

Sethu Bhaskara Matriculation Higher Secondary School

Common Quarterly Examination

Chemistry

Std XII

Marks: 70.

Part - I

I Choose the correct answers

1. c) Mg
2. a) Me_3SiCl
3. b) F_2
4. c) 0.6
5. b) $\frac{\pi}{6}$
6. c) 30 minutes
7. b) Strongly acidic
8. a) both assertion and reason are true and reason is the correct explanation of assertion
9. d) Nucleophilic addition
10. a) Formic acid
11. b) Prop-2-enal
12. c) SF_4
13. b) sp^3d
14. a) First order
15. d) Diamond

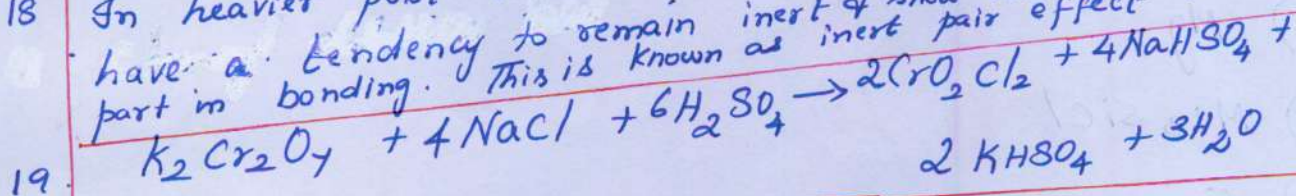
Part - II

16. Sulphide ores can be concentrated by Froth floatation method. 1.
Examples - Galena, Zinc blende 1

17. Uses of Alum

1. It is used for purification of water 2
2. It is used for water proofing textiles 2

18. In heavier post transition elements the outer s electrons have a tendency to remain inert & show reluctance to take part in bonding. This is known as inert pair effect. 2



20. Classify the following solids

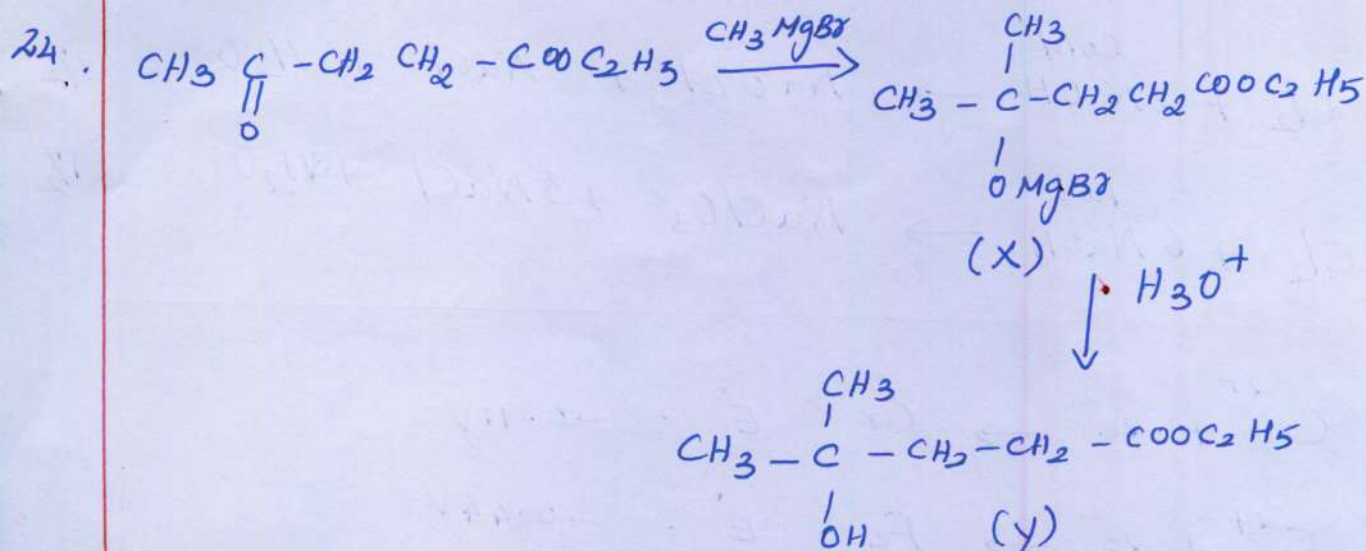
- a) Urea - Molecular solid
- b) Silicon carbide - covalent solid
- c) Brass - Metallic solid
- d) Sodium chloride - Ionic solid

$$\frac{1}{2} \times 4 = 2$$

21. Order of the reaction is defined as the sum of the powers of the concentration terms in the experimentally determined rate law. 2

22. pH is defined as the negative logarithm of base 10 of the molar concentration of the hydronium ions present in the solution.
$$pH = -\log_{10} [H_3O^+]$$
 2

23. C-O-C bond angle in ether is slightly greater than the tetrahedral bond angle due to the repulsive interaction between the two bulkier alkyl groups. 2



2m

Part in

25. Limitations of Ellingham diagram.

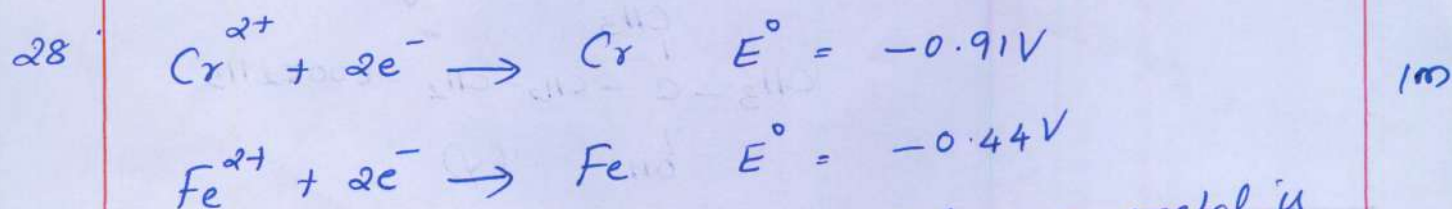
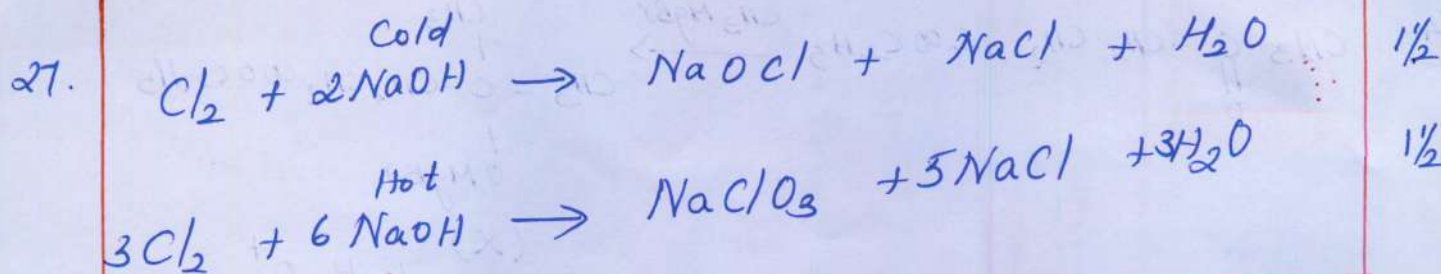
1. It gives information about the thermodynamic feasibility of a reaction. It does not tell anything about the rate of the reaction. 1 1/2
2. The interpretation of ΔG is based on the assumption that the reactants are in equilibrium with the products which is not always true. 1 1/2

26. Catenation is an ability of an element to form chain of atoms.

The following conditions are necessary for catenation.

- i) Valency of the element should be greater than or equal to two.
- ii) Element should have an ability to bond with itself.
- iii) The self bond must be as strong as its bond with other elements.
- iv) Kinetic inertness of catenated compound towards other molecules. Carbon possesses all the above properties & forms a wide range of compounds with itself & with other elements such as H, O, N, S & halogens.

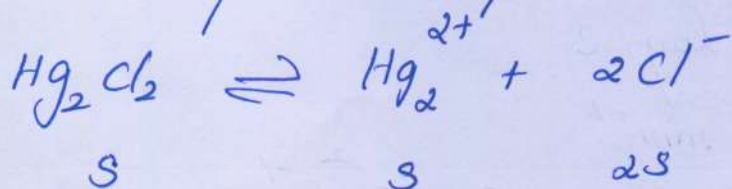
2m



If the standard electrode potential of a metal is large and negative, the metal is a powerful reducing agent. So Cr^{2+} is a stronger reducing agent. 1m

- | 29. | <u>Hexagonal close Packing</u> | <u>Cubic Close packing</u> |
|-----|---|---|
| 1. | Repeating unit of hcp arrangement has two layers of spheres arranged in ab ab... manner | Repeating unit of ccp has 3 layers of spheres arranged in abc abc... manner |
| 2. | In hcp the <u>iii</u> layer is directly over the <u>i</u> layer and the tetrahedral voids of the <u>ii</u> layer are covered by the spheres of the <u>iii</u> layer | In ccp all the spheres of the <u>iii</u> layer fit in the octahedral voids of the <u>ii</u> layer |
| 3. | HCP has hexagonal unit cell | CCP has cubic unit cell |
- 3m

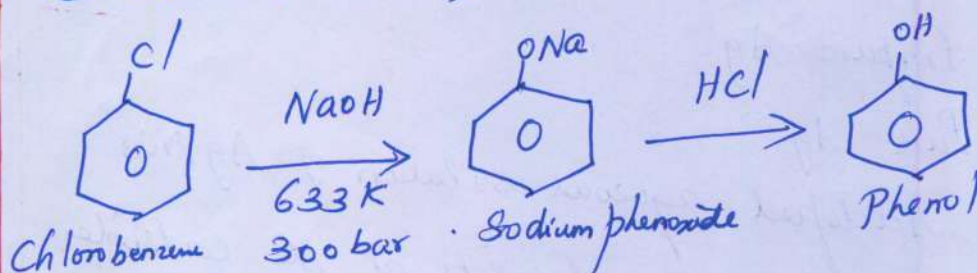
30. Solubility product is defined as the product of molar concentration of constituent ions each raised to the power of stoichiometric coefficient in the balanced equilibrium equation.



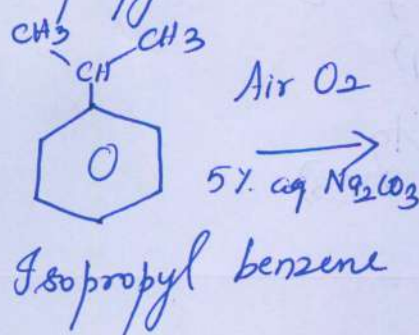
$$K_{sp} = [\text{Hg}_2^{2+}][\text{Cl}^-]^2$$

$$= S(2S)^2 = S \times 4S^2 = 4S^3$$

31. Chlorobenzene $\rightarrow$ Phenol

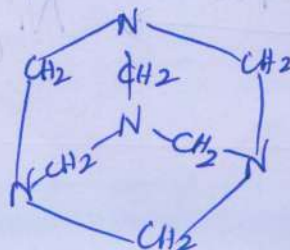


Isopropyl benzene



32. $6 \text{HCHO} + 4 \text{NH}_3 \rightarrow (\text{CH}_2)_6\text{N}_4 + 6 \text{H}_2\text{O}$
 Hexamethylene tetramine

Structure -



33

$$k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$$

$$= \frac{2.303}{1} \log \frac{0.08}{0.04}$$

$$= 2.303 \times \log 2$$

$$= 0.6932 \text{ min}^{-1}$$

$$k = \frac{0.6932}{60} \text{ s}^{-1} = 1.155 \times 10^{-2} \text{ s}^{-1}$$

Part IV.

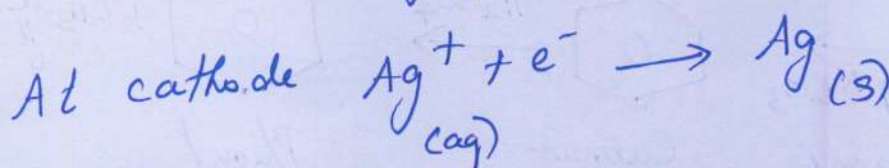
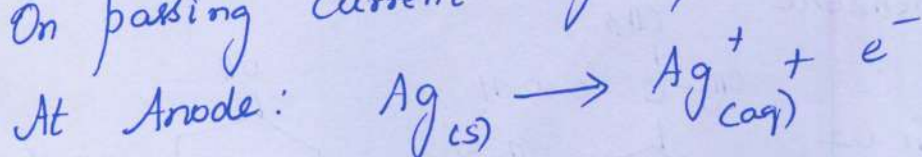
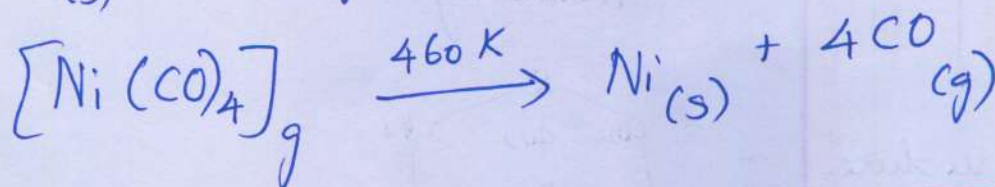
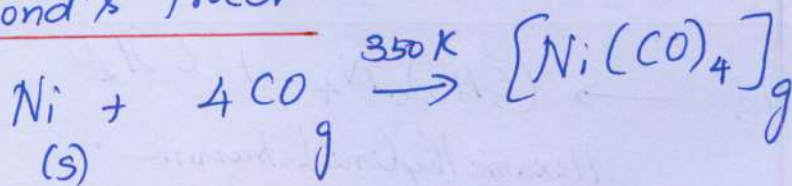
34) a) i) Electrolytic refining of Ag

Anode - Impure Ag

Cathode - Pure Ag

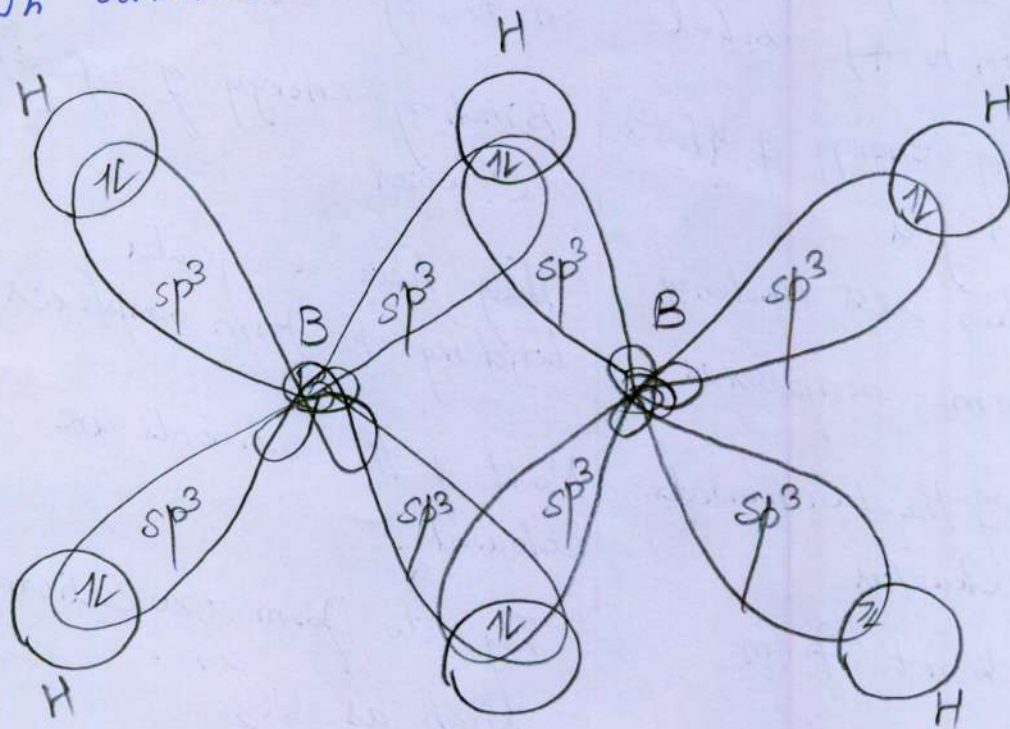
Electrolyte - Acidified aqueous solution of AgNO_3

On passing current Ag deposits at the cathode

ii) Mond's Process

34b) Structure of Diborane.

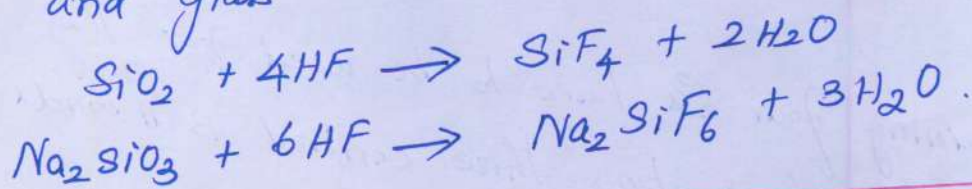
- In diborane two BH_2 units are linked by two bridged hydrogen bonds.
- It has 8 B-H bonds.
- However diborane has only 12 valence e^- & are not sufficient to form normal covalent bonds.
- The four terminal B-H bonds are normal covalent bonds.
- The remaining four e^- have to be used for the bridged bonds (i.e.) two three centred B-H bonds utilise 2 e^- for each.
- In diborane B is sp^3 hybridised.



35a) i) Properties of interhalogen compounds

- 1) The central atom will be the larger one
- 2) It can be formed between two halogens & not more than two halogens
- 3) They are strong oxidising agents

ii) HF cannot be stored in glass bottles because moist hydrofluoric acid rapidly reacts with silica and glass



b) Lanthanoids

1. Differentiating electrons enter into 4f orbital
2. Binding energy of 4f e^- s are higher
3. They show less tendency to form complexes
4. Most of the Lanthanoids are colourless
5. They do not form oxo cations

Actinoids

Differentiating electrons enter into 5f orbital

Binding energy of 5f e^- s are lower

They have a greater tendency to form complexes

Most of the actinoids are coloured.

They do form oxo cation such as VO_2^{2+} .

36) a) Non-stoichiometric defects

Metal Excess defect arises due to the presence of more number of metal ions than anions

Example NaCl

Diagram

Metal Deficiency Defect arises due to the presence of less number of cations than anions

Example FeO

Diagram

b) Integrated rate law for a I order rxn.



$$\text{Rate} = k[A]^1$$

$$\text{Rate} = -\frac{d[A]}{dt}$$

$$-\frac{d[A]}{dt} = k[A]$$

$$-\frac{d[A]}{[A]} = k dt$$

$$\int_{[A_0]}^{[A]} -\frac{d[A]}{[A]} = k \int_0^t dt$$

$$[-\ln[A]]_{[A_0]}^{[A]} = k[t]_0^t$$

$$-\ln[A] + \ln[A_0] = kt$$

$$\ln[A_0] - \ln[A] = kt$$

$$\ln \frac{[A_0]}{[A]} = kt$$

$$k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$$

37) a) Lewis concept
 Lewis acids accept e^- pair from another substance. 1/2
 Example - BF_3
 Lewis Bases donate e^- pair to another substance. 1/2

Example - NH_3
 Ionic product of water is defined as the product of concentration of hydronium ion and hydroxyl ion.
 $K_w = [H_3O^+][OH^-]$
 $K_w = 1 \times 10^{-14}$
 (25°C) 1

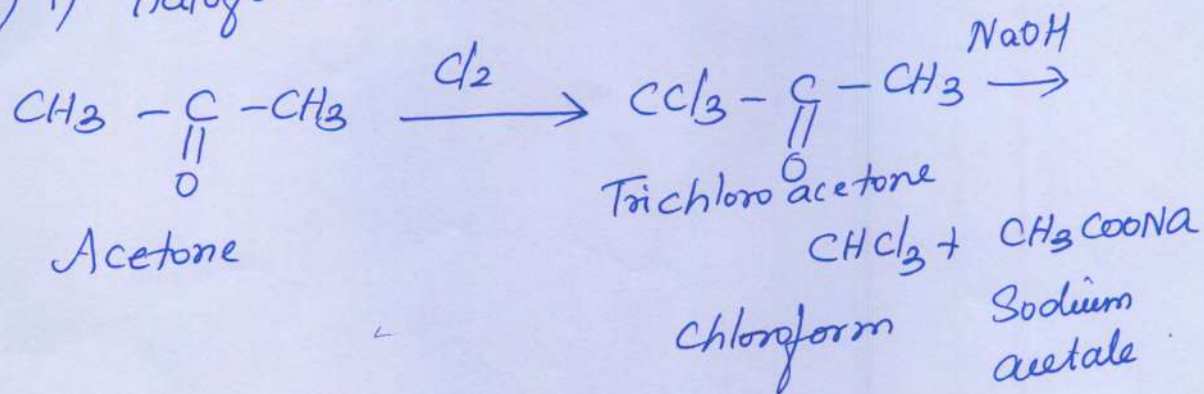
b) Lucas Test

$(CH_3)_3C-OH + HCl \xrightarrow[ZnCl_2]{\text{anhydrous}} (CH_3)_3C-Cl + H_2O$
 immediate appearance of turbidity 2m

$(CH_3)_2CH-OH + HCl \xrightarrow[ZnCl_2]{\text{anhydrous}} (CH_3)_2CH-Cl + H_2O$
 slow appearance of turbidity 2m

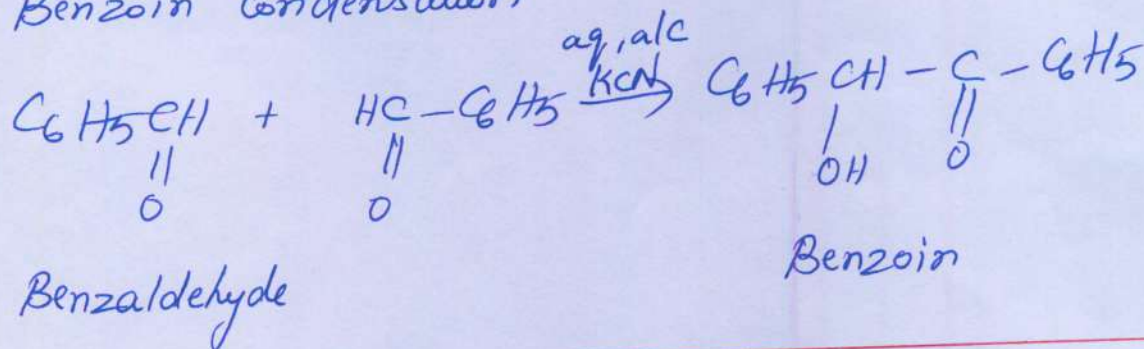
$CH_3CH_2OH + HCl \xrightarrow[ZnCl_2]{\text{anhydrous}}$ No reaction at room temperature.
 Turbidity appears only on heating 1m

38) a) i) Haloforn reaction.



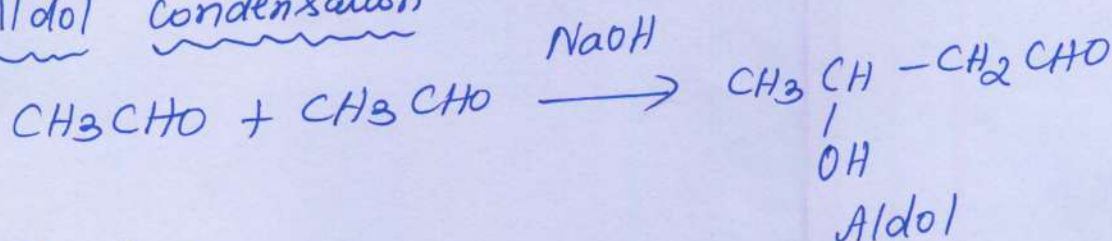
2 1/2

ii) Benzoin condensation



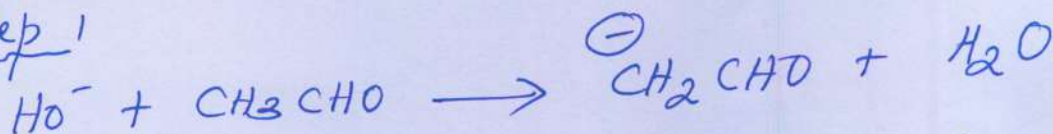
2 1/2

b) Aldol condensation



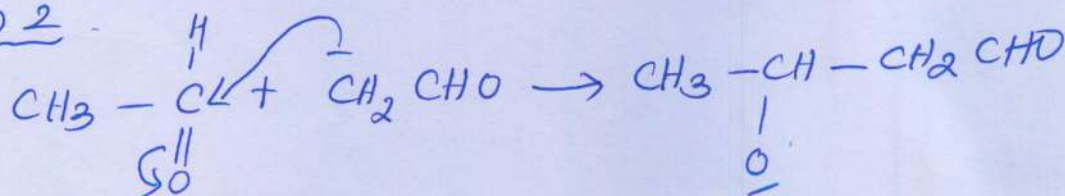
Mechanism

Step 1



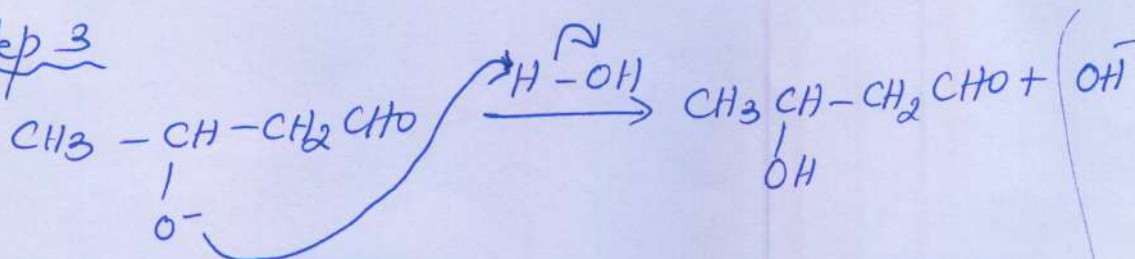
2

Step 2



2

Step 3



1

Handling Teachers

1. J. Smith
26/9/26
2. W. W. O. O.
26/9/26
3. Smith
26/9/26
4. W. W. O. O.
26/9/26
5. Spencer
26/9/26
6. Spencer
26/9/26
7. Spencer
26/9/26

Spencer
26/9/26