ICSE Board
Class X Chemistry
Sample Paper – 3 Solution

SECTION I

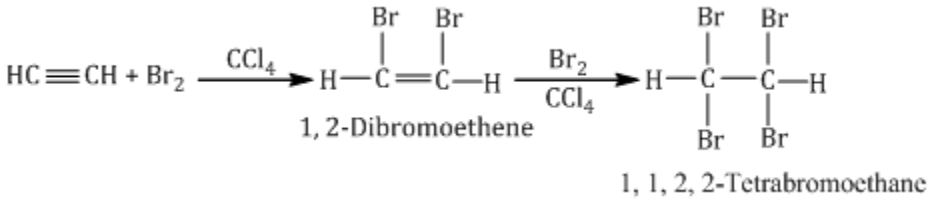
Answer 1

a.

i. Calcium oxide
ii. Alcoholic potassium hydroxide
iii. Acetylene or ethyne
iv. Copper oxide
v. Potassium iodide solution

b.

i.



1, 2-Dibromoethene

1, 1, 2, 2-Tetrabromoethane

ii. $4FeS_2 + 11O_2 \xrightarrow{\Delta} 2Fe_2O_3 + 8SO_2$

iii. $Cu + 2H_2SO_4\ (conc.) \longrightarrow CuSO_4 + 2H_2O + SO_2$

iv. $4NH_3 + 3O_2 \longrightarrow 2N_2 + 6H_2O$

v. $2H_2S + SO_2 \longrightarrow 2H_2O + 3S$

c.

i. Haematite
ii. Fe_2O_3
iii. +2
iv. +3
v. Dry chlorine

d.

i. Yellow-coloured particles are seen suspended in the clear solution and these particles do not settle down, i.e. a solution of colloidal sulphur is formed.

$$2H_2S + SO_2 \longrightarrow 2H_2O + 3S$$

ii. On adding ammonium hydroxide drop by drop to a solution of copper sulphate, a bluish white precipitate is formed which dissolves in excess of ammonium hydroxide to give a deep blue solution.

$$CuSO_4 + 2NH_4OH \longrightarrow Cu(OH)_2 + (NH_4)_2SO_4$$

$$Cu(OH)_2 + 4NH_4OH \longrightarrow [Cu(NH_3)_4](OH)_2 + 4H_2O$$

iii. A reddish brown precipitate is formed.

$$FeCl_3 + 3NaOH \longrightarrow Fe(OH)_3 + 3NaCl$$

iv. A white precipitate is formed which is soluble in excess of NaOH.

$$ZnSO_4 + 2NaOH \longrightarrow Zn(OH)_2 + Na_2SO_4$$

$$Zn(OH)_2 + 2NaOH \longrightarrow Na_2ZnO_2 + 2H_2O$$

v. An insoluble white precipitate of barium sulphate and a solution of sodium chloride are obtained, and barium sulphate is insoluble in all the mineral acids.

$$BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + 2NaCl$$

e.

i. A: Ammonium chloride
B: Slaked lime or sodium hydroxide
C: Ammonia
J: Nitrogen dioxide
K: Oxygen

ii. D: $N_2 + 3H_2 \longrightarrow 2NH_3$

E: $4NH_3 + 5O_2 \xrightarrow[800°C]{Pt} 4NO + 6H_2O$

F: $2NO + O_2 \xrightarrow{50°C} 2NO_2$

G: $4NO_2 + 2H_2O + O_2 \longrightarrow 4HNO_3$

H: $CaO + 2NHO_3$ (dil.) $\longrightarrow Ca(NO_3)_2 + H_2O$

I: $2Ca(NO_3)_2 \xrightarrow{\Delta} 2CaO + 4NO_2 + O_2$

g.

i. 1. Eight elements are present in the third period.
2. Fluorine < Oxygen < Nitrogen < Carbon < Boron < Beryllium < Lithium
3. Inert gases have a complete octet, i.e. eight electrons in the outermost shell, so they neither lose nor gain electrons; hence, they have zero valency.

ii. Group: As we move down the group, ionisation potential decreases.
Period: As we move across the period from left to right, ionisation potential increases.

h.

i. Ethane
ii. Methane
iii. Ethene
iv. Methanol
v. Ethyne

SECTION II

Answer 2

a.

i.

Cathode	Anode
(i) Lead	Bromine vapour
(ii) Hydrogen	Oxygen
(iii) Hydrogen	Oxygen

ii. 1. Electroplating
2. Electro refining
3. Electrometallurgy

b.

i. Molar mass of $AgNO_3$ = 108 + 14 + 48
= 170 g
Molar mass of AgCl = 108 + 35.5
= 143.5 g
143.5 g of AgCl was precipitated by 170 g of $AgNO_3$.
287 of AgCl will be precipitated by = $\frac{170}{143.5} \times 287$
= 340 g of $AgNO_3$

ii. Empirical formula weight of CH_2O = 12 + 2 + 16

$$\therefore \quad n = \frac{\text{Molecular weight}}{\text{Empirical formula weight}}$$

$$= \frac{180}{30} = 6$$

Molecular formula = $(CH_2O)_6$
= $C_6H_{12}O_6$

Answer 3

a.

C – Brittle
D – Acidic oxides
F – Discharged at the anode
I – Covalent chlorides
L – 5, 6 or 7 valence electrons

b.

i. Hall's process

$Al_2O_3.\ 2H_2O + 2NaOH \xrightarrow{\Delta} 2NaAlO_2 + 3H_2O$

$NaAlO_2 + 2H_2O \longrightarrow NaOH + Al(OH)_3$

$2\ Al(OH)_3 \xrightarrow{\Delta} Al_2O_3 + 3H_2O$

ii. Cryolite. It is used in the molten state.

iii. $O^{2-} - 2e^- \longrightarrow [O]$

$2[O] \longrightarrow O_2$

Answer 4

a.

i. $CH_2{=}CH_2$
ii. Addition reaction
iii. Reddish brown bromine solution decolourises.
iv. Ethanol
v. Dehydration of ethanol by conc. H_2SO_4

b.

i. 1. 22.4 dm^3
2. Molar

ii. Avogadro's law: Under similar conditions of temperature and pressure, equal volumes of all gases contain equal number of molecules.

iii. Molar mass of $CaCO_3$ = 40 + 12 + 48 = 100
No. of moles = 10/100 = 0.1 mole

Answer 5

a.

i. An alkali and a base:
   a) Alkalis are soluble in water, whereas bases may or may not be soluble in water.
   b) All alkalis are bases, but all bases are not alkalis.

ii. The chemical nature of an aqueous solution of HCl and an aqueous solution of NH_3
   a) The aqueous solution of HCl is acidic in nature. It can turn blue litmus red.
   b) The aqueous solution of NH_3 is basic in nature. It can turn red litmus blue.

b.

i. When sodium hydroxide is added to zinc nitrate, a white precipitate of zinc hydroxide is formed which is soluble in excess of NaOH. On adding sodium hydroxide solution to calcium nitrate, a white precipitate of $Ca(OH)_2$ is formed which is sparingly soluble.

ii. Sodium hydroxide when added to iron (II) chloride forms a dirty green ppt. of $Fe(OH)_2$, whereas iron (III) chloride forms a reddish brown ppt. with NaOH.

c. (A) Decomposition of salt
(B) Oxidising property

d.

i. Zinc displaces copper, and the blue colour of the solution changes.

ii. NO_2, ZnO and O_2 are formed.

Answer 6

a.

i. Copper sulphate and ammonium chloride

ii. Potassium acetate and sodium sulphide

b.

i. Reduction

ii. Oxidation

iii. Reduction

c.

i. First element – Lithium
   Last element – Neon

ii. On moving from top to bottom in a group, the atomic size increases.

iii. Chlorine

iv. They have seven electrons in their valence shell, and they need one electron to complete their octet.

Answer 7

a.

i. B or Dehydrating agent
ii. D or Oxidising agent
iii. C or Non-volatile acid
iv. A or Acid
v. A or Acid

b.

i. A: Conc. sulphuric acid and B: NaCl
ii. $NaCl + H_2SO_4$ (conc.) $\xrightarrow[200°C]{\text{below}} NaHSO_4 + HCl$
iii. Bring a glass rod dipped in NH4OH in contact with the mouth of a gas jar. If dense white fumes appear immediately, then the gas jar is filled with HCl.
iv. HCl is heavier than air.