ICSE X

MAHESH TUTORIALS I.C.S.E.

Marks : 80

SUBJECT : CHEMISTRY

Time : 2 hrs.

Exam No. : MT/ICSE/PRELIM-I-008

Model Answer Paper

SECTION - I (40 Marks)

*Attempt **all** questions from this section.*

A.1

(a)

(i) (C) Consists of molecules. **1**

(ii) (D) $FeCl_3$ **1**

(iii) (A) $CuSO_4$ **1**

(iv) (B) Gay-Lussac's Law **1**

(v) (B) Oxygen is released at anode **1**

(vi) (A) Al and Cu **1**

(vii) (A) NaCl **1**

(viii) (C) Passing dry ammonia oven heated copper oxide. **1**

(ix) (C) Substitution **1**

(x) (A) He **1**

(b)

(i) From the equation:

2 moles of $Ca(NO_3)_2$ gives 4 moles of NO_2

$\therefore$ 1 mole of $Ca(NO_3)_2$ gives x moles of NO_2

$\therefore \quad x = \frac{4}{2}$ = 2 moles

1 mole of $Ca(NO_3)_2$ gives 2 moles of NO_2 **1**

(ii) From the equation :

$2Ca(NO_3)_2 = O_2$

2 × molecular mass of $Ca(NO_3)_2$ = 1 Volume of O_2

(2 × 164) g of $Ca(NO_3)_2$ = 1 × 22.4 lt

65.6 g of $Ca(NO_3)_2$ = x lt

$$x = \frac{22.4 \times 65.6}{2 \times 164} = \frac{1469.44}{328}$$

$\therefore$ On heating 65.6 g of $Ca(NO_3)_2$ volume of O_2 produced is 4.48 lt it. **1**

(iii) From the equation :

$2Ca(NO_3)_2 = 2CaO$

$$\begin{bmatrix} 2 \times \text{molecular mass} \\ \text{in g of } Ca(NO_3)_2 \end{bmatrix} = \begin{bmatrix} 2 \times \text{molecular mass} \\ \text{in g of CaO} \end{bmatrix}$$

(2 × 164) g = (2 × 56) g

Let 65.6 g of $CO(NO_3)_2$ = x g of CaO

$$x = \frac{2\times56\times65.6}{2\times164} = \frac{3673.6}{164}$$

Mass of CaO formed is 22.4 g. **1**

(iv) There are two gaseous products ; namely nitrogen dioxide and oxygen.

From the equation :

$2Ca(NO_3)_2 = 4NO_2 + O_2$

$\left[\begin{array}{l}2\times\text{molecular mass}\\ \text{of } Ca(NO_3)_2 \text{ in g}\end{array}\right]$ = 4 moles + 1 mole

(2 × 164) g of $Ca(NO_3)_2$ = 5 moles

$\therefore$ 5 moles require 328 g of $Ca(NO_3)_2$ **1**

(v) From the equation :

$2Ca(NO_3)_2 = 4NO_2$

$\left[\begin{array}{l}2\times\text{molecular mass}\\ \text{of } Ca(NO_3)_2 \text{ in g}\end{array}\right]$ = (4 × 22.4) lt of NO_2

(2 × 164) g of $Ca(NO_3)_2$ = (4 × 22.4) lt of NO_2

Let, x g of $CO(NO_3)_2$ = 44.8 lt of NO_2

$$\therefore \quad x = \frac{2\times164\times44.8}{4\times22.4}$$

$\therefore$ 164 g of $CO(NO_3)_2$ is required. **1**

(c)

(i) Methane **1**

(ii) Ethyne **1**

(iii) Ethene **1**

(iv) Ethyl alcohol **1**

(v) Ethyl acetate or Ethyl ethenoate **1**

(d)

(i) HCl or hydrochloric acid. **1**

(ii) Methane or CH_4 **1**

(iii) Deliquescent substance, example : $FeCl_3$ **1**

(iv) Solder **1**

(v) Zinc or Aluminium **1**

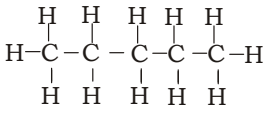
(e)

(i) $Al_2O_3 + 2NaOH \longrightarrow 2NaAlO_2 + H_2O$ **1**

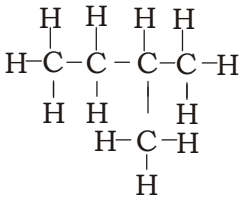
(ii) $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2\uparrow$ **1**

(iii) $2NO_2 + H_2O \longrightarrow HNO_3 + HNO_2$ **1**

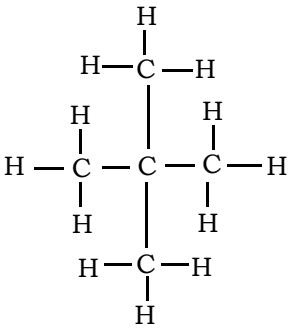
	(iv) $C_{12}H_{22}O_4 \xrightarrow{H_2SO_4} 12C + 11H_2O$	1
	(v) $Cu + 4HNO_3 \longrightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$	
(f)	(i) Propene	1
	(ii) methane	1
	(iii) propanaldehyde or Propanal	1
	(iv) Acetic acid or Ethanoic acid	1
	(v) Butanol	1
(g)	(i) Methanal	1
	(ii) Propan –2 – one / 2 – propanone	1
	(iii) Butan – 2 – ol / 2 – butanol	1
	(iv) Ethoxy ethane	1
	(v) 2, 2 – dimethyl propane	1
	SECTION - II (40 Marks)	
A.2.		
(a)	(i) Magnesium	1
	(ii) 8 elements	1
	(iii) Fluorine (accept the answer as "Chlorine" also)	1
	(iv) Fluorine	1
	(v) Hydrogen	1
(b)	(i) low	1
	(ii) 8, He, 2	3
	(iii) alkaline earth	1
A.3.		
(a)	(i) Isomers of C_5H_{12}	



n-pentane



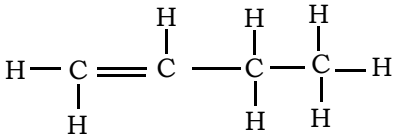
iso - pentane



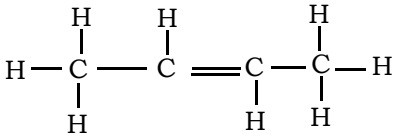
neo-Pentane [C_5H_{12}]

2,2 - dimethyl propane

(ii) Isomers of C_4H_8 **5**



But - 1 - ene



But - 2 - ene

(b) **Denatured alcohol** : Ethyl alcohol containing pyridine or copper sulphate. **1**

(c) **Two important uses of ethanol are : (any two)**

1. As a solvent for gums and resins
2. In thermometers and spirit level it is a low freezing mobile liquid.
3. In manufacture of chemical like :
   acetaldehyde, acetic acid, chloroform, diethyl ether. **2**

(d) (i) $C_2H_4 + H_2O \xrightarrow[(acid)]{H^+} C_2H_5 - OH$

ethene water ethanol **1**

(ii) $C_2H_5OH + [O] \xrightarrow[acidified]{K_2Cr_2O_7} CH_3CHO + H_2O$

Ethanol Acetaldehyde

$CH_3CHO + [O] \xrightarrow[acidified]{K_2Cr_2O_7} CH_3\ COOH$

Acetaldehyde Acetic acid **1**

A.4.

(a) (i) Neutralization **1**

(ii) Precipitation **1**

(iii) Direct combination **1**

(b) (i)

Reagent used	Copper sulphate	Iron (II) sulphate
NH_4OH solution	Pale blue precipitate is formed	Dirty green precipitate is formed

1

(ii)

Reagent used	Zinc nitrate	Lead nitrate
NH_4OH solution	Gelatinous white precipitate is formed	Chalky white precipitate is formed

1

(iii)

Reagent used	Iron (II) Sulphate	Iron (III) Sulphate
NH_4OH solution	Dirty green precipitate is formed	Reddish brown precipitate is formed

1

(c) (i) Chlorine gas (Cl_2)
(ii) Zinc oxide (ZnO)
(iii) Methane gas (CH_4) [Accept all other valid answers]
(iv) Sodium chloride [Accept all other valid answers]

A.5.

(a) (i) Mercury **1**
(ii) Graphite (carbon) **1**
(iii) H_2O, NO, CO. (any one) **1**
(iv) Na_2O, K_2O, MgO, CaO, Al_2O_3, Fe_2O_3, ZnO (any one) **1**
(v) Graphite or Iodine **1**

(b) (i) Bauxite **1**
(ii) Bayer's Process **1**
(iii) Cryolite enhances the conductivity of the mixture and also enhances the mobility of fused mixture by acting as a solvent for the electrolytic mixture. **1**
(iv) Cathode reaction : $2Al^{3+} + 6e^- \longrightarrow 2Al$ **1**
Anode reaction : $3O^{2-} - 6e^- \longrightarrow 3[O] \longrightarrow 3O_2$ **1**
(v) Zinc blende is concentrated by Froth Floatation method. **1**

A.6.

(a)

Element	% Composition	At. Wt.	Relative No. of Atoms (At Ratio)	Simplest Ratio of whole numbers
Carbon	54.55%	12	$\frac{54.55}{12} = 4.545$	$\frac{4.545}{2.266} = 2$
Hydrogen	9.09%	1	$\frac{9.09}{1} = 9.09$	$\frac{9.09}{2.266} = 4$
Oxygen	36.26%	16	$\frac{36.26}{16} = 2.266$	$\frac{2.266}{2.266} = 1$

Empirical formula = C_2H_4O

Empirical formula weight $= 2 \times 12 + 4 \times 1 + 1 \times 16$
$= 24 + 4 + 16$
$= 44$

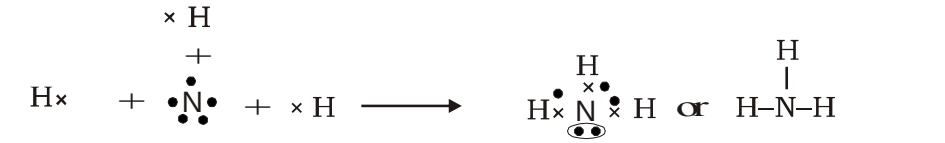
Molecular formula weight $= 2 \times V.D$
$= 2 \times 44 = 88$

$n = \frac{\text{Mol.formula weight}}{\text{Emp. formula weight}} = \frac{88}{44} = 2$

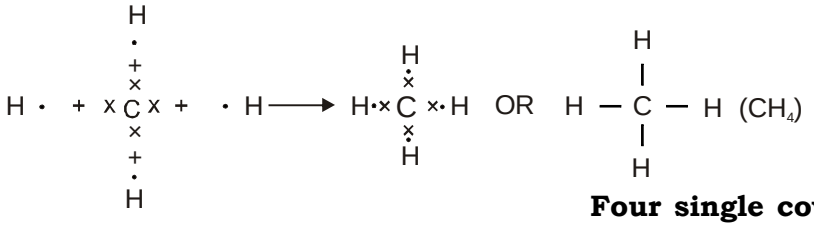
$\therefore$ Molecular formula $= n \times E.F.$
$= 2 \times [C_2H_4O]$ **5**

(b) Electron dot structure of :

(i) NH_3 **1**

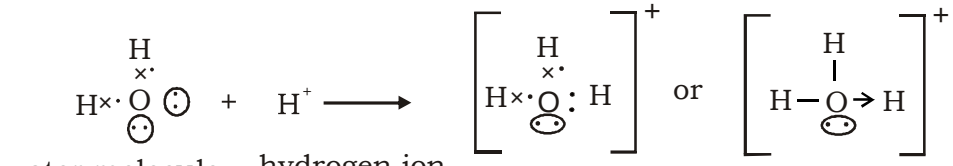


(ii) CH_4 **1**



Four single covalent bonds

(iii) **1**



(c)

	Property	Electrovalent Compounds	Covalent compounds
(i)	Solubility	Soluble in water but insoluble in organic solvents	Soluble in organic solvent but insoluble in water.
(ii)	Structure	Crystalline hard solids	gases, liquids or soft solids.

2

A.7.

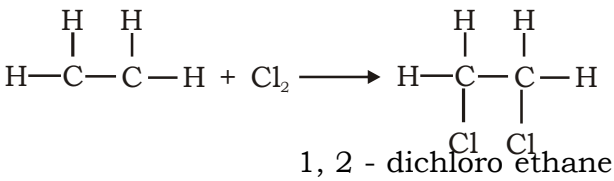
(a) (i) $CH_3COONa + NaOH \xrightarrow[\Delta]{CaO} CH_4 + Na_2CO_3$

Sodium acetate Soda lime **1**

(ii) $C_2H_4 + Cl_2 \longrightarrow C_2H_4Cl_2$

ethene chlorine dichloro ethane

or

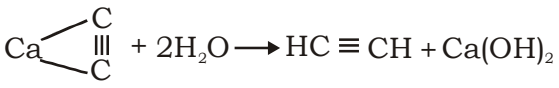


2

(iii) $CaC_2 + 2H_2O \longrightarrow C_2H_2 + Ca(OH)_2$

Calcium carbide — ethyne

or



$Ca(C \equiv C) + 2H_2O \longrightarrow HC \equiv CH + Ca(OH)_2$ **2**

(b) (i) Haber's Process **1**

(ii) Nitrogen and hydrogen are taken in the ratio 1 : 3 respectively. **1**

(iii) Finely divided iron or iron (III) oxide **1**

(iv) $N_2 + 3H_2 \rightleftharpoons 2NH_3 + \Delta$ **1**

(v) Reducing action of ammonia :

$3PbO + 2NH_3 \longrightarrow 3Pb + 3H_2O + N_2\uparrow$

OR

$3CuO + 2NH_3 \longrightarrow 3Cu + 3H_2O + N_2\uparrow$

(Consider any one reaction) **1**

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