

# TNTET STUDY MATERIALS

## X – STD CHEMISTRY

### SOLUTION

1. The process of food assimilation by man is in the form of solution.
2. Blood and lymph are in the form of solution.
3. A solution is a homogeneous mixture of two (or) more substances.
4. All solutions exist in homogeneous form.
5. **Homogeneous** - state in which two (or) more substances are uniformly present in given mixture.
6. If a solution contains two components, then it is called as a **Binary Solution**.
7. Example for binary solution - Salt solution.
8. In a solution, the component present in lesser amount by weight is called **solute** and the other in a larger amount by weight is called **solvent**.
9. A solvent is a dissolving medium.
10. **Solute + Solvent → Solution.**
11. Based on the particle size of the solute, the solutions are divided into three types – true solution, colloidal solution and Suspension.
12. **True solution** is a homogeneous mixture with small solute particles dissolved in the solvent eg. Sugar in water.
13. **Colloidal solution** is a heterogeneous mixture made up dispersed phase and dispersion medium.
14. In a colloidal solution, the substance distributed as particles is called **dispersed phase**.
15. In a colloidal solution, the continuous phase in which the colloidal particles are dispersed is called **dispersion medium**.
16. **Suspension** is a heterogeneous mixture of small insoluble particles in a solvent.
17. In a suspension, the particles of solid stay in clusters that is large enough to be seen (e.g. Chalk powder in water).
18. **In a true Solution** the particles are of  $1\text{Å}$  to  $10\text{Å}$ , transparent, not visible even under ultra microscope, homogeneous, diffuse rapidly, and do not scatter light .

19. **In a Colloidal Solution** the particles are of  $10 \text{ \AA}$  to  $2000 \text{ \AA}$ , translucent, visible under ultra Microscope, heterogeneous, diffuse slowly, and scatter light.
20. **In a Suspension**, the particles are more than  $2000 \text{ \AA}$ , opaque in nature, visible to the naked eye, heterogeneous, don't diffuse, and do not scatter light.
21. Based on the type of solvent solutions are classified in to aqueous solution and non -aqueous solution.
22. The solution in which water acts as a solvent is called **aqueous solution**. For e.g., sugar solution.
23. The solution in which any liquid other than water acts as a solvent is called **nonaqueous solution**. e.g., Sulphur in carbon disulphide. (Benzene, ether,  $\text{CS}_2$ , are some of the examples for non aqueous solvents.)
24. Based on the amount of solute in the given amount of solvent, solutions are classified into Unsaturated solution, Saturated solution and Super saturated solution.
25. A solution in which the solute is in lesser amount in comparison with the solvent is called unsaturated solution.
26. In unsaturated solution, addition of solute is possible till the solution reaches the point of saturation. e.g., 5g or 10g or 20g of NaCl in 100g water.
27. A solution in which no more solute can be dissolved in a definite amount of solvent at a given temperature is called a saturated solution e.g., A saturated solution of  $\text{CO}_2$  in  $\text{H}_2\text{O}$ .
28. 36g of NaCl in 100g of water at room temperature forms saturated solution.
29. A solution which has more of solute at a given temperature than that of saturated solution is called **super saturated solution**.
30. Solubility of a solute is defined as the number of grams of solute necessary to saturate 100g of the solvent.
31. Solubility of  $\text{CuSO}_4$  in  $\text{H}_2\text{O}$  is 20.7g at  $20^\circ\text{C}$ .
32. **Factors affecting solubility** – Temperature, Nature of solute (or) solvent and Pressure.
33. In endothermic process, solubility increases with increase in temperature.
34. In exothermic process, solubility decreases with increase in temperature.
35. A polar compound dissolves in a polar solvent. E.g., Common salt dissolves in water.
36. A polar compound is less soluble (or) insoluble in a non polar solvent.
37. An increase in pressure increases the solubility of a gas in a liquid.

## ATOMS AND MOLECULES

1. The word atom is derived from the Greek word "Atomos" which means indivisible.
2. John Dalton modeled atoms as hard indivisible spheres.
3. Atom is considered to be a divisible particle.
4. Atoms of the same element may not be similar in all respects. eg: Isotopes
5. Atoms of different elements may be similar in some respects eg. Isobars
6. Atom is the smallest particle which takes part in chemical reactions.
7. The ratio of atoms in a molecule may be fixed and integral but may not be simple  
e.g.,  $C_{12}H_{22}O_{11}$  is not a simple ratio (Sucrose).
8. Atoms of one element can be changed into atoms of other element by transmutation.
9. The mass of an atom can be converted into energy. This is in accordance with  
Einstein's equation  $E = mc^2$ .
10. Amedeo Avogadro put forward hypothesis and is based on the relation between number of  
molecules and volume of gases.
11. Avogadro's Law: Equal volumes of all gases under the same conditions of temperature  
and pressure contain the equal number of molecules.
12. Avogadro's law plays an important role in (a) deducing atomicity of gases and (b)  
establishing the relation between vapour density and molecular mass.
13. The number of atoms present in one molecule of an element is called the atomicity of an  
element.
14. Depending upon the number of atoms in one molecule of an element, molecules are classified  
into monoatomic, diatomic, triatomic, and poly atomic molecules.
15. Avogadro's law enables us to changeover directly from a statement about volume of gases to a  
statement about molecules of gases and vice-versa.
16. Nitrogen and oxygen are called diatomic molecules and are written as  $N_2$  and  $O_2$ .
17. Atomicity of nitrogen is 2 and the atomicity of oxygen is 2.
18. Relative Molecular Mass is defined as the ratio of the mass of 1 molecule of the gas or  
vapour to the mass of 1 atom of hydrogen.
19. Vapour Density (V.D) is defined as the ratio of the mass of a certain volume of the gas or  
vapour to the mass of the same volume of hydrogen at the same temperature and pressure.
20. Avogadro's law is used to determine the atomicity of gases.
21. Avogadro's law is helpful in determining the molecular formula of gaseous compound.



47. Relative atomic mass of an element is the ratio of mass of one atom of element to the  $\frac{1}{12}$  th part of mass of one atom of carbon.
48. Relative atomic mass is a pure ratio and has no unit.
49. If the atomic mass of an element is expressed in grams, it is known as gram atomic mass.
50. Gram atomic mass of hydrogen = 1g.
51. Gram atomic mass of carbon = 12g.
52. Gram atomic mass of nitrogen = 14g.
53. Gram atomic mass of oxygen = 16g.
54. Gram atomic mass of sodium = 23g.
55. Atomic mass is expressed in atomic mass unit (amu).
56. One atomic mass unit is defined as 1/12th part of the mass of one atom of carbon.
57. The relative molecular mass of an element or a compound is the ratio of mass of one molecule of the element or a compound to the mass of one atom of hydrogen.
58. The relative molecular mass of an element or a compound is the ratio of mass of one molecule of the element or a compound to the mass of 1/12th part of mass of one atom of carbon.
59. Relative molecular mass is a pure ratio and has no unit.
60. If the molecular mass of a given substance is expressed in gram, it is known as gram molecular mass of that substance.
61. Molecular mass is the sum of atomic masses.
62. Number of atoms or molecules or ions present in one mole of a substance is called Avogadro number. Its value is  $6.023 \times 10^{23}$ .
63. Mole is defined as the amount of substance that contains as many specified elementary particles as the number of atoms in 12g of carbon-12 isotope.
64. One mole is defined as the amount of substance which contains Avogadro number ( $6.023 \times 10^{23}$ ) of particles.
65. One mole of any substance contains Avogadro number of particles.
66. One mole of oxygen atoms represents  $6.023 \times 10^{23}$  atoms of oxygen.

### **CHEMICAL REACTION**

1. Physical changes can be easily reversed
2. Chemical changes are more permanent than physical changes.
3. All chemical changes are accompanied by chemical reactions.

- ★ 4. Silver anklet has got tarnished, due to the formation of silver sulphide ( $\text{Ag}_2\text{S}$ ), as a result of the reaction between silver and hydrogen sulphide in the air.
- ★ 5. Calcium oxide reacts with water to produce slaked lime (calcium hydroxide).
- ★ 6. Formation of slaked lime is an exothermic, accompanied by hissing sound and bubbles.
- ★ 7. The brisk effervescence is due to the evolution of carbon dioxide gas.
- ★ 8. The substances taking part in the reaction are known as reactants and those formed as a result of the reaction are called products.
- ★ 9. The chemical formula for marble is also  $\text{CaCO}_3$ .
- ★ 10. Chemical reactions are classified into six categories - combination reaction, decomposition reaction, displacement reaction, double decomposition reaction / double displacement reaction, Oxidation and reduction
- ★ 11. A combines with B to form a new product AB. (combination reaction).
- ★ 12. Magnesium combines with oxygen to form a single product, magnesium oxide. Such a reaction in which a single product formed from two or more reactants is known as combination reaction.  $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ .
- ★ 13. Combustion of coal and Combustion of hydrogen are examples of combination reaction.
- ★ 14. AB splits into A and B (decomposition reaction). E.g., Decomposition of lime stone, decomposition of ammonium dichromate, chemical volcano.
- ★ 15. In the reaction between A and BC, A displaces B from BC to form AC(displacement reaction).
- ★ 16. Lead can displace copper from its salt solutions.
- ★ 17. Copper can't displace zinc or lead from their salt solutions, because copper is less reactive than zinc and lead.
- ★ 18. The reaction in which, a more reactive element displaces a less reactive element from its compound is called displacement reaction.
- ★ 19. Double decomposition reaction / double displacement reaction - In the reaction between AB and CD, both the reactants decompose to form AD and CB through the rearrangement of ions.
- ★ 20. Double decomposition reaction is any reaction in which exchange of ions between two reactants occurs, leading to the formation of two different products.
- ★ 21. Oxidation and reduction Fading of the colours of the clothes, burning of substances like cooking gas, wood and coal, and also rusting of iron articles – due to oxidation , reduction reaction (redox reaction).

22. A large number of industrial processes like electroplating, extraction of metals like Aluminium, are based upon the redox reaction.
23. Oxidation is a chemical reaction which involves addition of oxygen or removal of hydrogen or loss of electron(s).
24. Reduction is a chemical reaction which involves addition of hydrogen or removal of oxygen or gain of electron(s).
25. Redox reaction is a chemical reaction in which oxidation and reduction take place simultaneously.
26. Loss of electron is oxidation (LEO). Gain of electron is reduction (GER).
27. Oxidation is Gain of oxygen / Loss of hydrogen / Loss of electron(s).
28. Reduction is Loss of oxygen / Gain of hydrogen / Gain of electron(s).
29. One of the most common changes during chemical reactions is a change in temperature.
30. Oxidation also has damaging effects on food and eatables.
31. The chemical reactions which proceed with the evolution of heat energy are called exothermic reactions. Eg.,  $N_2 + 3H_2 \rightarrow 2NH_3 + \text{Heat}$
32. All combustion reactions are exothermic.
33. The chemical reactions which proceed with the absorption of heat energy are called endothermic reactions. Eg.,  $2NH_3 + \text{Heat} \rightarrow N_2 + 3H_2$
34. Rate of the chemical reaction is defined as change in concentration of any one of the reactants or products per unit time.
35. Rate of the reaction is given by  $\frac{d[A]}{d[B]}$
36. The greater the surface area, greater is the rate of the reaction.
37. Acid is a substance which furnishes  $H^+$  ions or  $H_3O^+$  ions when dissolved in water.
38. Acids have one or more replaceable hydrogen atoms.
39. The word acid is derived from the Latin name 'acidus' which means sour taste.
40. Substances with 'sour taste' are acids.
41. Lemon juice, vinegar and grape juice have sour taste, so they are acidic.
42. Acids change blue litmus to red.
43. A substance which alters the rate of the reaction without undergoing any change in mass and composition is known as catalyst.
44. Acids are colorless with phenolphthalein and pink with methyl orange.



- agriculture.
71. Hydrochloric acid is used as cleansing agent in toilet.
72. Tartaric acid is a constituent of baking powder.
73. Salt of benzoic acid (sodium benzoate) is used in food preservation.
74. Carbonic acid is used in aerated drinks.
75. An acid produces hydrogen ions in water.
76. Hydrogen ions exist in the form of hydronium ( $\text{H}_3\text{O}^+$ ) ions with water.
77. The atmosphere of Venus is made up of thick white and yellowish clouds of sulphuric acid.
78. The term acidity means the number replaceable hydroxyl groups present in one molecule of a base.
79. Base is a substance which releases hydroxide ions when dissolved in water.
80. Base is bitter in taste and soapy to touch (e.g. Washing soda, caustic soda and causticpotash).
81. Bases change red litmus to blue. They are pink with phenolphthalein and yellow with methyl orange.
82. Based on ionization, bases are classified in to strong bases and weak bases. Strong bases ionize completely in aqueous solution eg.  $\text{NaOH}$ ,  $\text{KOH}$ .
83. Weak bases ionize partially in aqueous solution eg.  $\text{NH}_4\text{OH}$ ,  $\text{Ca}(\text{OH})_2$ .
84. Based on their acidity, bases are classified in to monoacidic, diacidic and triacidic bases.
85. Monoacidic base is a base which ionizes in water to give one hydroxide ion per molecule eg.  $\text{NaOH}$ ,  $\text{KOH}$ .
86. Diacidic base is a base which ionizes in water to give two hydroxide ions per molecule eg.  $\text{Ca}(\text{OH})_2$ ,  $\text{Mg}(\text{OH})_2$ .
87. Triacidic base is a base which ionises in water to give three hydroxide ions per molecule eg.  $\text{Al}(\text{OH})_3$ ,  $\text{Fe}(\text{OH})_3$ .
88. Based on the concentration, bases are classified in to Concentrated and dilute alkali.
89. Concentrated alkali is an alkali having a relatively high percentage of alkali in its aqueous solution.
90. Dilute alkali is an alkali having a relatively low percentage of alkali in its aqueous solution.
91. Bases generate hydroxide ( $\text{OH}^-$ ) ions when dissolved in water.
92. Bases which dissolve in water are called alkalis. All alkalis are bases, but not all bases are alkalies.



123. A normal salt is obtained by complete neutralization of an acid by a base.  
e.g.,  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
124. Acid salts are derived by the partial replacement of hydrogen ions of an acid by a metal.
125. Basic salts are formed by the partial replacement of hydroxide ions of a diacidic or triacidic base by an acid radical.
126. A basic salt may react with an acid to give a normal salt.
127. Double salts are formed by the combination of saturated solution of two simple salts in equimolar ratio followed by crystallization. e.g., potash alum.
128. Common salt ( $\text{NaCl}$ ) It is used in our daily food and as preservative.
129. Washing soda ( $\text{Na}_2\text{CO}_3$ ) is used in softening hard water, as a cleaning agent.
130. Baking soda ( $\text{NaHCO}_3$ ) is used in making baking powder.
131. Baking powder is the mixture of baking soda and tartaric acid.
132. Baking powder is used to make cake and bread soft and spongy .
133. Baking soda is an ingredient in antacid.
134. Bleaching powder ( $\text{CaOCl}_2$ ) is used for disinfecting drinking water to make it free from microorganisms.
135. Bleaching powder is used for bleaching cotton and linen in the textile industry.
136. Plaster of paris ( $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ ) is used for plastering fractured bones and in making casts for statues.

### PERIODIC CLASSIFICATION OF ELEMENTS

- As on date one hundred and eighteen elements are known.
- Real credit for preparing the periodic table goes to Mendeleev.
- Moseley suggested that atomic number (Z) should be the basis of the classification of the element.
- Moseley gave modern periodic law.
- Modern periodic law states that “the physical and chemical properties of elements are the periodic function of their atomic numbers.”
- The modern periodic table commonly is based upon the electronic configuration of elements.
- The modern periodic table has also been divided into four blocks known as s, p, d and f blocks.
- In the periodic table, horizontal rows are called periods and vertical columns are called groups.
- There are seven horizontal rows in the periodic table.

- ★ 10. First period (Atomic number 1 and 2) is the shortest period and contains only two elements (hydrogen and helium).
- ★ 11. Second period (Atomic number 3 to 10) is a short period with eight elements (lithium to neon).
- ★ 12. Third period (Atomic number 11 to 18) is also a short period and has eight elements (sodium to argon).
- ★ 13. Fourth period (Atomic number 19 to 36) is a long period and contains eighteen elements (potassium to krypton).
- ★ 14. Fifth period (Atomic number 37 to 54) is also a long period and has 18 elements (rubidium to xenon). This includes 8 normal elements and 10 transition elements.
- ★ 15. IV & V periods include 8 normal elements and 10 transition elements.
- ★ 16. Sixth period (Atomic number 55 to 86) is the longest period and has 32 elements (caesium to radon).
- ★ 17. VI period includes 8 normal elements, 10 transition elements and 14 inner transition elements (lanthanides).
- ★ 18. Seventh period (Atomic number 87 to 118) also has 32 elements.
- ★ 19. Only 26 elements have been authenticated by IUPAC.
- ★ 20. Vertical columns in the periodic table starting from top to bottom are called groups.
- ★ 21. There are 18 groups in the periodic table.
- ★ 22. First group elements are called alkali metals.
- ★ 23. Second group elements are called alkaline earth metals.
- ★ 24. Groups' three to twelve are called transition elements.
- ★ 25. Group 1, 2 and 13 - 18 are called normal elements or main group elements or representative elements.
- ★ 26. Group 16 elements are called chalcogen family (except polonium).
- ★ 27. Group 17 elements are called halogen family.
- ★ 28. Group 18 elements are called noble gases or inert gases.
- ★ 29. The lanthanides and actinides which form part of the group 3 are called inner transition elements.
- ★ 30. Atomic size of the elements in a period decreases from left to the right.
- ★ 31. In a period, the metallic character of the element decreases while their non-metallic character increases.
- ★ 32. The elements present in 2 and 18 groups differ in atomic number by 8, 8, 18, 18, 32.



- as metallurgy.
58. The rocky impurity, associated with the ore is called gangue or matrix.
59. Flux is a compound added to the ore to remove its impurities by fusion. e.g., CaO
60. Slag is the fusible product formed when flux reacts with gangue during the extraction of metals. Flux + Gangue → Slag
61. Smelting is the process of reducing the roasted oxide to metals in the molten condition.
62. Nearly 80 metallic elements are obtained from mineral deposits on or beneath the surface of the earth.
63. Metals which have low chemical reactivity are found in Free State, or in native state.
64. Gold, silver and platinum are examples of metals that are partly found in a free state.
65. Symbol for aluminium is Al
66. Colour of aluminium is Silvery white.
67. Atomic number of aluminium is 13.
68. Electronic configuration of aluminium is 2, 8, 3.
69. Valency of aluminium is 3.
70. Atomic mass of aluminium is 27.
71. Position in the periodic table of aluminium is period=3, group=13 (III A).
72. Aluminium is the most abundant metal in the earth's crust.
73. Aluminium is a reactive metal and occurs in the combined state.
74. The important ores of aluminium - Bauxite  $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ , Cryolite  $\text{Na}_3\text{AlF}_6$ , Corundum  $\text{Al}_2\text{O}_3$ .
75. The chief ore of aluminium is bauxite ( $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ ).
76. Extraction of aluminium from bauxite involves two stages.
77. Bauxite is converted into Alumina by Baeyer's Process.
78. In the Electrolytic reduction of Alumina by Hall's process, Aluminium is produced.
79. Aluminium has low density, malleable and ductile, good conductor of heat and electricity.
80. Melting point of aluminium is  $660^\circ\text{C}$
81. When steam is passed over red hot aluminium, hydrogen is produced.
82. Aluminium reacts with strong caustic alkalis forming aluminates.
83. with dilute and con. HCl aluminium liberates  $\text{H}_2$  gas.
84. Aluminium liberates hydrogen on reaction with dilute sulphuric acid.
85. Sulphur dioxide is liberated with hot concentrated sulphuric acid.
86. Aluminium is a powerful reducing agent.





with high concentration is solvent and the metal with low concentration is solute. For example, brass is an alloy of zinc (solute) in copper (solvent).

- ★ 141. An alloy is produced by fusing the metals together or by compressing finely divided metals one over the other.
- ★ 142. An amalgam is an alloy of mercury with metals such as sodium, gold, silver, etc.,
- ★ 143. Corrosion is defined as the slow and steady destruction of a metal by the environment.
- ★ 144. Corrosion is a simple electro chemical reaction.
- ★ 145. Alloys of copper - Brass (Cu,Zn), Bronze(Cu,Sn,Zn).
- ★ 146. Alloys of aluminium - Duralumin (Al,Mg,Mn,Cu), Magnalium(Al,Mg).
- ★ 147. Iron Alloys - Stainless steel (Fe,C,Ni,Cr), Nickel steel (Fe,C,Ni).
- ★ 148. Corrosion of metals is prevented by not allowing them to come in contact with moisture,CO<sub>2</sub> and O<sub>2</sub>.
- ★ 149. Paint coated metal surfaces keep out air and moisture.
- ★ 150. Application of oil and grease on the surface of iron tools prevents them from moisture and air.
- ★ 151. Alloyed metal is more resistant to corrosion. Example: stainless steel.
- ★ 152. Galvanization is a process of coating zinc on iron sheets by using electric current. In this zinc forms a protective layer of zinc carbonate on the surface of iron.
- ★ 153. Electroplating is a method of coating one metal with another by passing electric current. Example: silver plating, nickel plating.
- ★ 154. Magnesium coated on the steel articles it sacrifices itself to protect the steel.

### CARBON AND ITS COMPOUNDS

- ★ 1. The electronic configuration of carbon is K=2, L=4.
- ★ 2. Carbon has four electrons in the valence shell and belongs to group IV A (group 14) of the periodic table.
- ★ 3. Carbon is a non metal. In nature, it occurs in its pure form as **diamond and graphite**.
- ★ 4. When fuels burn, the carbon in them reacts with oxygen to form carbon dioxide.
- ★ 5. Carbon compounds hold the key to plant and animal life on earth.
- ★ 6. Carbon chemistry is called **Living Chemistry**.
- ★ 7. Carbon circulates through air, plants, animals and soil by means of complex reactions. This is called **carbon cycle**.
- ★ 8. Compounds of carbon are classified into two types - Inorganic compounds (obtained from non

- living matter) Organic compounds (obtained from living matter).
- ★9. Carbon atoms form the building blocks for living organisms.
  - ★10. The term organic chemistry was used by the Swedish chemist Berzelius.
  - ★11. The German chemist Wohler succeeded in creating an organic compound (urea) from an inorganic compound (ammonium cyanate) in his laboratory.
  - ★12. The atomic number of carbon is 6 and its ground state electronic configuration is  $1s^2 2s^2 2p^2$ .
  - ★13. Since it has four electrons in its outermost shell, its valency is four.
  - ★14. To achieve noble gas configuration, carbon atom has to lose or gain four electrons to form  $C^{4+}$  and  $C^{4-}$  ions.
  - ★15. Carbon shares its valence electrons with other atoms, this characteristic is referred as tetra valency of carbon.
  - ★16. A molecule of methane ( $CH_4$ ) is formed when four electrons of carbon are shared with four hydrogen atoms.
  - ★17. The most precious diamond is a crystalline allotrope of carbon.
  - ★18. Organic chemistry is defined as the branch of chemistry that deals with organic compounds which is made up of the hydrocarbons and their derivatives.
  - ★19. Allotropy is defined as the property by which an element can exist in more than one form that are physically different but chemically similar.
  - ★20. Carbon exists in three allotropic forms - crystalline form (diamond and graphite), amorphous form (coke, charcoal) and fullerene.
  - ★21. In diamond each carbon atom is bonded to four other carbon atoms forming a rigid three dimensional structure.
  - ★22. In graphite each carbon atom is bonded to three other carbon atoms in the same plane giving hexagonal layers held together by weak Vander Waals forces accounting for softness.
  - ★23. Graphite is a good conductor of electricity unlike other non-metals since it has free electrons in it.
  - ★24. Fullerenes are also carbon allotropes. The first one was identified to contain 60 carbon atoms in the shape of a football. ( $C_{60}$ ). Since this looks like the geodesic dome designed by the US architect Buckminster Fuller, it is named as Buckminster Fullerene.
  - ★25. Carbon has the ability to form covalent bonds with other atoms of carbon giving rise to large number of molecules through self linking property. This property is called catenation.
  - ★26. Carbon compounds show isomerism.





- CHO is the functional group).
73. The IUPAC name of aldehyde is derived by replacing - e, in the word alkane, by the suffix -al. Hence we get the name “alkanal”.
74. Ketones are carbon compounds containing carbonyl - CO - group attached to two alkyl groups.
75. The general formula of ketone is R-CO-R' where R and R' are alkyl groups and - CO - is the functional group.
76. The IUPAC name of ketone is derived by replacing -e, in the word alkane, by the suffix - one. Hence we get the name “alkanone”.
77. Carboxylic acids are carbon compounds containing –COOH group attached to a hydrogen atom or alkyl group.
78. The general formula of acid is R-COOH where ‘R’ is a hydrogen atom or alkyl group and –COOH is the functional group.
79. The IUPAC name of acid is derived by replacing - e, in the word alkane, by the suffix - oic acid. Hence we get the name “alkanoic acid”.
80. Ethanol (C<sub>2</sub>H<sub>5</sub>OH) ethyl alcohol or alcohol is one of the most important members of the family of alcohols.
81. Ethanol is a clear liquid with burning taste.
82. Ethanol's boiling point is 351K.
83. Ethanol is completely miscible with water in all proportions.
84. Ethanol, when heated with excess conc. H<sub>2</sub>SO<sub>4</sub> at 443 K undergoes intra molecular dehydration.
85. Ethanol reacts with sodium metal to form sodium ethoxide and hydrogen gas.
86. Ethanol is oxidized to ethanoic acid with alkaline KMnO<sub>4</sub> or acidified.
87. The slow chemical change taking place in an organic compound by the action of enzymes leading to the formation of smaller molecules is called fermentation.
88. When the vapour of ethanol is passed over reduced copper catalyst at 573 K, it is dehydrogenated to acetaldehyde.
89. Ethanol is used as an anti-freeze in automobile radiators.
90. Ethanol is used as a preservative for biological specimen.
91. Ethanol is used as an antiseptic to sterilize wounds in hospitals.
92. Ethanol is used as a solvent for drugs, oils, fats, perfumes, dyes, etc.

93. Ethanol is used in the preparation of methylated spirit (95% ethanol + 5% methanol), rectified spirit (95.5% ethanol+ 4.5% of water), power alcohol (petrol + ethanol) and denatured sprit (ethanol + pyridine).
94. Ethanol is used in cough and digestive syrups.
95. If ethanol is consumed, it tends to slow down metabolism of our body and depresses the central nervous system.
96. Ethanol causes mental depression and emotional disorder.
97. Ethanol affects our health by causing ulcer, high blood pressure, cancer, brain and liver damage.
98. Ethanol reacts with ethanoic acid in the presence of conc.  $H_2SO_4$  (catalyst) to form ethyl ethanoate and water.
99. The compound formed by the reaction of an alcohol with carboxylic acid is known as ester (fruity smelling compound) and the reaction is called esterification.
100. Intake of methanol in very small quantities can cause death.
101. Methanol is oxidized to methanal (formaldehyde) in the liver.
102. Methanol also affects the optic nerve, causing blindness.
103. Ethanoic acid ( $CH_3COOH$ ) - is most commonly known as acetic acid and belongs to a group of acids called carboxylic acids.
104. Acetic acid is present in many fruits and sour taste of fruits is because of this acid.
105. Ethanol on oxidation in the presence of alkaline potassium permanganate or acidified potassium dichromate gives ethanoic acid.
106. Ethanoic acid is a colourless liquid and has a sour taste.
107. Ethanoic acid is miscible with water in all proportions.
108. The boiling point of Ethanoic acid is (391K).
109. On cooling, pure ethanoic acid is frozen to form ice like flakes. They look like glaciers, so it is called glacial acetic acid.
110. Ethanoic acid is a weak acid but it turns blue litmus to red.
111. Ethanoic acid reacts with metals like Na, K, Zn, etc to form metal ethanoate and hydrogen gas.
112. Ethanoic acid reacts with carbonates and bicarbonates and produces brisk effervescence due to the evolution of carbon dioxide.
113. Ethanoic acid reacts with sodium hydroxide to form sodium ethanoate and water.

- ★ 114. When sodium salt of ethanoic acid is heated with soda lime methane gas is formed.
- ★ 115. Ethanoic acid is used in making vinegar which is used as a preservative in food and fruit juices.
- ★ 116. Ethanoic acid is used as a laboratory reagent.
- ★ 117. Ethanoic acid is used for coagulating rubber from latex.
- ★ 118. Ethanoic acid is used in the preparation of dyes, perfumes and medicine.

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