratory? Convent 0.5L into ml and $30cm^3$ to dm^3

Ans: In the laboratory volume of a liquid can be measured by using graduated cylinder, burette, pipette etc.

1L = 1000 ml

1000cm3 = $1dm^3$

0.5L = 500 ml

$30cm^3 = \frac{1}{100\cancel{0}} \times 3\cancel{0} dm^3$

= $0.03dm^3$

7.Convert 35^0C to ^oF & K.

Ans.^oF

$$^\circ F = \frac{9}{5}(^\circ C) + 32$$

$$^\circ F = \frac{9}{5}(35) + 32$$

$$= 63 + 32 = 95^\circ F$$

K

$$K = ^\circ C + 273.15$$

$$= 35 + 273.15$$

$$= 308.15K$$

8.What does the following prefixes stand for –

(a) pico

(b) nano

(c) centi

(d) deci

Ans: Pico = 10^{-12}

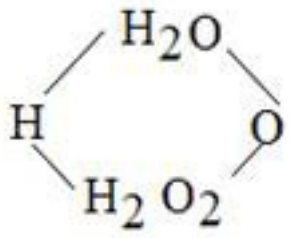
nano = 10^{-9}

centi = 10^{-2}

deci = 10^{-1}

9.Explain law of multiple proportions with an example.

Ans: The law of multiple proportions rays that if two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of other element are in a ratio of small whole numbers. e.g. hydrogen and oxygen can combine to form water as well as hydrogen peroxide.



Here, the masses of oxygen (16g & 32g) which combine with a fixed mass of hydrogen (2g) bear a simple ratio i.e., 16:32 = 1:2.

10.Write Postulates of Dalton's atomic theory.

Ans. Postulates of Dalton's atomic theory –

1. Matter consists of indivisible atoms.

2. All the atoms of a given element have identical properties including atomic mass. Atoms of different element differ in mass.

3. Compounds are formed when atoms of different elements combine in a fixed ratio.

4. Chemical reaction involves reorganization of atoms. These are neither created nor destroyed

11.Calculate molecular mass of –

C_2H_6, $C_{12}H_{22}O_{11}$, H_2SO_4, H_3PO_4

Ans: $C_2H_6 = (2\times12) + (6\times1) = 30$

$C_{12}H_{22}O_{11} = (12\times12) + (22\times1) + (11\times16) = 342$

$H_2SO_4 = (2\times1) + 32 + (4\times16) = 98$

$H_3PO_4 = (1\times3) + 31 + (4\times16) = 98$

12. Give one example each of a molecule in which empirical formula and molecular formula are (i) same (ii) Different.

Ans:(i) Same molecular formula and empirical formula. Carbon dioxide, both is CO_2.

(ii) When molecular formula and empirical formula are different –

Hydrogen peroxide: molecular formula is H_2O_2 and empirical formula is HO

13.Calculate the number of moles in the following masses –

(i) 7.85g of Fe

(ii) 7.9mg of Ca

Ans. (i) 7.85g of Fe

56g of Fe contains 6.022×10^{23} atoms = 1mole

56g of Fe = 1mole

7.85g of Fe = $\frac{1}{56}\times7.85$ = 0.14moles

(ii)40g of Ca = 40×10^3 mg of Ca

40g of Ca = 1mole

Or 4×10^4 mg of Ca = 1mole

7.9mg of Ca = $\frac{7.9}{4\times10^{4}}$

$=1.97\times10^{-4}moles$

14.How much potassium chlorate should be heated to produce 2.24L of oxygen at NTP?

Ans: $2KClO_3$ à $2KCl + 3O_2$

2moles 3moles

$2(39 + 35.5 + 3 \times 16)$ $22.4 \times 3L$

= 245g = 67.2L

67.2L of oxygen is produced from 245g of $KClO_3$

2.24L of oxygen is produced from = $\frac{245}{67.2}\times2.24$

= 8.17g of $KClO_3$

15.Write an expression for molarity and molality of a solution.

Ans: $\text{Molarity} = \frac{\text{number of moles of solute}}{\text{Volume of solution in Litres}}$

$\text{Molality} = \frac{\text{number of moles of solute}}{\text{Mass of solvent in kg}}$

16.Calculate the weight of lime (CaO) obtained by heating 2000kg of 95% pure lime stone ($CaCO_3$)

Ans:100kg impure sample has pure $CaCO_3$ = 95

= 95kg

$\therefore$200kg impure sample has pure $CaCO_3$ = $\frac{95 \times 200}{100}$

= 190kg

$CaCO_3$ à CaO + CO_2

Since 100kg $CaCO_3$ gives CaO = 56kg

190kg $CaCO_3$ will give CaO = $\frac{56 \times 190}{100}$

= 106.4kg

17. 4 litres of water are added to 2L of 6 molar HCl solutions.What is the molarity of resulting solution?

Ans. Initial volume, V_1 = 2L

Final volume, V_2 = 4L + 2L = 6L

Initial molarity, M_1 = 6M

Final molarity = M_2

$M_1V_1 = M_2V_2$

$$6M \times 2L = M_2 \times 6L$$

$$M_2 = \frac{6M \times 2L}{6L} = 2M$$

Thus the resulting solution is 2M HCl.

18.What volume of 10M HCl and 3M HCl should be mixed to obtain 1L of 6M HCl solution?

Ans: Let the required volume of 10M HCl be V liters.

Then, the required volume of 3M HCl be (1 – V) Liters.

$M_1V_1 + M_2V_2 = M_3V_3$

$$10 \times V + 3 \times (1 - V) = 6 \times 1$$

$$10V + 3 - 3V = 6$$

$$7V = 3$$

$$V = \frac{3}{7} = 0.428L = 428mL.$$

Then the volume of 10M HCl required = 428mL

& volume of 3M HCl required = 1000mL – 428mL = 572mL

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3 Marks Questions

1.How many significant figures are present in

(a) 4.01 $\times 10^2$

(b) 8.256

(c) 100

Ans:(a) 4.01 $\times 10^2$ – Three

(b) 8.256 – Four

(c) 100 – One

2.Vitamin C is essential for the prevention of scurvy. Combustion of 0.2000g of vitamin C gives 0.2998g of CO_2 and 0.819g of H_2O. What is the empirical formula of vitamin C?

Ans: Percentage of carbon = $\frac{12}{44} \times 0.02998 \times \frac{100}{0.2} = 47.69$

Percentage of Hydrogen $= \frac{2}{18} \times 0.0819 \times \frac{100}{0.2} = 4.55$

Percentage of oxygen $= 100 - (47.69 + 4.55) = 47.76$

Element	**%**	**Atomic Mass**	**Relative no. of atoms**	**Simplest Ratio**
C	47.69	12	$\frac{47.69}{12} = 3.97$	$\frac{3.97}{2.98} = 1.33$

H	4.55	1	$\frac{4.55}{1}=4.55$	$\frac{4.55}{2.98}=1.5$
O	47.76	16	$\frac{47.76}{15}=2.98$	$\frac{2.98}{2.98}=1$

Empirical formula = $C_{1.33}\,H_{1.5}\,O$,

= $C_8H_9O_6$