NEB - GRADE XII
2077 (2020)
Chemistry

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Time: 1:30 hrs.   **Full Marks (Condense): 30**

Group 'A'

Attempt any **five** questions.   5x2=10

1. What are hybrid orbitals? Draw hybrid structure of methane.
2. What do you mean by normality of a solution is 1N?
3. Distinguish between electrochemical equivalent and chemical equivalent.
4. On what factors the Rate of reaction depends?
5. Write the chemical formula of Green Vitriol.
6. Give an example of Coupling reaction.
7. Draw the structure of Glucose and fructose.

Group 'B'

Attempt any **two** questions.   2x5=10

1. Define the terms;
   i. Titration error   ii. Standard solution
   Calculate the volume of 1M NaOH required to neutralize 200cc of 2M HCl. What mass of sodium chloride are produced from the neutralized reaction?

2. Name a primary reference electrode and mention its one important use.
   For a cell;
   $Mg(s)/Mg^{++}(1M)//Cu^{++}(1M)/Cu(s)$
   $E^o Mg(s)/Mg^{++}= 2.37$ V and $E^oCu^{++}/Cu= +0.34$ V
   i. Indicate cathode and anode
   ii. Write the reaction taking place at electrode.
   iii. Calculate the emf at 1M solution of its ions.

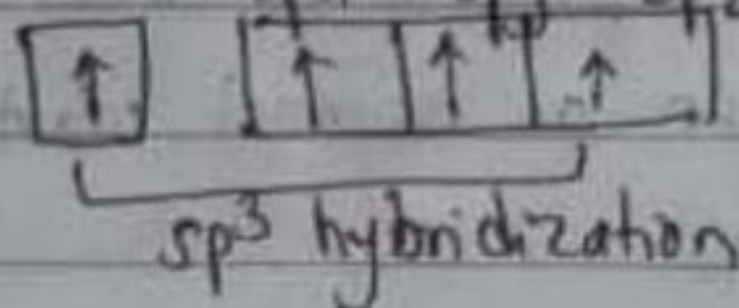3. How would you separate 1°, 2°, 3° amines from their mixture by Hoffmann's method?

Group 'A'

1). What are hybrid orbitals ? Draw hybrid structure of methane ?

Ans: The process of mixing of dissimilar atomic orbitals of same atom giving rise to equal number of a new set of orbitals having same energy is known as hybridization and new orbital is called hybrid orbitals.
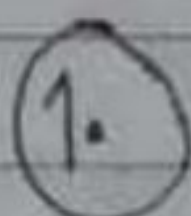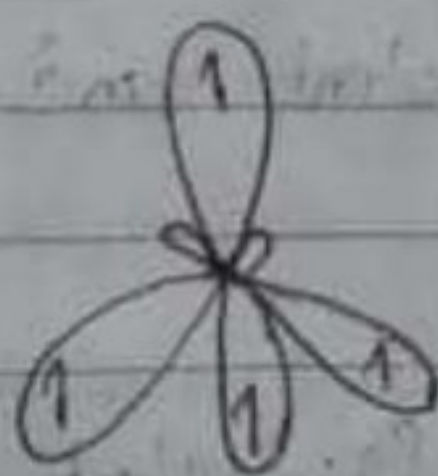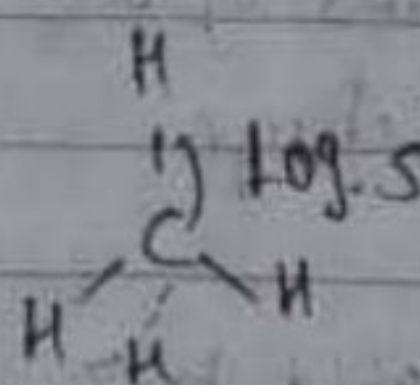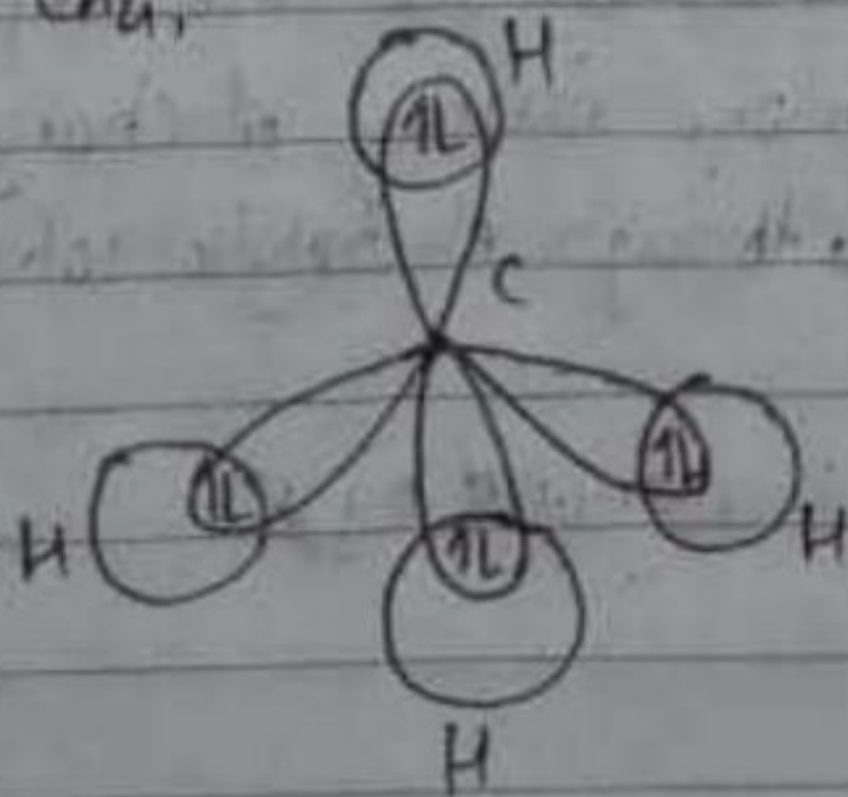
methane (CH_4)

$C_{gs} = 1s^2 \, 2s^2 \, 2p^2$

$C_{es} = 1s^2 \; 2s^1 \; 2p_x^1 \; 2p_y^1 \; 2p_z^1$

$$\boxed{\uparrow} \quad \boxed{\uparrow \mid \uparrow \mid \uparrow}$$

sp^3 hybridization

for C,   for H

for CH_4,

$\Rightarrow$

i) $109.5°$

2) What do you mean by normality of a solution is 1 N?

Ans:

Normality is defined as the number of gram equivalent of solute present in one litre of solution. It is denoted by N.

$$Normality = \frac{no \ of \ gram \ equivalent \ of \ solute}{volume \ of \ solution \ in \ litre}$$

Normality of a solution is 1 N means that one gram equivalent of substance is present in one litre of its solution. It is also known as normal solution.

3) Distinguish between electrochemical equivalent and chemical equivalent.

Ans.

Electrochemical equivalent	Chemical Equivalent
1. The mass of substance deposited or liberated by one coulomb of charge.	1. The mass of substance deposited when one faraday of charge is passed through electrolytic solution
2. It is denoted by Z.	2. It is denoted by E.

4) On what factors the Rate of reaction depends?

Ans Rate of reaction is defined as the change in concentration of reactants or products per unit time. It depends upon the following factors:
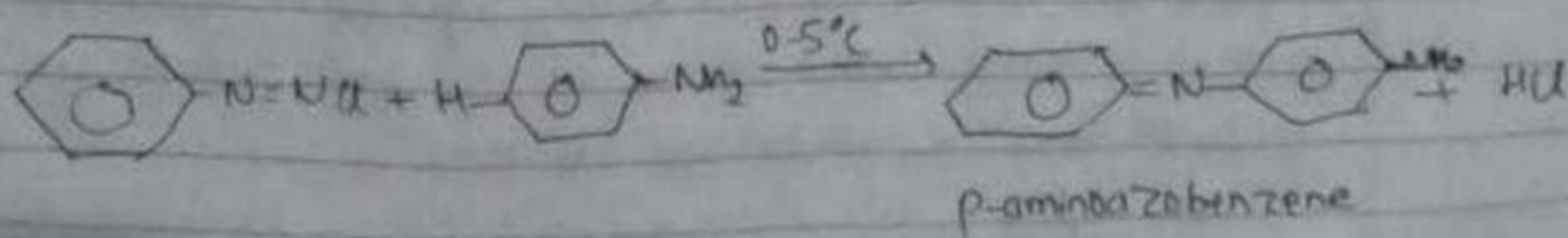
i) Nature of reactant
ii) Concentration of reactants
iii) Temperature
iv) Catalyst
v) Surface area of reactants
vi) Light

5. Write the chemical formula of green vitriol.

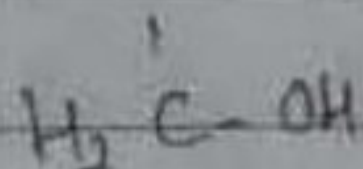Ans ferrous sulphate heptahydrate ($FeSO_4 \cdot 7H_2O$) is the chemical formula of green vitriol.

6) Give an example of Coupling reaction.

Ans When aniline is treated with benzene diazonium chloride, p-amino azobenzene is obtained. This reaction is known as coupling reaction.

$$\langle O \rangle - N = Na \cdot Cl + H - \langle O \rangle - NH_2 \xrightarrow{0-5°C} \langle O \rangle = N - \langle O \rangle - NH_2 + HCl$$

p-aminoazobenzene

7. Draw the structure of Glucose and fructose

Ans:

$H-C=O$ H_2C-OH

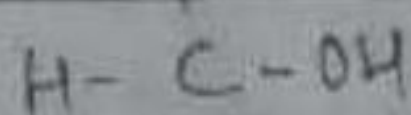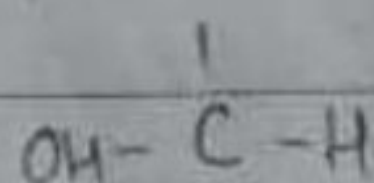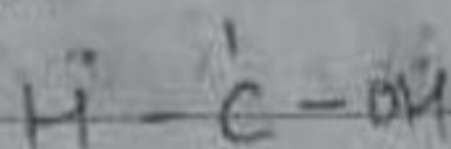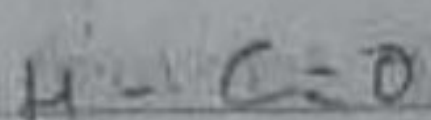$H-\overset{|}{C}-OH$ $\overset{|}{C}=O$

$OH-\overset{|}{C}-H$ $OH-\overset{|}{C}-H$

$H-\overset{|}{C}-OH$ $H\;\overset{|}{C}-OH$

$H-\overset{|}{C}-OH$ $H-\overset{|}{C}-OH$

$H_2\overset{|}{C}-OH$ $H_2\overset{|}{C}-OH$
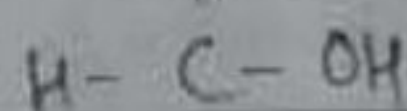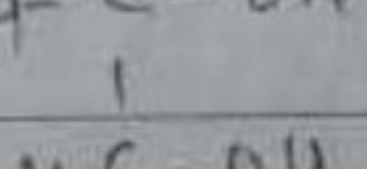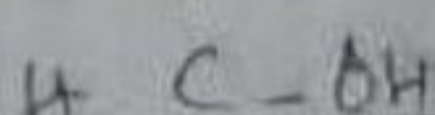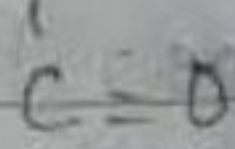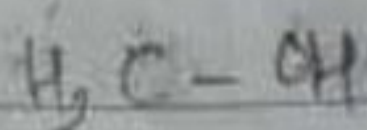
Glucose (aldohexose)   fructose (ketohexose)

Group 'B'

1. Define the terms:

i. Titration error: The difference between the equivalence point and end point is called titration error.

ii. Standard Solution: The solution whose concentration is known is called standard solution.

Calculate the volume of 1 M NaOH required to neutralize 200cc of 2M HCl. What volume of sodium chloride are produced from the neutralized reaction.

Sol^n:

$V_1 = ?$ $V_2 = 200cc$

$N_1 = M_1 = 1N$ $N_2 = 2M = 2N$

Q. Name a primary reference electrode and mention its important use.

Ans: A primary reference electrode is an electrode which has a stable and well-known electrode potential. Standard Hydrogen Electrode is an example of primary reference electrode. Its potential is assumed to be zero and used to calculate cell potential using different electrodes.

Ans

Numerical:

The given cell notation is as:

$Mg(s) / Mg^{2+}(1M) // Cu^{2+}(1M) / Cu(s)$
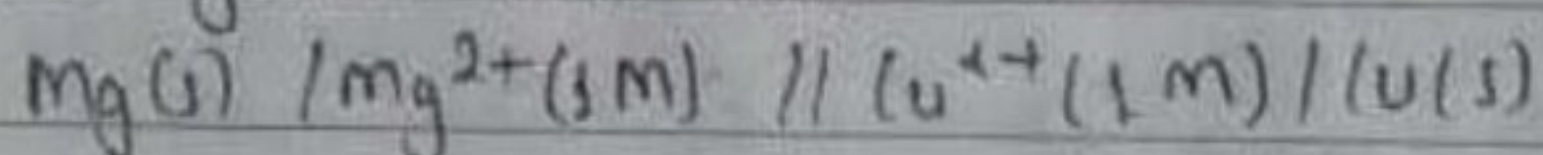
Anode   Cathode

$-2.37V$ $+0.34V$

i. $Mg(s) | Mg^{2+}$ is anode and $Cu^{2+}/Cu(s)$ is cathode.

ii. Mg acts act as anode which undergoes oxidation and Cu acts as cathode where reduction takes place.

$$Mg \rightarrow Mg^{2+} + 2e^- \text{ (oxidation)}$$
$$Cu^{2+} + 2e^- \rightarrow Cu \text{ (reduction)}$$
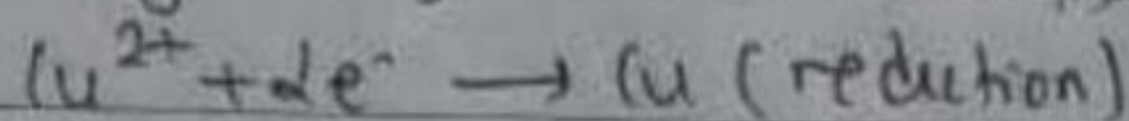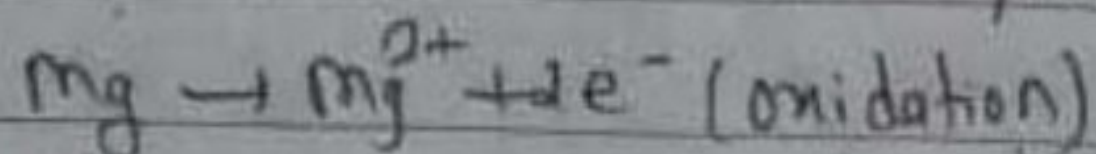
iii. Emf of cell

$E^\circ cell = E^\circ red (cathode) - E^\circ red (anode)$

$= +0.34 - (-2.37)$

$= +2.71 V$

from the normality eq^n.

$$N_1 V_1 = N_2 V_2$$

or. $1 \times V_1 = 200 \times 2$

$\Rightarrow V_1 = 400 \, cc.$

Now.

$$NaOH + HCl \longrightarrow NaCl + H_2O$$
$$40 \, gm \qquad\qquad\qquad 58.5 \, gm$$
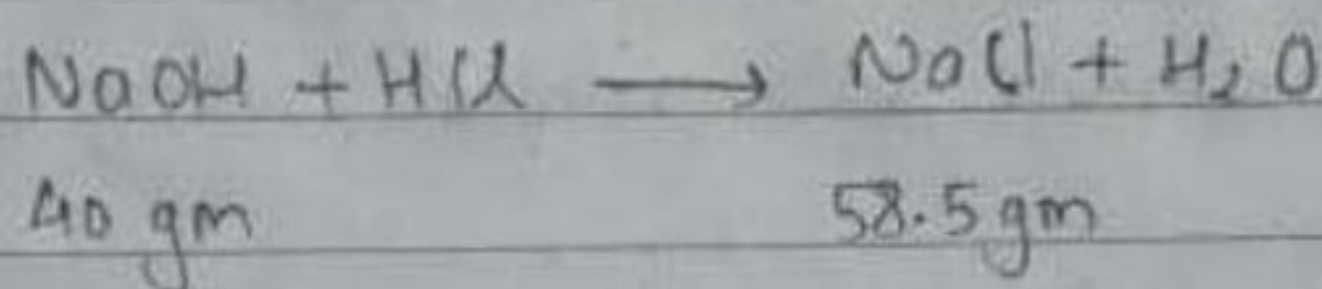
for NaOH,

$$\omega = \frac{NEV}{1000} = \frac{1 \times 400 \times 40}{1000} = 16 \, gm$$

$\therefore$ 40 gm of NaOH gives 58.5 gm of NaCl

16 gm of NaOH gives $\left(\dfrac{58.5}{40} \times 16 \right)$ gm of NaCl

$$= 23.4 \, gm \text{ of } NaCl$$

3. How would you separate $1°, 2°, 3°$ amines from their mixture by Hoffman's method?

Ans. The mixture of $1°, 2°$ and $3°$ amines can be separated by treating it with hoffman's reagent ie diethyl oxalate.

$$2R-NH_2 + \underset{COOC_2H_5}{COOC_2H_5} \longrightarrow \underset{CONHR}{CONHR} + 2C_2H_5OH$$

1° amine — diethyl oxamide (solid)

$$R_2-NH + \underset{COOC_2H_5}{COOC_2H_5} \longrightarrow \underset{COOC_2H_5}{CONR_2} + C_2H_5OH$$

diethyl oxamic ester (oily liquid)

$$R_3-N + \underset{COOC_2H_5}{COOC_2H_5} \longrightarrow No\ reaction$$
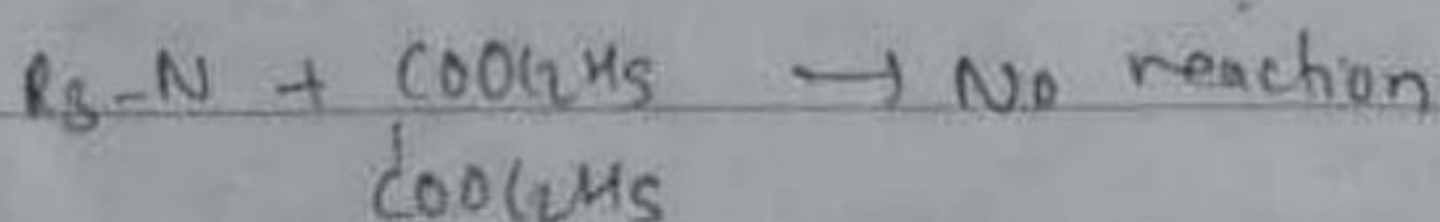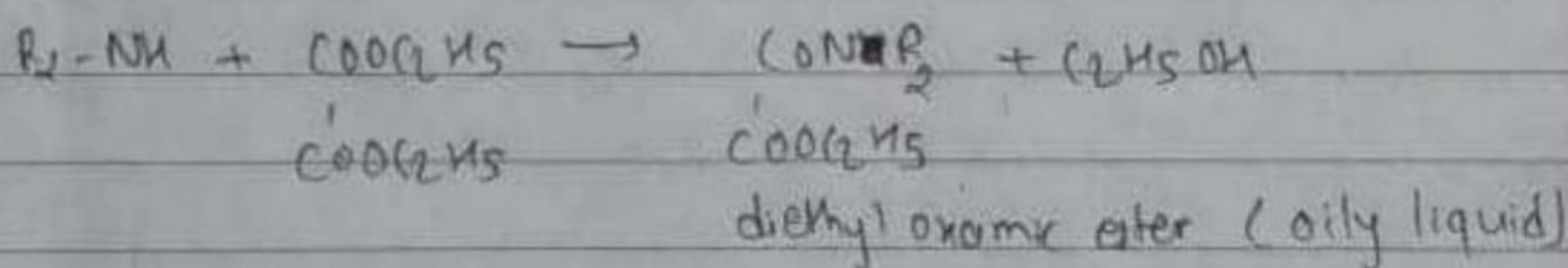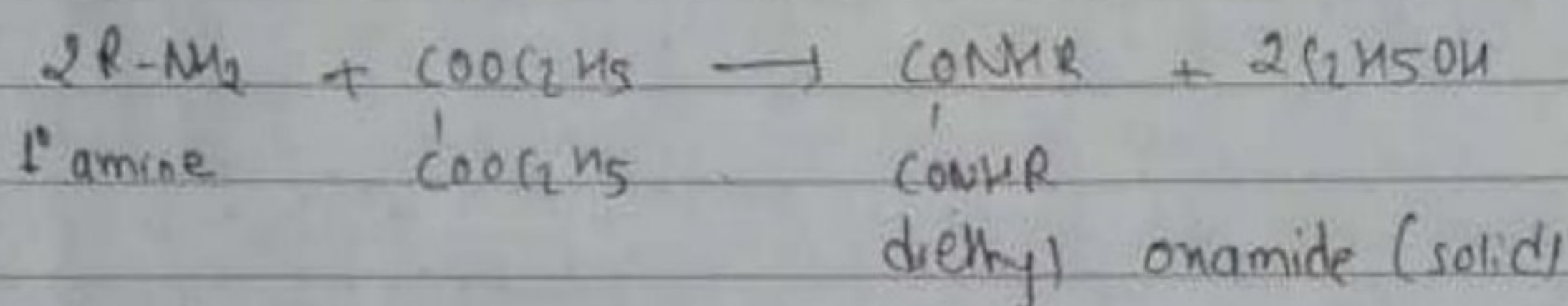
Now the mixture containing diethyl oxamide, diethyl oxamic ester, tertiary amine and alcohol are subjected to filtration. The diethyl oxamide is obtained as residue and is treated with aq. KOH to obtain primary amine.

$$\underset{CONHR}{CONHR} + aq.\ KOH \longrightarrow \underset{COOK}{COOK} + R-NH_2$$
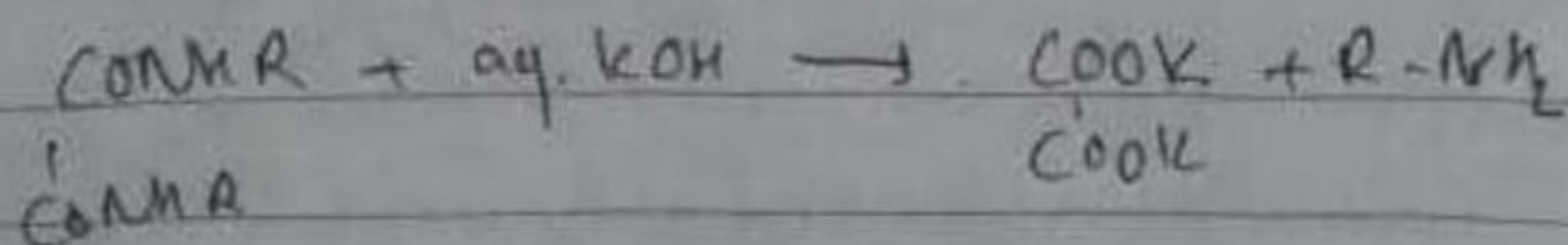
Now the mixture containing diethyl oxamic ester, ethanol and tertiary amine is subjected to fractional distillation.

$$\underset{\underset{COOC_2H_5}{|}}{CONHR} + aq.\ KOH \longrightarrow \underset{COOK}{\overset{COOK}{|}} + R_2NH + C_2H_5OH$$
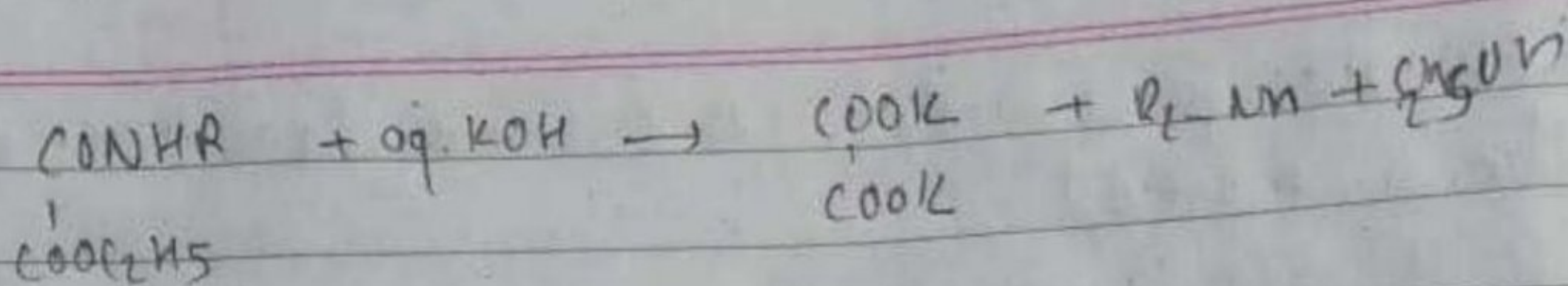
In this way, $1°, 2°$ and $3°$ amines are separated.

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Chemistry

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Time: 1:30 hrs.   Full Marks (Condense): 30

Group 'A'

Attempt any five questions.   5x2=10

1. What is the mode of hybridization of B in BF_3? Write any two important features of this hybridization.
2. Distinguish between end point and equivalence point of reaction.
3. What is meant by single electrode potential? How is it measured?
4. Define enthalpy of formation giving an example of it.
5. Give the balanced chemical reaction for the preparation of black oxide from blue vitriol. How is black oxide converted into red oxide?
6. What is Williamson's etherification reaction?
7. A primary haloalkane (X), if allowed to react with KCN yields a compound(Y), which on acidic hydrolysis gave propanoic acid. Identify (X) and (Y).

Group 'B'

Attempt any two questions.   2x5=10

8. Are all standard solutions, primary standard solutions or not? Give reason. 1 g of a divalent metal was dissolved in 25mL of 2N H_2SO_4 (f=1.01). The excess acid required 15.1mL of 1N NaOH (f= 0.8) for complete neutralization. Find the atomic weight of the metal.
9. What is meant by enthalpy of formation? Calculate the enthalpy of formation of ethane at 298 K, if the enthalpies of combustion of C, H and C_2H_6 are - 94.14, - 68.47 and - 373.3 KCal respectively.
10. An Organic Compound (A) reacts with PBr_3 to give (B). Compound B produces (C) when heated with alc. KOH. The compound (C) undergoes ozonolysis to yield ethanal and methanal as major products. The compound A responses iodoform test. Identify A, B, C and write reactions involved. How is (A) obtained from CH_3MgBr?

Group 'C'

Attempt any **one** question. 1x10=10

11. Give a suitable chemical reaction for the laboratory preparation of trichloromethane. What happens when trichloromethane reacts with

i. Phenol   ii. Nitric acid

iii. Silver powder   iv. Atmospheric air.

12. Define the terms (i) activation energy (ii) order of reaction (iii) molecularity of reaction (iv) effective collision (v) rate law equation.

Why does powder sugar dissolve faster than grain sugar?

The following data were obtained for a hypothetical reaction

$x + y \longrightarrow z$

Expt	[x] mol L^{-1}	[y] mol L^{-1}	Formation of z mol L^{-1} S^{-1}
1	0.20	0.20	3×10^{-3}
2	0.40	0.20	1.2×10^{-2}
3	0.60	0.40	6×10^{-3}
4	0.80	0.20	9×10^{-3}

Group 'A'

1→ The mode of hybridization of B in BF3 is sp² hybridi-zation.

① The important feature of this hybridization are :
ⓐ The bond angle of sp² hybridization orbital is 120° and traingular shape.
ⓑ sp² hybridization poses 33.3% of S character and 66.7% of p character.

2→

| Endpoint/Neutral point	equivalence point
The point in a titration at which reaction betⁿ 2 solution is just completed and at which indicator can show sharp colour change is called end point.	The point in a titration in which equivalent quantity of titrant is just completly neutralized by titrand is called equivalence point.

3→ Single electrode potential : When a metal is dipped into a solution containing it's own ion, a potential is devloped betⁿ them. This is called single electrode potential. It is measured by the separation of charge betⁿ the metal electrode and it's solution. example :

When zinc is metal rod is immersed into the zinc sulphate solution, zinc metal lose electron and zins

ion is formed. The zinc ion passes into the solution keeping leaving behind the electrons in the metal surface.

4 -> The heat change when one mole of substance is formed from its own elements in their ~~neutra~~ natural state is called heat of formation or enthalphy of formation.

eg:
$$H_2(g) + \frac{1}{2} O_2(g) \longrightarrow H_2O(I), \Delta H = -286.2 KJ$$
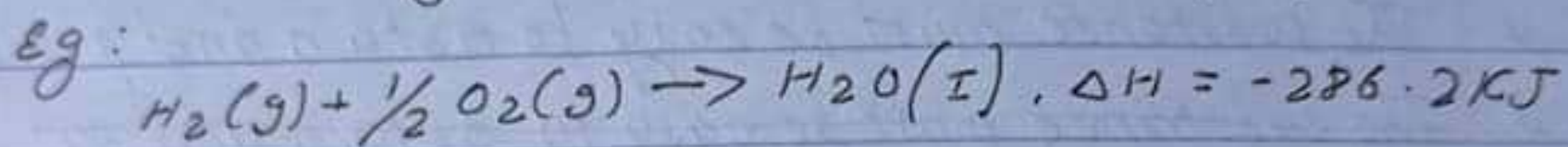
6 -> The reaction in which alkyl halide and sod. or pot. alkoxide are reacted to form ether is known as Williomson's etherification reaction.

$$R-ONa + R'-X \xrightarrow{\Delta} R-O-R' + NaX$$
$$\text{ether}$$
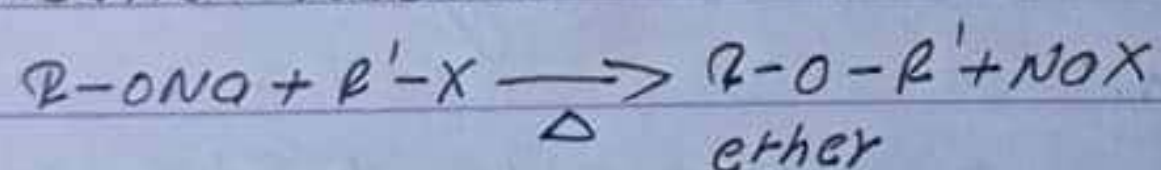
7 -> The compound (Y) is obtained from the compound (X) on treatment with KCN ~~solution~~ which on hydrolysis gives propanoic acid. The compound (Y) must be CH_3CH_2CN. The compound (Y) is obtained from (X) with KCN. So, the compound (X) must be CH_3CH_2-X. This conversion can be confirmed by the following reaction.

$$H_3C-CH_2-X \xrightarrow{KCN} H_3C-CH_2CN \xrightarrow{Hydrolysis}$$
$$\text{ethyl cyanide}$$
$$H_3C-CH_2-\overset{O}{\overset{||}{C}}-OH$$
$$\text{propanoic acid.}$$
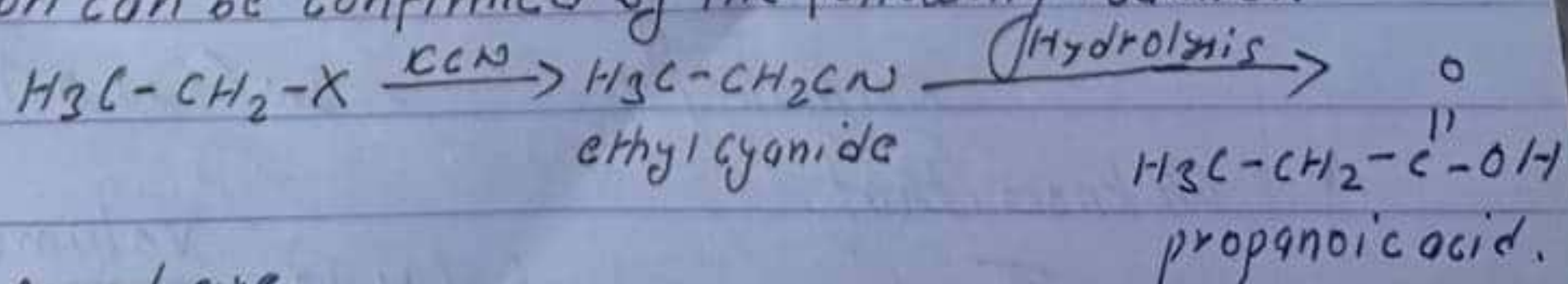
The compound are.

X = Haloethene

Y = ethyl cyanide

Attempt ony two question

8→ Not, all standard solution are not primary standard solution.
To be a primary standard, a substance must fulfill the
following criteria :

1. The substance must be easy to obtain and purity.
2. ~~The substance must be easy to obtain and pu~~
2. The substance must not be hygroscopic or efflorescent of
deliquescent.
8. The composition should not charge during storage or weighing.
4. The substance should be readily soluble under the employed
condition.
5. The substance should have high molecular mass

Numerical :

Given,

$$The\ wt\ of\ the\ metal = 1\,g$$
$$The\ volency\ of\ metal = 2$$

for acid :

$$Volume\ of\ acid\ (H_2SO_4) = 25ml$$
$$Normality\ '' \quad '' = 2N\,(f=1.01)$$

We know that,

$$The\ gm\text{-}equivalent\ of\ H_2SO_4 = \frac{volume \times Normality}{1000}$$

$$= \frac{25 \times 2 \times 1.01}{1000}$$

$$= 0.0505$$

For base :

Volume of base $(NaOH) = 15.1 ml$

Normality of acid $= 1N (f = 0.8)$

We know that.

The gm equivalent of $NaOH = \dfrac{volume \times Normality}{1000}$

$$= \dfrac{15.1 \times 1 \times 0.8}{1000}$$

$$= 0.01208$$

For metal

The gm·equivalent of metal $F = \dfrac{weight\ of\ metal}{\text{Eq·wt. of metal}} = \dfrac{15.1 \times 1 \times 0.8}{1000}$

$$= 0.01208$$

$$\dfrac{wt\ of\ metal}{\text{Eq·wt of metal}} = \dfrac{1}{\text{Eq·wt. of metal}}$$

We know that

The gm equivalent of metal = The gm. equivalent of H_2SO_4 − The gm. equivalent of $NaOH$

$$\dfrac{1}{\text{Eq·wt of metal}} = (0.0505 - 0.01208) = 0.03842$$

$\therefore$ Eq·wt of metal $= 26.02$

Hence, the atomic wt. of metal $= $ Eq·wt $\times$ Valency $=$

$$26.02 \times 2 = 52.05\ amu$$

9→ **Enthalpy of formation :** The quantity of heat change is involved when one mole of chemical substance is formed from it's constituent element is known as enthalphy of formation. It is denoted by ΔH

Numerical.

Given.

Enthalpy of combustion of carbon i.e. formation of carbondioxide

$$C(s) + O_2(g) \rightarrow CO_2(s), \quad \Delta H = -94.14 \, kcal. \quad —①$$
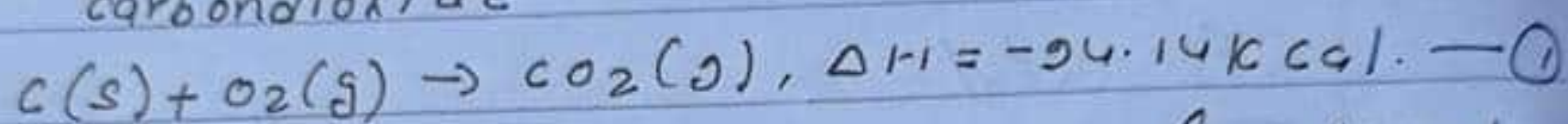
Enthalpy of combustion of hydrogen i.e. formatin of water.

$$H_2(g) + \frac{1}{2}(O_2)g \rightarrow H_2O(l), \quad \Delta H = -68.97 \, kcal \quad ②$$
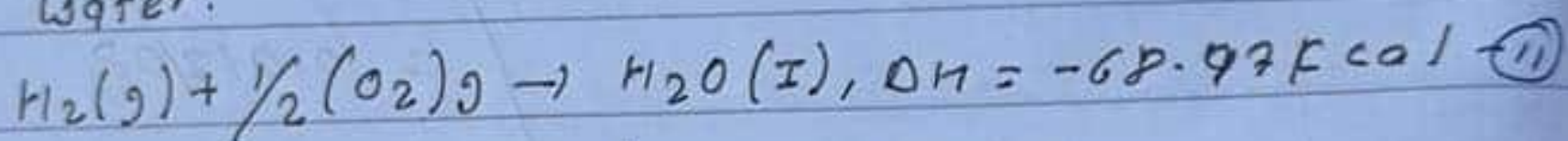
Enthalpy of combustion of ethane i.e. C_2H_6

$$C_2H_6(s) + \frac{7}{2}O_2(g) \rightarrow 3H_2O(l) + 2CO_2(g), \quad \Delta H = -373.3 \, kcal \quad ③$$

Enthalpy of formation of ethane

$$2(c) \quad 2C(s) + 3H_2(g) \rightarrow C_2H_6(g), \quad \Delta H = ?$$
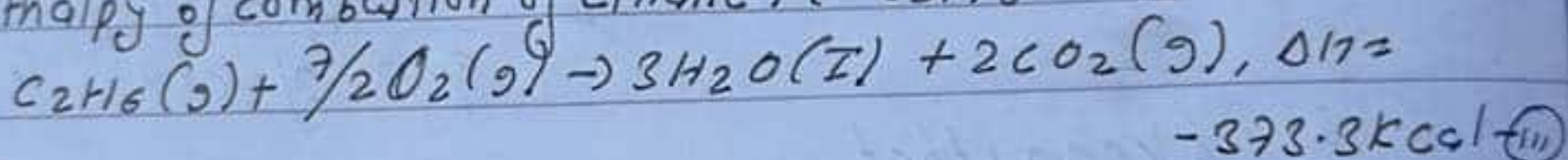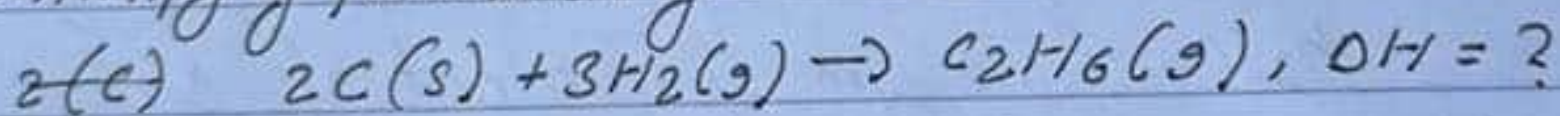
eq. ① is multiplied 2 and eq.② is multiplied by 3 and adding both the eqⁿ then we get.

$$2×c \quad 2C(s) + 2O_2(g) \rightarrow 2CO_2(s), \quad \Delta H = 2×(-94.14 kcal) =$$
$$-188.28 \, kcal$$

$$3H_2(s) + \frac{3}{2}O_2(g) \rightarrow 3H_2O(l), \quad \Delta H = 3×-68.47 \, kcal =$$
$$-205.41 \, kcal$$

$$3H_2(g) + 2C(s) + \frac{7}{2}O_2(g) \rightarrow 2CO_2 + 3H_2O(l), \quad \Delta H = -393.69 \, kcal \quad ④$$

Subtracting eqⁿ ③ from eqⁿ ④ we get

Be-H $3H_2(g) + 2C(s) + \frac{7}{2}O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$,

$$\Delta H = -393.69 \, Kcal$$

$C_2H_6(g) + \frac{7}{2}O_2(g) \longrightarrow 3H_2O(l) + 2CO_2(g)$, $\Delta H = -373.3 \, k$

$$+ \quad cal$$

$$-$$

$$\therefore \quad 3H_2(g) + 2C(s) \longrightarrow C_2H_6(g), \Delta H = -20.39 \, Kcal$$
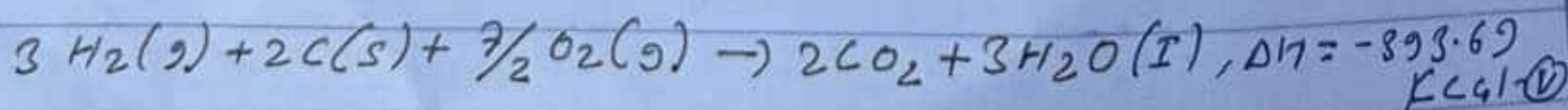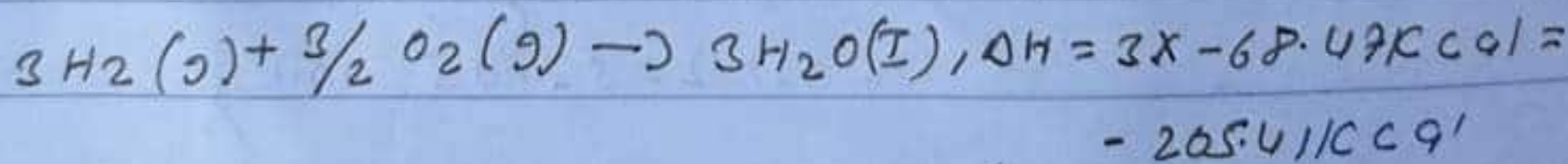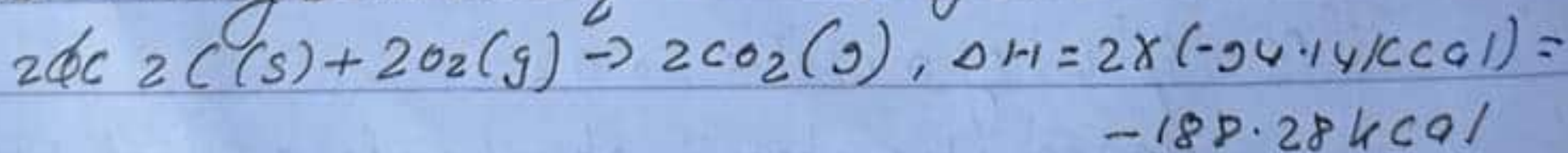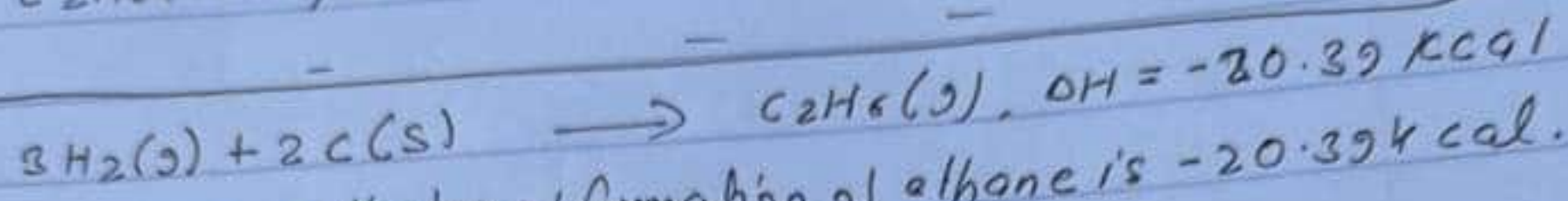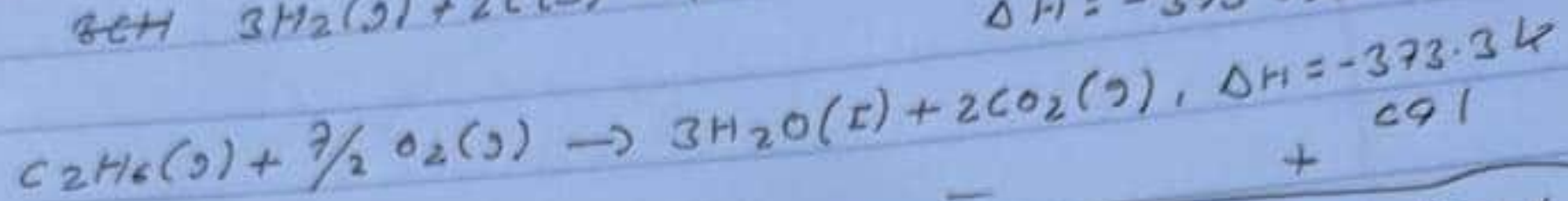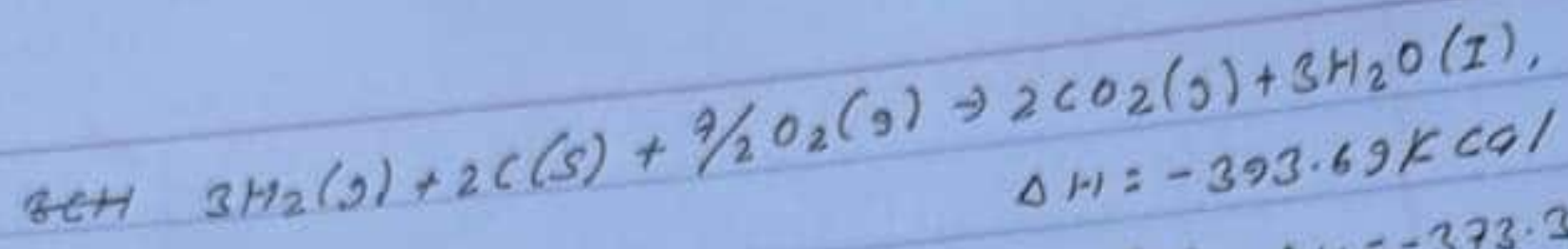
Hence, enthalpy of formation of ethane is $-20.39 \, k \, cal$.

Group 'c'

11 - Guide ko. p.g. no. 211
12 - Guide. ko. p.g. no. 167

LONG ANSWER QUESTIONS

2076 Set B Q.No. 32 Define the terms (i) activation energy (ii) order of reaction (iii) molecularity of reaction (iv) effective collision (v) rate law equation.

Why does powder sugar dissolve faster than grain sugar?

The following data were obtained for a hypothetical reaction $x + y \longrightarrow z$

Expt.	[x] mol L⁻¹	[y] mol L⁻¹	formation of z mol L⁻¹ S⁻¹
1	0.20	0.20	3×10^{-3}
2	0.40	0.20	1.2×10^{-2}
3	0.20	0.40	6×10^{-3}
4	0.60	0.20	9×10^{-3}

Calculate the rate constant and find out rate of disappearance of y when [x] = 0.2 mol L⁻¹ and [y] = 0.4 mol L⁻¹.

[5+1+2+2]

i. **Activation energy:** The minimum energy over the average energy which must be gained by the reacting molecules before they could react to form the product is called activation energy.

ii. **Order of reaction:** The sum of powers of concentration terms of reacting subastance which is appearing in its rate law equation is called order of reaction.

iii. **Molecularity of a reaction:** The total number of atoms or molecules which take part in any chemical reaction is called molecularity of a reaction.

iv. **Effective collision:** Effective collisions are those that result in a chemical reaction. In order to produce an effective collision, reactant particles must possess some minimum amount of energy. This energy, used to initiate the reaction, is called the activation energy.

v. **Rate law equation:** The mathematical expression that gives the true rate of reaction in terms of concentration which influences the rate of reaction is called rate law.

Numerical:

The reaction $x + y \longrightarrow z$

$Rate = k[x]^m[y]^n$

Therefore,

$3 \times 10^{-3} = k[0.2]^m[0.2]^n$ ...(i)

$1.2 \times 10^{-2} = k[0.4]^m[0.2]^n$ ... (ii)

$6 \times 10^{-3} = k[0.2]^m[0.4]^n$ ...(iii)

$9 \times 10^{-3} = k[0.6]^m[0.2]^n$ ...(iv)

Dividing equation (ii) by (i) we get

$$\frac{1.2 \times 10^{-2}}{3 \times 10^{-3}} = \frac{k[0.4]^m[0.2]^n}{k[0.2]^m[0.2]^n}$$

or, $4 = 2^m$

or, $2^2 = 2^m$

or, $m = 2$

The reaction is 2nd order with respect to x

Again, dividing equation (iii) by (i) we get

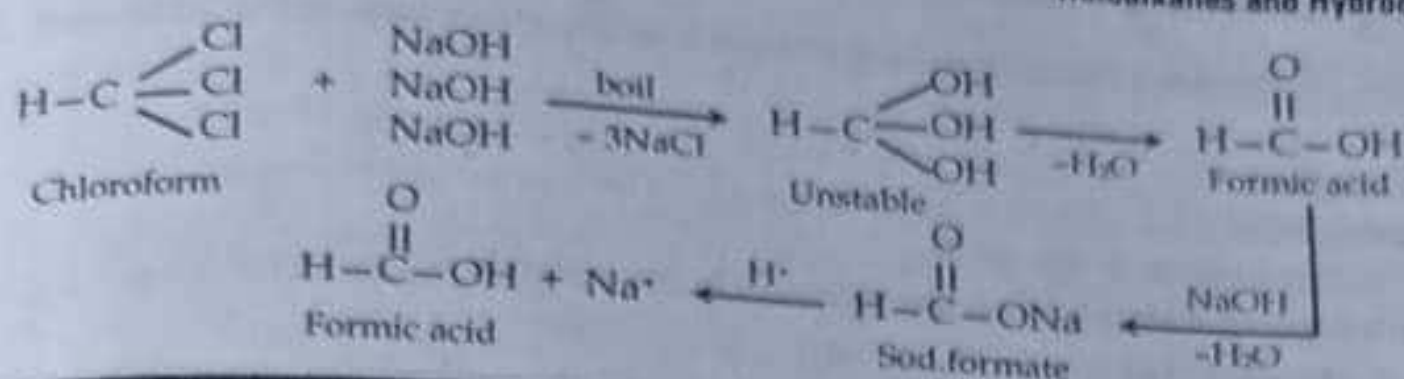$$\frac{6 \times 10^{-3}}{3 \times 10^{-3}} = \frac{k[0.2]^m[0.4]^n}{k[0.2]^m[0.2]^n}$$

or, $2^1 = 2^n$

or, $n = 1$

The reaction is 1st order with respect to y

Hence, the rate law expression is

$Rate = k[x]^2[y]^1$

[4+1]

$$H-C\begin{smallmatrix}Cl\\Cl\\Cl\end{smallmatrix} + \begin{smallmatrix}NaOH\\NaOH\\NaOH\end{smallmatrix} \xrightarrow[-3NaCl]{boil} H-C\begin{smallmatrix}OH\\OH\\OH\end{smallmatrix} \xrightarrow{-H_2O} H-\overset{O}{\overset{||}{C}}-OH$$

Chloroform .... Unstable .... Formic acid

$$H-\overset{O}{\overset{||}{C}}-OH + Na^\cdot \longleftarrow H^\cdot \quad H-\overset{O}{\overset{||}{C}}-ONa \xleftarrow[-H_2O]{NaOH}$$

Formic acid .... Sod. formate

LONG ANSWER QUESTIONS [10 MARKS]

53. **2070 Set C Q.No. 31 b** Give a suitable chemical reaction for the laboratory preparation of trichloromethane. What happen when chloromethane reacts with
i. Phenol
ii. Nitric acid
iii. Silver powder
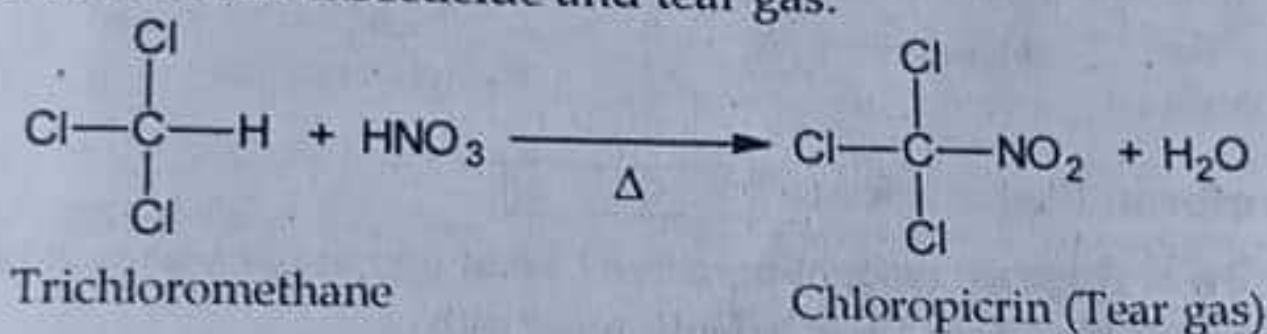iv. Atmospheric air.   [10]

➤ Laboratory preparation of trichloroform: Please refer to **2076 Set B Q.No. 28**
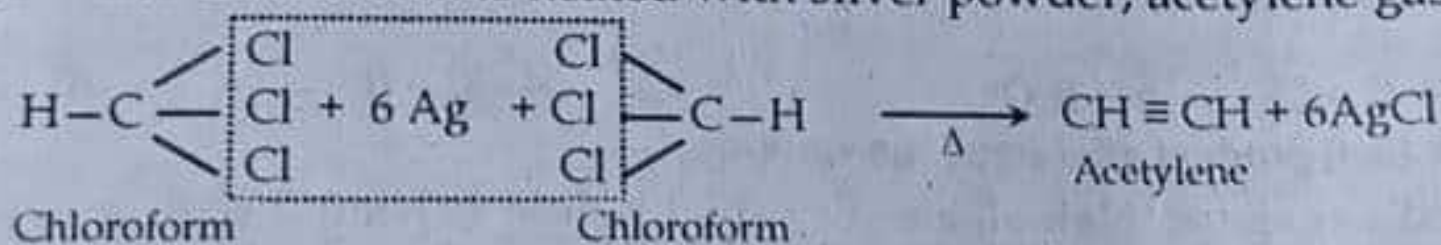
Trichloromethane reacts with:

i. **Phenol:** When phenol is heated with chloroform in the presence of aqueous KOH at 70°C, a mixture of o-hydroxy benzaldehyde and p-hydroxy benzaldehyde is obtained. This reaction is known as Reimer-Tiemann reaction.

Phenol + CHCl₃ + 3 KOH ⟶ (o-hydroxy benzaldehyde 40%) + (p-hydroxy benzaldehyde 10%) + KCl + 2 H₂O
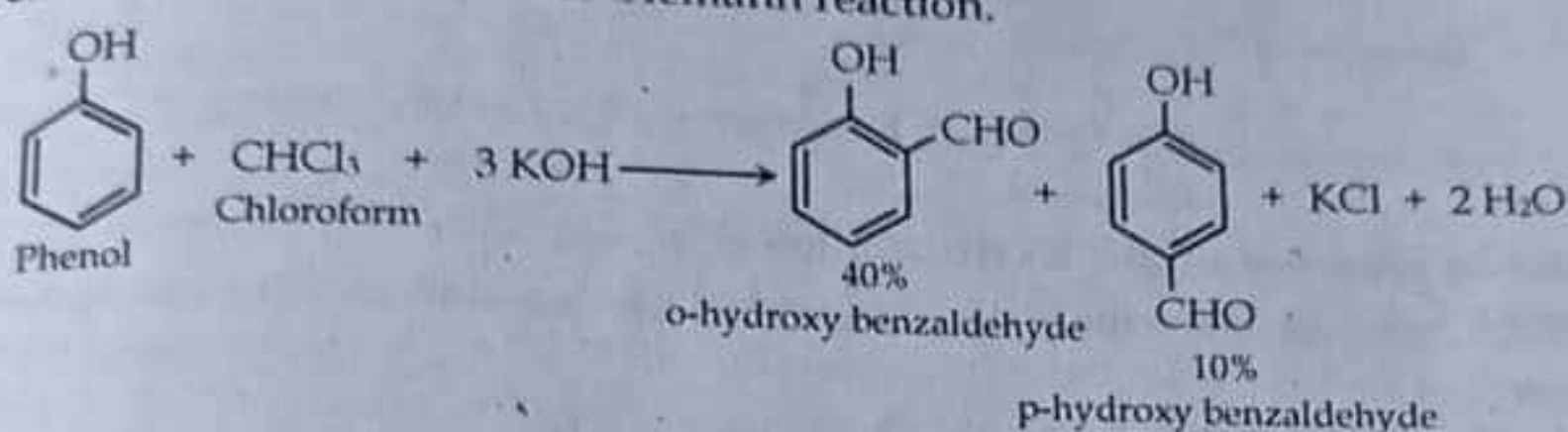
ii. **Nitric acid (Chloroform):** Trichloromethane is heated with Conc. HNO_3, chloropicrin is formed which is used as an insecticide and tear gas.

$$Cl-\underset{Cl}{\overset{Cl}{\underset{|}{\overset{|}{C}}}}-H + HNO_3 \xrightarrow{\Delta} Cl-\underset{Cl}{\overset{Cl}{\underset{|}{\overset{|}{C}}}}-NO_2 + H_2O$$

Trichloromethane .... Chloropicrin (Tear gas)

iii. **Silver powder:** When chloroform is heated with silver powder, acetylene gas is formed.

$$H-C\begin{smallmatrix}Cl\\Cl\\Cl\end{smallmatrix} + 6 Ag + \begin{smallmatrix}Cl\\Cl\\Cl\end{smallmatrix}C-H \xrightarrow{\Delta} CH\equiv CH + 6AgCl$$

Chloroform .... Chloroform .... Acetylene

iv. **Atmospheric air:** When Chloroform ($CHCl_3$) is left exposed to air and light, it slowly gets oxidized to phosgene gas or carbonyl chloride ($COCl_2$) which is a poisonous gas.

$$2CHCl_3 + O_2 \longrightarrow 2 COCl_2 + 2HCl$$

Chloroform .... Carbonyl chloride

Chloroform ($CHCl_3$) is used for anesthetic purpose in surgery. Hence, anesthetic chloroform ($CHCl_3$) is kept in brown bottle to cut off light and the bottle is filled completely with chloroform to exclude air. A 1% solution of ethyl alcohol is also added to it to retard oxidation of chloroform. Ethanol converts phosgene to non-poisonous diethyl carbonate.

$$Cl-\overset{O}{\overset{||}{C}}-Cl + 2 H_3C-CH_2-OH \longrightarrow O=C\begin{smallmatrix}O-C_2H_5\\O-C_2H_5\end{smallmatrix} + 2H-Cl$$

Phosgene gas .... Ethanol .... Diethyl carbonate

[4+1]

NEB - GRADE XII
2077 (2020)
Chemistry

Candidates are required to give their answers in their own words as far as practicable. The figures in margin indicate full marks.

Time: 1:30 hrs.   Full Marks (Condense): 30

Group 'A'

Attempt any **five** questions.   5x2=10

1. Predict the structure of water molecule using VSEPR model.
2. What do you mean by equivalent weight of an element?
3. Calculate the pH of 0.1 N H_2SO_4.
4. Why does silver nitrate solution become bluish when copper rod is dipped into it?[Given $E^o\ Cu^{2+}/Cu = 0.34V$ and $E^o\ Ag^+/Ag = 0.80V$]
5. Starting from copper how would you obtain blue vitriol?
6. Why does halogenation in nitrobenzene occur at meta position?
7. What type of polymer is bakelite? Mention its monomers.

Group 'B'

Attempt any **two** questions.   2x5=10

8. What is meant by acidity of base? 500 cc of 2 N Na_2CO_3 are mixed with 400 cc of 3N H_2SO_4 and volume was diluted to one litre. Will the resulting solution be acidic, basic or neutral? Also, calculate the molarity of the dilute solution.

9. State and explain Faraday's 1st law of electrolysis. An electrolytic cell contains a solution of $CuSO_4$ and anode of impose copper. How many Kg of copper will be deposited at cathode by 150 ampere passing for 12 hours?

10. A secondary alcohol (X) reacts with PCL_5 to give an alkyl halide (Y), which on dehydrohalogenation yields an alkene (Z). The alkene (Z) upon ozonolysis gives the mixture of ethanal and methanal. Identify X, Y and Z. Suggest your answer with chemical reaction.

Group 'C'

Attempt any one question. 1x10=10

11. How is pure aniline prepared in the laboratory? Starting from aniline, how would you obtain:

i. Ortho-nitro aniline

ii. N-methylaniline

12. What is meant by the terms:

i. Common ion effect

ii. Solubility product constant (K_{sp})

Explain the common ion effect and solubility product principle in qualitative salt analysis. What will be the resulting pH of a solution prepared by mixing 200 mL of aqueous solution of HCL (pH = 2) with 300 mL of an aqueous solution of NaOH (pH = 12).

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