

# Sample Question Paper-1

(Specimen Paper issued by CISCE dated 12<sup>th</sup> July 2022)

## CHEMISTRY (Science Paper-2)

Class-10<sup>th</sup>

**SOLVED**

Time allowed: 2 hours

MM: 80

Answers to this Paper must be written on the paper provided separately.

You will **not** be allowed to write during the first 15 minutes.

This time is to be spent in reading the Question Paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Section A is compulsory. Attempt **any four** questions from Section B.

The intended marks for questions or parts of questions are given in brackets [ ].

### Section-A

(Attempt **all** questions from this Section)

#### Question 1

Choose one correct answer to the questions from the given options:

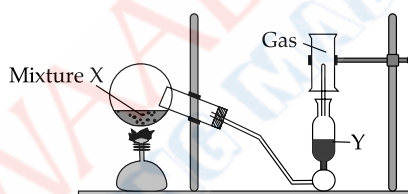
[15]

- (i) A weak electrolyte is:  
(a) Alcohol (b) Potassium hydroxide  
(c) Ammonium hydroxide (d) Glucose
- (ii) Electron affinity is maximum in:  
(a) Alkaline earth metals (b) Halogens  
(c) Inert gases (d) Alkali metals
- (iii) The main components of bronze are:  
(a) Copper and tin (b) Copper and iron  
(c) Copper and lead (d) Copper and zinc
- (iv) A polar covalent compound is:  
(a) Methane (b) Ammonia  
(c) Nitrogen (d) Chlorine
- (v) An acid which has two replaceable hydrogen ions:  
(a) Acetic acid (b) Hydrochloric acid  
(c) Phosphoric acid (d) Carbonic acid
- (vi) The hydroxide which is soluble in excess of NaOH is:  
(a) Ferric hydroxide (b) Lead hydroxide  
(c) Copper hydroxide (d) Calcium hydroxide
- (vii) If the RMM of carbon dioxide is 44, then its vapour density is:  
(a) 22 (b) 32  
(c) 44 (d) 88
- (viii) Drying agent used to dry Hydrogen chloride gas:  
(a) Concentrated Sulphuric acid (b) Calcium oxide  
(c) Sulphurous acid (d) Calcium hydroxide

- (ix) The catalyst used in the Haber's Process is:  
 (a) Molybdenum (b) Platinum  
 (c) Nickel (d) Finely divided Iron
- (x) An aqueous compound which turns colourless phenolphthalein to pink:  
 (a) Ammonium hydroxide (b) Nitric acid  
 (c) Anhydrous calcium chloride (d) Sulphuric acid
- (xi) The gas formed when carbon reacts with concentrated sulphuric acid:  
 (a) Hydrogen (b) Sulphur trioxide  
 (c) Sulphur dioxide (d) Oxygen
- (xii) The organic compound prepared when Ethanol undergoes dehydration:  
 (a) Methane (b) Ethane  
 (c) Acetylene (d) Ethene
- (xiii) The IUPAC name of methyl acetylene is:  
 (a) Propyne (b) Ethene  
 (c) Propane (d) Ethyne
- (xiv) The product formed at the cathode in electroplating of an article with Nickel is:  
 (a) Hydrogen gas (b) Nickel ions  
 (c) Nickel atoms (d) Oxygen gas
- (xv) An alkali metal found in period 3 and group 1 is:  
 (a) Magnesium (b) Lithium  
 (c) Sodium (d) Potassium

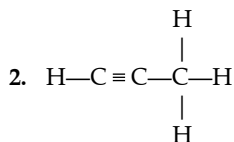
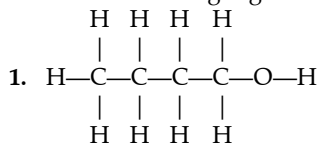
## Question 2

- (i) The diagram shows an experiment set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature. [5]



- (a) Name the gas collected in the gas jar.  
 (b) Write a balanced chemical equation for the above preparation.  
 (c) How is the gas being collected?  
 (d) What is the purpose of using Y?  
 (e) How will you find that the jar is full of gas?
- (ii) Match the following Column A with Column B. [5]
- | Column A           | Column B                              |
|--------------------|---------------------------------------|
| (a) Acid Salt      | 1. Black in colour                    |
| (b) Copper Oxide   | 2. Reddish brown                      |
| (c) Zinc hydroxide | 3. Hydrogen chloride                  |
| (d) Copper Metal   | 4. Sodium Hydrogen Carbonate          |
| (e) Polar compound | 5. Soluble in excess sodium hydroxide |
- (iii) Complete the following by choosing the correct answers from the bracket: [5]  
 (a) Ammonia in the liquefied form is \_\_\_\_\_. [neutral/basic]  
 (b) Organic compounds are generally insoluble in \_\_\_\_\_. [Water/Organic solvents]  
 (c) An inert electrode used in electrolysis of acidified water is \_\_\_\_\_. [iron/platinum]  
 (d) Hydrocarbons having double bond are \_\_\_\_\_. [alkenes/alkynes]  
 (e) An alkaline gas gives dense white fumes of  $[\text{NH}_4\text{OH}/\text{NH}_4\text{Cl}]$  with hydrogen chloride gas.
- (iv) Identify the following: [5]  
 (a) The property by which carbon bonds with itself to form a long chain.

- (b) A substance that conducts electricity in molten or aqueous state.  
 (c) The energy required to remove an electron from the valence shell of a neutral isolated gaseous atom.  
 (d) The name of the process by which the Bauxite ore is concentrated.  
 (e) The bond formed by a shared pair of electrons with both electrons coming from the same atom.
- (v) (a) Draw the structural formula for the following: [5]  
 1. 2-pentanol  
 2. Ethanal  
 3. 1-butene
- (b) Name the following organic compounds in IUPAC system:



### Section-B

(Attempt any four questions from this Section.)

#### Question 3

- (i) Identify the Anion present in each of the following compounds. [2]  
 (a) When Barium Chloride Solution is added to a solution of compound B, a white precipitate insoluble in dilute Hydrochloric acid is formed.  
 (b) When dilute Sulphuric acid is added to compound D, a gas is produced which turns lime water milky but has no effect on acidified potassium dichromate solution.
- (ii) Write the products and balance the equation. [2]  
 (a)  $\text{S} + \text{Conc. HNO}_3 \rightarrow$   
 (b)  $\text{ZnS} + \text{HCl} \rightarrow$
- (iii) Arrange the following as per the instruction given in the brackets: [3]  
 (a) Na, K, Cl, Si, S (increasing order of electronegativity)  
 (b) Be, Li, F, C, B, N, O (increasing order of metallic character)  
 (c) Br, F, I, Cl (increasing order of atomic size)
- (iv) Fill in the blanks selecting the appropriate word from the given choice:  
 (a) In a covalent compound, the bond is formed due to \_\_\_\_\_ of electrons (sharing / transfer)  
 (b) A molecule which has a single lone pair of electrons \_\_\_\_\_. ( $\text{NH}_3/\text{H}_2\text{O}$ )  
 (c) Electrovalent compounds do not conduct electricity in their \_\_\_\_\_ state. (molten/solid)

#### Question 4

- (i) For each of the substances given below, what is the role played in the extraction of Aluminum. [3]  
 (a) Cryolite  
 (b) Graphite
- (ii) Calculate: [3]  
 (a) A gas cylinder is filled with hydrogen and it holds 5 g of gas. The same cylinder holds 85 g of gas X under same temperature and pressure. Calculate the vapour density of gas X.  
 (b) Give the empirical formula of  $\text{CH}_3\text{COOH}$ .
- (iii) The following questions are pertaining to the laboratory preparation of Hydrogen chloride gas. [3]  
 (a) Write a balanced chemical equation for its preparation mentioning the condition required.  
 (b) Why is concentrated Nitric Acid not used in the preparation of Hydrogen Chloride gas?  
 (c) How is Hydrogen Chloride gas collected?
- (iv) Explain the following: [3]  
 (a) Concentrated Nitric acid appears yellow when it is left standing in a glass bottle.  
 (b) An inverted funnel is used to dissolve Hydrogen Chloride gas in water.  
 (c) All apparatus made of glass is used in the laboratory preparation of Nitric acid.

#### Question 5

- (i) (a) State one property of Ammonia demonstrated in the Fountain Experiment. [2]  
 (b) Give the ionic equation when Ammonium Hydroxide is dissolved in water.
- (ii) Name a probable cation present based on the following observations: [2]  
 (a) Reddish brown precipitate insoluble in Ammonium Hydroxide.  
 (b) Blue coloured sulphate solution.
- (iii) Give balanced chemical equation for the following: [3]

- (a) Laboratory Preparation of Methane from Sodium Acetate.  
 (b) Preparation of Ethyne from 1, 2 dibromoethane.  
 (c) Ethene reacting with Chlorine.
- (iv) **State one relevant observation for each of the following reactions:** [3]  
 (a) When excess Ammonia is passed through an aqueous solution of Lead Nitrate.  
 (b) Copper Sulphate solution is electrolysed using Copper electrodes.  
 (c) Ammonium hydroxide is added to Ferrous Sulphate solution.

**Question 6**

- (i) **Define:** [2]  
 (a) Gay Lussac's law of combining volume.  
 (b) Vapour Density
- (ii) **Solve:** [2]  
 1250 cc of oxygen was burnt with 300 cc of ethane (C<sub>2</sub>H<sub>6</sub>). Calculate the volume of the unused oxygen and the volume of the carbon dioxide formed.  
 $2C_2H_6 + 7O_2 \rightarrow 7CO_2 + 6H_2O$
- (iii) **State the conditions required for the following reactions:** [3]  
 (a) Conversion of Sulphur dioxide to Sulphur trioxide.  
 (b) Conversion of Ammonia to Nitric acid  
 (c) Conversion of Nitrogen to Ammonia
- (iv) **Choose the role played by concentrated Sulphuric acid as a, b, c which is responsible for the reactions 1 to 3.** [3]  
 (a) Oxidizing agent  
 (b) Non Volatile Acid  
 (c) Dehydrating agent
- $NaNO_3 + H_2SO_4 \xrightarrow{<200^\circ C} NaHSO_4 + HNO_3$
  - $CuSO_4 \cdot 5H_2O \xrightarrow{<200^\circ C} CuSO_4 + H_2SO_4$
  - $S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$ .

**Question 7**

- (i) **Find the empirical formula and molecular formula of an organic compound from the data given below:**  
 C = 75.92% H = 6.32%, N = 17.76% its vapour density is 39.5 (At.wt: C=12, H = 1, N = 14) [2]
- (ii) **Identify the functional group in the following organic compounds:** [2]  
 (a) HCHO  
 (b) C<sub>2</sub>H<sub>5</sub>COOH
- (iii) **During the Electrolysis of Copper II Sulphate solution using platinum as cathode and graphite as anode.** [3]  
 (a) State what you observe at the cathode.  
 (b) State the change noticed in the electrolyte.  
 (c) Write the reaction at the cathode.
- (iv) **Choose the answer from the list which fits the description.** [3]  
 [CaO, CO<sub>2</sub>, NaOH, Fe(OH)<sub>3</sub>, CO]  
 (a) A basic oxide.  
 (b) An oxide which is acidic.  
 (c) An Alkali.

**Question 8**

- (i) **Draw the electron dot structure for the following.** [2]  
 (a) H<sub>3</sub>O<sup>+</sup>  
 (b) CH<sub>4</sub>
- (ii) **Distinguish between the following as directed:** [2]  
 (a) Sodium Carbonate and Sodium Sulphate by using dilute HCl  
 (b) Ammonium Sulphate and Sodium Sulphate by using Calcium hydroxide.
- (iii) **Name the particles present in:** [3]  
 (a) Strong Electrolyte  
 (b) Weak Electrolyte  
 (c) Non Electrolyte
- (iv) **An element X has atomic number 17. Answer the following questions.** [3]  
 (a) State the period & group to which it belongs:  
 (b) Is it a Metal or Non Metal?  
 (c) Write the formula between X and Hydrogen.

# SOLUTIONS

## Sample Question Paper-1

### Chemistry

**SECTION : A**

1. (i) **Option (c) is correct.**

*Explanation:* Ammonium hydroxide  
Its chemical formula is  $\text{NH}_4\text{OH}$ . It is a weak electrolyte as it can't completely dissociate in the solution.

- (ii) **Option (b) is correct.**

*Explanation:* As halogens require only one electron to complete their octet shell, they possess the highest electron affinity.

- (iii) **Option (a) is correct.**

*Explanation:* Bronze is an alloy of copper and tin.

- (iv) **Option (b) is correct.**

*Explanation:* Ammonia is an example of a polar covalent compound because it consists of partial positive and partial negative charges due to the unequal distance between the atoms.

- (v) **Option (d) is correct.**

*Explanation:* Its formula is  $\text{H}_2\text{CO}_3$ . It contains two hydrogen atoms, i.e.,  $2\text{H}^+$  and  $\text{CO}_3^{2-}$ .

- (vi) **Option (c) is correct.**

*Explanation:* Copper hydroxide is amphoteric in nature. Thus, it is soluble in excess of  $\text{NaOH}$  solution.

- (vii) **Option (a) is correct.**

*Explanation:* Vapour density

$$= \frac{\text{Molecular mass}}{2} = \frac{44}{2} = 22$$

- (viii) **Option (a) is correct.**

*Explanation:* Conc.  $\text{H}_2\text{SO}_4$  is used as a drying agent.

- (ix) **Option (d) is correct.**

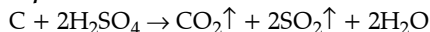
*Explanation:* Iron (Fe) is used as a catalyst in Haber's process.

- (x) **Option (a) is correct.**

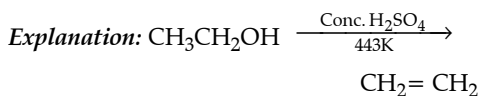
*Explanation:* Phenolphthalein converts a base into pink color. Since, ammonium hydroxide is a base so it turns into pink color on adding an indicator.

- (xi) **Option (c) is correct.**

*Explanation:*



- (xii) **Option (d) is correct.**



- (xiii) **Option (a) is correct.**

*Explanation:*  $\text{CH}_2 = \text{C} - \text{CH}_3$

- (xiv) **Option (b) is correct.**

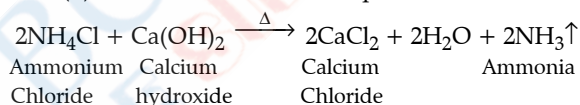
*Explanation:* Nickel ions are deposited at the cathode and a block of Nickel metal is taken at the anode.

- (xv) **Option (c) is correct.**

*Explanation:* Sodium is present in group 1 and period 3 in a periodic table.

2. (i) (a) The gas collected in the jar is Ammonia.

(b) The balanced chemical equation is :



(c) The gas is collected by using downward displacement of air.

(d) Gas Y is ammonia. It is used in agriculture as fertilizers.

(e) By bringing a wet red litmus paper near the brim or mouth of the gas jar. When the jar is full of gas it converts red litmus into blue litmus.

- (ii) 

Column A	Column B
(a) Acid Salt	4. Sodium hydrogen carbonate
(b) Copper oxide	1. Black in color
(c) Zinc hydroxide	5. Soluble in excess of sodium hydroxide
(d) Copper metal	2. Reddish brown
(e) Polar compound	3. Hydrochloric acid

(iii) (a) basic

(b) water

(c) platinum

(d) alkenes

(e)  $\text{NH}_4\text{Cl}$

(iv) (a) Catenation

*Explanation:* A property of a carbon atom to form a long chain by itself is called catenation.

(b) Electrolytes  
*Explanation:* Electrolytes conduct electricity in a molten or aqueous state.

(c) Ionization potential  
*Explanation:* The energy required to remove an electron from a valance shell from an isolated gaseous atom and convert it into a positively charged atom is called Ionization potential.

(d) Bayer's process

*Explanation:* The process for the concentration of Bauxite ore is Bayer's process.

(e) Coordinate bond

**Explanation:** The formation of a bond takes place by shared pair of electrons in which both the electrons are coming from the same atom is called a Coordinate bond.

- (v) (a) 1. 2-pentanol
- $$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3 \\ | \\ \text{H} \end{array}$$
2. Ethanal
- $$\begin{array}{c} \text{H} \\ | \\ \text{CH}_3-\text{C}=\text{O} \end{array}$$
3. 1-butene  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$
- (b) 1. Butanol  
2. Propyne

**SECTION : B**

3. (i) (a) The anion present is Sulphate ( $\text{SO}_4^{2-}$ ).  
 $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 + \text{dil. HCl} \rightarrow \text{BaSO}_4$   
 Salt B white  
insoluble precipitate
- (b) The anion present is the Carbonate ion ( $\text{CO}_3^{2-}$ ).  
 $\text{Na}_2\text{CO}_3 + \text{dil. H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{CO}_2\uparrow + \text{H}_2\text{O}$   
 Salt D turns lime  
water into milky

(ii) (a)  $\text{S} + \text{Conc. HNO}_3 \rightarrow \text{H}_2\text{SO}_4 + 2\text{H}_2\text{O} + 6\text{NO}_2$ (b)  $\text{ZnS} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2\text{S}\uparrow$ (iii) (a)  $\text{K} < \text{Na} < \text{Si} < \text{S} < \text{Cl}$   
(increasing order of electronegativity)(b)  $\text{F} < \text{O} < \text{N} < \text{C} < \text{Be} < \text{Li}$   
(increasing order of metallic character)(c)  $\text{F} < \text{Cl} < \text{Br} < \text{I}$  (increasing order of atomic size)

(iv) (a) sharing

(b)  $\text{NH}_3$ 

(c) solid

Q. 4. (i) (a) Cryolite – It is used to decrease the melting point of aluminum oxide from  $2000^\circ\text{C}$ – $2500^\circ\text{C}$  to  $900^\circ\text{C}$ – $1000^\circ\text{C}$ . Therefore, it helps in reducing energy costs.

(b) Graphite – It prevents the formation of oxygen gas from oxidizing aluminum at the anode in the electrolysis of aluminum process by converting it into  $\text{CO}_2$  and  $\text{CO}$ . Thus, it prevents the oxidation of aluminum.

(ii) (a) Vapour density =  $\frac{\text{Molecular mass}}{2}$ 

The volume of both hydrogen gas and gas X have an equal number of moles.

So,  $n(\text{H}_2) = n(\text{X})$

$$\frac{5}{2} = \frac{85}{M}$$

$$M = 34 \text{ g}$$

$$\text{V.D} = \frac{34}{2} = 17$$

(b) Empirical formula is the simplest formula of any compound. The molecular formula of Acetic acid is  $\text{CH}_3\text{COOH}$ .

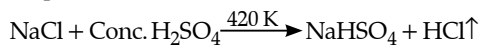
The ratio of C : H : O = 2 : 4 : 2

Thus, the simplified form will be 1 : 2 : 1

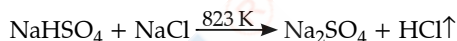
Empirical formula =  $\text{CH}_2\text{O}$ .

(iii) (a) Preparation of Hydrogen chloride gas:

Firstly, by heating sodium chloride with conc. Sulphuric acid at 420 K.



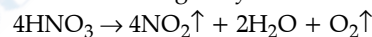
Secondly, the by-product sodium bicarbonate formed during the reaction is insoluble and further heated with sodium chloride at a higher temperature of around 823 K to give soluble sodium sulphate and HCl gas.



(b) Concentrated Nitric acid is not used in the preparation of HCl gas because it acts as a strong oxidizing agent and oxidizes hydrogen gas to convert it into water.

(c) Hydrogen chloride gas is collected by upward displacement of air as it is 1.28 times heavier than air neither collected in water as it is soluble in it.

(iv) (a) When conc. Nitric acid is left in the glass bottle, it turns yellow due to its exposure to sunlight as it slowly decomposes at room temperature and produces nitrogen dioxide gas when dissolved in the air gives yellow colour.

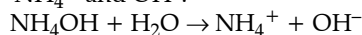


(b) An inverted funnel is used in the preparation of hydrogen chloride gas to prevent back suction of water. Also, in order to increase the surface area of absorption, it is kept inverted.

(c) Nitric oxide gas is a powerful oxidizing agent. So, in order to prevent the apparatus from getting corroded, all apparatus used in its preparation is made up of glass.

Q. 5. (i) (a) Property of solubility is demonstrated in the fountain experiment.

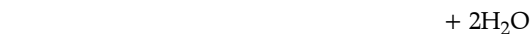
(b) When ammonium hydroxide is dissolved in water, it dissociates into ions that are  $\text{NH}_4^+$  and  $\text{OH}^-$ .



(ii) (a)  $\text{Fe}^{3+}$  is the probable cation that gives an insoluble reddish-brown precipitate in ammonium hydroxide.

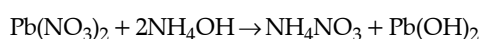
(b)  $\text{Cu}^{2+}$  is the probable cation present in a blue-coloured copper sulphate solution.

(iii) (a)  $\text{CH}_3\text{COONa} + \text{NaOH} \xrightarrow{\text{CaO}} \text{CH}_4 + \text{Na}_2\text{CO}_3$   
 (b)  $\text{BrCH}_2=\text{CH}_2\text{Br} + \text{alc. 2KOH} \rightarrow \text{CH}\equiv\text{CH} + 2\text{KBr}$



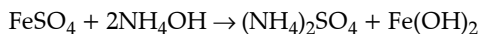
(c)  $\text{C}_2\text{H}_4 + \text{Cl}_2 \rightarrow \text{ClCH}_2-\text{CH}_2\text{Cl}$

(iv) (a) When excess ammonia is passed through lead nitrate solution, an insoluble white precipitate is formed.



(b) When copper sulphate solution is electrolysed using copper electrodes, a reddish-pink copper metal deposition takes place on the cathode.

- (c) When ammonium hydroxide is added to ferrous sulphate solution, a dirty green precipitate of ferrous hydroxide is formed.



- Q. 6. (i) (a) Gay-Lussac's law is a gas law that states that the pressure exerted by a gas is directly proportional to the temperature of the gas when the mass is constant and the volume is constant. Mathematically,

$$P \propto T$$

$$P/T = k$$

Where,

P is the pressure exerted by the gas.

T is the absolute temperature of the gas.

k is a constant.

- (b) Vapour density is the density of vapour with respect to hydrogen. It can be defined as the mass of a certain volume of matter divided by the mass of the same volume of hydrogen.

$$\text{Vapour density} = \frac{\text{Molecular mass}}{2}$$

- (ii) 
$$2\text{C}_2\text{H}_6 + 7\text{O}_2 \rightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$$
  

$$2V \quad 7V \quad 4V$$

Acc. to the equation, 2V of ethane reacts with 7V of oxygen

$$\frac{300 \times 7}{2} = 1050 \text{ cc}$$

Hence, unused  $\text{O}_2 = 1250 - 1050 = 200 \text{ cc}$

From 2V of ethane, 4V of  $\text{CO}_2$  is produced.

So, 300 cc of ethane will give,

$$\frac{300 \times 4}{2} = 600 \text{ cc of } \text{CO}_2$$

- (iii) (a) The following conditions required to convert sulphur dioxide into sulphur trioxide (Contact process) are:

1. Catalyst -  $\text{V}_2\text{O}_5$
2. Temperature - 450 - 500°C
3. Pressure - 1 - 2 atm

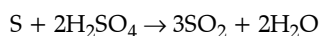
- (b) The following conditions required to convert ammonia to nitric acid (Ostwald process) are:

1. Catalyst - Pt
2. Temperature - 800°C
3. Pressure - 1 - 2 atm

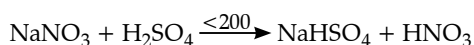
- (c) The following conditions required to convert nitrogen to ammonia (Haber-Bosch process) are:

1. Catalyst - Fe
2. Temperature - 400-450°C
3. Pressure - 200 atm

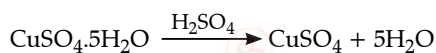
- (iv) (a) Oxidising agent - reaction 3



- (b) Non-Volatile acid - reaction 1



- (c) Dehydrating agent - reaction 2



7. (i) (a)

Symbol	Percentage	Atomic Weight	Relative ratio	Simplest ratio
C	75.92%	12	$\frac{75.92}{12} = 6.32$	$\frac{6.32}{1.26} = 5$
H	6.32%	1	$\frac{6.32}{1} = 6.32$	$\frac{6.32}{1.26} = 5$
N	17.76%	14	$\frac{17.76}{14} = 1.26$	$\frac{1.26}{1.26} = 1$

Empirical formula =  $\text{C}_5\text{H}_5\text{N}$

$$\text{Vapour density} = \frac{\text{Molecular mass}}{2}$$

$$\text{Molecular mass} = 2 \times 39.5 = 79$$

$$\text{Empirical formula mass} = 12$$

$$n = \frac{\text{Molecular formula mass}}{\text{Empirical formula mass}} = \frac{79}{12} = 1$$

Thus, both empirical formula and molecular formula are  $\text{C}_5\text{H}_5\text{N}$ .

- (ii) (a) Aldehyde  
 (b) Carboxylic acid  
 (iii) (a) At cathode, red coloured metal copper get deposited and at anode, a colourless, odourless gas oxygen releases.  
 (b) The blue colour of the solution appears due to copper sulphate solution soon fades.  
 (c) At cathode:  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$   
 (iv) (a)  $\text{CaO}$ ,  $\text{Fe}(\text{OH})_3$   
 (b)  $\text{CO}$ ,  $\text{CO}_2$   
 (c)  $\text{NaOH}$

8. (i) (a) 
$$\left[ \begin{array}{c} \text{H} - \ddot{\text{O}} - \text{H} \\ | \\ \text{H} \end{array} \right]^+$$
  
 (b) 
$$\begin{array}{c} \text{H} \\ \text{H} : \ddot{\text{C}} : \text{H} \\ \text{H} \end{array}$$

(ii) (a)

S No.	Sodium Carbonate	Sodium Sulphate
1.	Sodium carbonate on treating with dil. HCl results in the formation of sodium chloride with the liberation of carbon dioxide gas.	Sodium sulphate on treating with dil. HCl results in the formation of sodium chloride Sulphuric acid.
2.	$\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2\uparrow$	$\text{Na}_2\text{SO}_4 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{SO}_4$

(b)

S No.	Ammonium Sulphate	Sodium Sulphate
1	Ammonium sulphate on treated with calcium hydroxide results in the formation of calcium sulphate with the liberation of ammonia gas.	Sodium sulphate on treating with calcium hydroxide results in the formation of sodium hydroxide and insoluble calcium sulphate.
2	$(\text{NH}_4)_2\text{SO}_4 + \text{Ca}(\text{OH})_2 \rightarrow 2\text{CaSO}_4 + \text{H}_2\text{O} + \text{NH}_3\uparrow$	$\text{Na}_2\text{SO}_4 + \text{Ca}(\text{OH})_2 \rightarrow 2\text{NaOH} + \text{CaSO}_4\uparrow$

(iii) (a) Strong electrolyte – Only ions

(b) Non-electrolyte – molecules

(c) Weak electrolyte – Ions as well as molecules

(iv) (a) The electronic configuration of element 'X' with atomic number 17 is 2,8,7.

Hence, it has 7 valence electrons.

Its ground state electronic configuration is  $1s^2 2s^2 2p^6 3s^2 3p^5$ 

Therefore, it lies in the Group 17 (10 + 7)

Since in element X, the third shell is being filled, it lies in the third period. X is chlorine.

(b) It is a non-metal.

■ ■