

ICSE Board
Class X Chemistry
Sample Paper – 11 Solution

SECTION I

Answer 1

(a)

- i. (c) Consists of molecules
- ii. (d) FeCl_3
- iii. (a) CuSO_4
- iv. (a) Avogadro's law
- v. (b) Oxygen is released at the anode.

(b)

- i. Haber's process
- ii. The reactants must be taken in the ratio 1:3. That is, 1 volume of nitrogen and 3 volumes of hydrogen are taken.
- iii. Finely divided iron
- iv. $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3 + \text{Heat}$
- v. $3\text{CuO} + 2\text{NH}_3 \rightarrow 3\text{Cu} + \text{N}_2 + 2\text{H}_2\text{O}$

Black
Pinkish red

(c)

- i. Methane
- ii. Ethyne
- iii. Ethene
- iv. Ethanol
- v. Ethyl acetate

(d)

- i. Hydrogen chloride gas
- ii. Butane
- iii. Ferric chloride (FeCl_3)
- iv. Brass
- v. Zinc

(e)

- i. $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$
- ii. $\text{Zn} + \text{H}_2\text{SO}_4(\text{dil.}) \rightarrow \text{ZnSO}_4 + \text{H}_2$
- iii. $\text{Mg}_3\text{N}_2 + 6\text{H}_2\text{O} \xrightarrow{\Delta} 3\text{Mg}(\text{OH})_2 + 2\text{NH}_3$
- iv. $\text{C}_{12}\text{H}_{22}\text{O}_{11} \xrightarrow{\text{Conc. H}_2\text{SO}_4} 12\text{C} + 11\text{H}_2\text{O}$
- v. $\text{Cu} + 4\text{HNO}_3(\text{conc.}) \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{NO}_2 + 2\text{H}_2\text{O}$

(f)

- i. Propene
- ii. Methane
- iii. Propanal
- iv. Ethanoic acid
- v. Butanol

(g)

- i. Methanal
- ii. Propan-2-one
- iii. 2-butanol
- iv. Ethoxyethane
- v. 2, 2-Dimethylpropane

(h)

Column A	Column B
1. Sodium chloride	Ionic bond
2. Ammonium ion	Covalent and coordinate bond
3. Electronegativity across the period	Increases
4. Non-metallic character down the group	Decreases
5. Carbon tetrachloride	Covalent bond

SECTION II

Answer 2

(a)

- i. Molecules only
- ii. The particles present in a dilute solution apart from water molecules are hydrogen ions (H^+), X^- ions and HX molecules.
- iii. Loss, gain
- iv. The electrolyte must contain ions of the metal which is to be plated on the article.
- v. Electrolysis is an example of a redox reaction because reduction takes place at the cathode and oxidation takes place at the anode, and both these reactions take place simultaneously.

(b)

- i. g 1. 2 moles of $Ca(NO_3)_2 = 4$ moles of NO_2
1 moles of $Ca(NO_3)_2 = 2$ moles of NO_2
Hence, the answer is 2 moles.

- ii. 2 moles of $\text{Ca}(\text{NO}_3)_2 = 1$ moles of O_2
 $328 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 22.4 \text{ dm}^3 \text{ of } \text{O}_2$
 $65.6 \text{ g of } \text{Ca}(\text{NO}_3)_2 = \frac{22.4}{328} \times 65.6 \text{ dm}^3 \text{ of } \text{O}_2 = 4.48 \text{ dm}^3 \text{ of } \text{O}_2$
- iii. 2 moles of $\text{Ca}(\text{NO}_3)_2 = 1$ moles of CaO
 $328 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 112 \text{ g of } \text{CaO}$
 $65.6 \text{ g of } \text{Ca}(\text{NO}_3)_2 = \frac{112}{328} \times 65.6 \text{ g of } \text{CaO} = 22.4 \text{ g of } \text{CaO}$
- iv. 2 moles of $\text{Ca}(\text{NO}_3)_2 = 5$ moles of gaseous products
 $2 \times 164 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 5 \text{ moles of gaseous products}$
 $328 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 5 \text{ moles of gaseous products}$
- v. 2 moles of $\text{Ca}(\text{NO}_3)_2 = 4$ moles of NO_2
 $328 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 4 \times 22.4 \text{ L of } \text{NO}_2$
 $328 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 89.6 \text{ L of } \text{NO}_2$
 $44.8 \text{ L of } \text{NO}_2 = \frac{328}{89.6} \times 44.8 \text{ g of } \text{Ca}(\text{NO}_3)_2 = 164 \text{ g of } \text{Ca}(\text{NO}_3)_2$

Answer 3

(a)

- Carbon or graphite
- At cathode
- Pure alumina (Al_2O_3) and cryolite (Na_3AlF_6)
- Electrode B has to be replaced periodically as it gets oxidised by oxygen to carbon dioxide at the anode.

(b)

- Zinc sulphide
- $2\text{ZnS} + 3\text{O}_2 \xrightarrow{800^\circ\text{C}} 2\text{ZnO} + 2\text{SO}_2$
- Reducing agent
- Carbon or coke

Answer 4

(a)

General Formula	C_nH_{2n}	$\text{C}_n\text{H}_{2n-2}$	$\text{C}_n\text{H}_{2n+2}$
IUPAC name of the homologous series	Alkene	Alkyne	Alkane
Characteristic bond type	Double bond	Triple bond	Single bond
IUPAC name of the first member of the series	Ethene	Ethyne	Methane
Type of reaction with chlorine	Addition	Addition	Substitution

Answer 5**(a)**

- i. Iron (II) chloride on reaction with ammonium hydroxide forms a dirty green precipitate of ferrous hydroxide, while iron (III) chloride on reaction with ammonium hydroxide forms a reddish brown precipitate of ferrous hydroxide.
- ii. Zinc sulphate solution on reaction with ammonium hydroxide produces a white, gelatinous precipitate of zinc hydroxide which is soluble in excess of ammonium hydroxide, whereas lead nitrate on treatment with ammonium hydroxide forms a chalky white ppt. which is insoluble in excess of ammonium hydroxide.
- iii. Lead hydroxide remains insoluble in excess of ammonium hydroxide, whereas zinc hydroxide dissolves in excess ammonium hydroxide.

(b)

- i. The experiment is the fountain experiment and is used to demonstrate solubility.
- ii. The colour of the water that has entered the round-bottom flask is red.

(c)

- i. B: Neutralisation
- ii. E: Direct synthesis
- iii. C: Decomposition by acid
- iv. A: Simple displacement
- v. D: Double decomposition

Answer 6**(a)**

- i. $\text{MgO} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2\text{O}$
- ii. $\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$

(b)

- i. Polar covalent bond
- ii. Ionic bond
- iii. Non-polar covalent bond

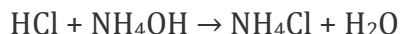
(c)

- i. Thallium
- ii. Boron
- iii. Three
- iv. BCl_3
- v. Less metallic – the metallic nature decreases across a period moving from left to right

Answer 7

(a)

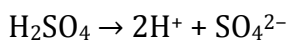
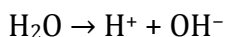
- i. Anhydrous HCl is a poor conductor due to the absence of ions in it, whereas aqueous HCl is an excellent conductor since it contains ions.
- ii. When the stopper is opened, HCl gas comes in contact with water vapour of air and gives white fumes due to the formation of hydrochloric acid.
- iii. When ammonium hydroxide is brought near the mouth of HCl, dense white fumes are formed due to the formation of ammonium chloride.



- iv. Dry hydrogen chloride is not acidic, whereas moist hydrogen chloride is acidic. In the presence of a drop of water, HCl gas dissolves in water and forms hydrochloric acid which turns blue litmus paper red.
- v. Hydrogen chloride is not collected over water as it is highly soluble in water.

(b)

- i. Electrolyte used is nickel sulphate solution.
- ii. The keychain is used as the cathode.
- iii. Block of pure nickel metal is used as the anode.



- iv. At the cathode: $\text{Ni}^{2+} + 2\text{e}^- \rightarrow \text{Ni}$
- v. At the anode: $\text{Ni} - 2\text{e}^- \rightarrow \text{Ni}^{2+}$