12 P

திருப்புதல் மாதிரித்தேர்வு

Register No. பா.கவியரசு

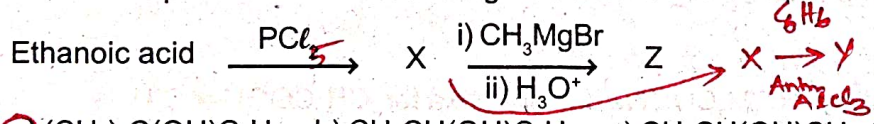
First Revision Examination- 2025

Time : 3.00 Hrs. 22.01.2025 +2/CHEMISTRY Marks : 70

PART – I

Choose the correct answer 15 x 1 = 15

1. The compound having peroxide linkage is I Volume Page No: 81
   a) $H_2S_2O_7$ b) H_2SO_4 c) H_2SO_5 (d) $H_2S_2O_8$
2. Boric acid is an acid because its molecule
   a) contains replaceable H^+ion b) gives up a proton c) combines with proton to form water molecule (d) accepts OH^- from water, releasing proton
3. The metal oxide which cannot be reduced to metal by carbon is.....
   a) PbO b) ZnO c) FeO (d) Al_2O_3
4. The total number of tetrahedral voids in the face centered cubic is.....? (a) 8 b) 6 c) 4 d) 2
5. If 75% of first order reaction was completed in 60min, 50% of same reaction under the same condition would be completed in? a) 35 minutes b) 20 minutes c) 75 minutes (d) 30minutes
6. Which of the following can act as Lowry – Bronsted acid as well as base?
   a) HCl b) Br^- c) SO_4^{2-} (d) HPO_4^{2-}
7. On which of the following properties does the coagulating power of an ion depend?
   (a) both magnitude and sign of the charge on the ion b) size of the ion alone
   c) the magnitude of the charge on the ion alone d) sign of charge on the ion alone
8. Which of the following pairs has half filled f – orbitals in their ground state?
   a) Tb & Eu b) Gd & Sm c) Gd & Tb (d) Gd & Eu I Volume Page No: 120
9. The complex $[Mn_2(CO)_{10}]$ structure have
   a) metal – metal linkage b) Terminal CO groups c) bridging CO groups
   d) metal in zero oxidation state
   Choose the correct answer
   a) only a, b, c b) only b, c, d c) only a, c, d (d) only a, b, d
10. Ionic conductance at infinite dilution of Al^{3+} and SO_4^{2-} are 189 and 160 mho cm^2. Calculate the equivalent conductance of the electrolyte $Al_2(SO_4)_3$ at infinite dilution.
    (a) 143 mho cm^2 equ^{-1} b) 858 mho cm^2 equ (c) 143 mho cm^2 equ^{-1} d) 480 mho cm^2 equ F-175-10
11. Which of the following compounds can be used as antifreeze in automobile
    a) benzaldehyde (b) Ethylene glycol c) glycerol d) Ethanol
12. Predict the product Z in the following series of reaction



    (a) $(CH_3)_2C(OH)C_6H_5$ b) $CH_3CH(OH)C_6H_5$ c) $CH_3CH(OH)CH_2$-CH_3 d) $C_6H_5CH_2OH$
13. Which one of the following is essential amino acid?
    a) Glycine (b) valine c) proline d) Alanine II Volume Page No: 252
14. The product formed by the reaction aromatic aldehyde with a primary amine
    a) Carboxylic acid (b) Schiffs base c) ketone d) Aromatic acid
15. Milk of Magnesia is used as .....
    a) Tranquilizer (b) Antacid c) Analgesic d) Anaesthetic II Volume Page No: 279

1 Mark Answers:
1. d
2. d
3. d
4. a
5. d
6. d
7. a
8. d
9. d
10. a
11. b
12. a
13. b
14. b
15. b

BB – 8
Int – 7
15

PART – B

Answer any 6 questions. Question No. 24 is compulsory 6 x 2 = 12

16. Write a note on gravity separation method. F-8-3
17. Why HF is not stored in glass bottle. F-48-70
18. Out of Mn^{3+} and Cr^{3+} which is strong oxidizing agent and why? F-56-12
19. What happens when a colloidal sol of $Al(OH)_3$ and AS_2S_3 are mixed? F-179-6
20. What are antibiotics? F-316-1

பா.கவியரசு M.Sc.,B.Ed.,
முதுகலை வேதியியல் ஆசிரியர்

B.KAVIYARASU M.Sc.,B.Ed.,
P.G.Asst In Chemistry,
Govt.Model Hr.Sec.School,
Mulanur,Tiruppur-638 106.

21. What is Buffer solution? Give an example. F-139-20
22. What happen when 2 methoxy – 2 methyl propane treated with dil HI. F-229-1
23. Write short note on perkin's reaction. F-244-35
24. Calculate the time to deposit 1.5g of silver at cathode when a current of 1.5A was passed through the solution of $AgNO_3$ (molar mass of Ag = 108g mol^{-1}). $m = ZIt$, $t = \frac{m}{ZI} = \frac{1.5 \times 96500}{108 \times 1.5} = 893.51s$ 14.85min

PART – III

Answer any 6 question. Question No. 33 is compulsory **6 x 3 = 18**

25. Write the name and structure of the monomer of the following polymers:
    1) Bakelite 2) Teflon 3) PHBV
26. How will you convert Aniline to phenol. $C_6H_5NH_2 \xrightarrow[HCl]{HNO_2} C_6H_5N_2Cl \xrightarrow[273K]{HOH} C_6H_5OH$
27. Write a note on Schottky defect. F-100-6
28. Show that in case of first order rection, the time required for 99.9% completion is nearly ten times the time required for half completion of the reaction. F-122-15
29. Write any three difference between chemical and physical adsorption. F-191-1
30. Write short note on Zeolites? F-22-13
31. Discuss briefly the nature of bonding in metal carbonyls. F-85-3
32. What are interstitial compound and write its properties.
33. $CH_3CH_2OH \xrightarrow{PCC} A \xrightarrow{HCN/H^+} B \xrightarrow{CaO/NaOH} C$ Find A,B,C
    A = CH_3CHO, B = CH_3CHOH (Lactic acid), C = CH_3CH_2OH

PART – IV

Answer all the questions **5 x 5 = 25**

34. a) i) Explain the electrometallurgy of aluminium. F-15-1
    ii) What is the role of silica in the extraction of copper? F-6-11-a
    (OR)
    b) i) Based on VB theory explain why $[Cr(NH_3)_6]^{3+}$ is paramagnetic. F-72-5
    ii) In an octahedral crystal field, draw the figure to show splitting of d orbitals. F-73-9
35. a) i) Describe the structure of Diborane. F-33-2
    ii) What are interhalogen compounds? Give example. F-38-5
    (OR)
    b) i) Calculate the percentage efficiency of packing in case of BCC crystal. F-109-6
    ii) Give the uses of Helium. F-38-7
36. a) i) Derive an expression for ostwalds dilution law. F-142-2
    ii) Write a note on standard hydrogen electrode. F-168-3
    (OR)
    b) i) Explain the function of $H_2 - O_2$ fuel cell. F-158-11
    ii) Calculate the degree of hydrolysis of CH_3COONa solution (pka for CH_3COOH=4.74) II Volume Page No: 24 Example 8.8
37. a) i) Derive integrated Rate Law for a zero order reaction. F-122-1
    ii) Write Arrhenius equation and explains the term involved. F-118-7
    (OR)
    b) i) Write the primary and secondary structure of protein. F-295-2
    ii) Write any two reactions of glucose which cannot be explained by open chain structure. F-299-11
38. a) How to convert phenol into
    i) phenolphthalein ii) salicyladehyde iii) picric acid
    F-215-39 F-21538 F-214-37-b
    (OR)
    b) i) Complete the following reaction.

$$CH_3CH_2NO_2 \xrightarrow{Sn/HCl} A \xrightarrow[ii)\ H_2O]{i)\ NaNO_2/HCl} B$$

A = $CH_3CH_2NH_2$, B = CH_3CH_2OH

ii) Write the mechanism of esterification. F-257-2

பா.கவியரசு M.Sc.,B.Ed.,
முதுகலை வேதியியல் ஆசிரியர்

22.1.25 I Revision Exam-Jan-2025

Chemistry +2 Em (Tiruppur district) Answerkey

பா.கவியரசு M.Sc.B.Ed., முதுகலை வேதியியல் ஆசிரியர்

1 marks: Part-I 15×1=15

1. d) $H_2S_2O_8$
2. d) accepts OH^- from water, releasing proton
3. d) Al_2O_3
4. a) 8
5. d) 30 minutes
6. d) HPO_4^{2-}
7. a) both magnitude and sign of the charge on the ion.
8. d) Gd & Eu
9. d) only a, b, d
10. a & c) 143 mho cm^2 equ^{-1}
11. b) Ethylene glycol
12. a) $(CH_3)_2COH$ C_6H_5
13. b) Valine
14. b) schiff's base
15. b) Antacid

B.KAVIYARASU M.Sc.,B.Ed.,
P.G.Asst In Chemistry,
Govt.Model Hr.Sec.School,
Mulanur, Tiruppur-638 106.

2 Marks: Part-B 6×2=12

16. Gravity separation method:

1. It is based on the differences in gravity of ores and the gangue particles.
2. This method is suitable for native ore and heavy oxide ores.
3. Ore is crushed to a finely powdered form and treated with rapidly flowing current of H_2O. The lighter gangue particles are washed away by the running H_2O. e.g: Au and Fe_2O_3, SnO_2.

17. Moist Hydrofluoric acid rapidly react with silica and glass. Hence it is not stored in glass bottles.

$$SiO_2 + 4HF \longrightarrow SiF_4 + 2H_2O$$
$$Na_2SiO_3 + 6HF \longrightarrow Na_2SiF_6 + 3H_2O$$

18. Cr^{3+} has half filled t_{2g}^3 configuration, it is a more stable Configuration. Hence Cr^{3+} acts as strong reducing agent.

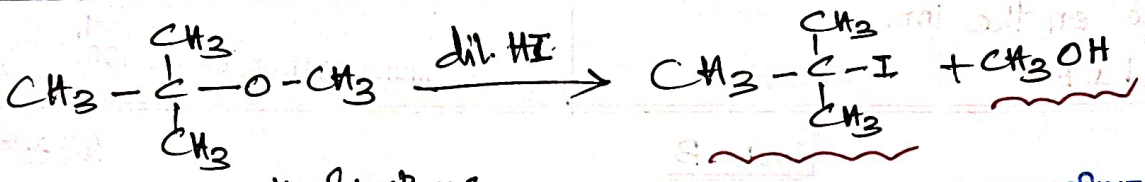
$$Mn^{3+}_{(d^4)} + e^- \longrightarrow Mn^{+2}_{(d^5)}$$

Thus Mn^{+3} is easily reduced to Mn^{+2}. The extra stability associated with Halffilled 'd' subshell makes the reduction of Mn^{+3} very easy. Hence Mn^{+3} is act as strong oxidising agent.

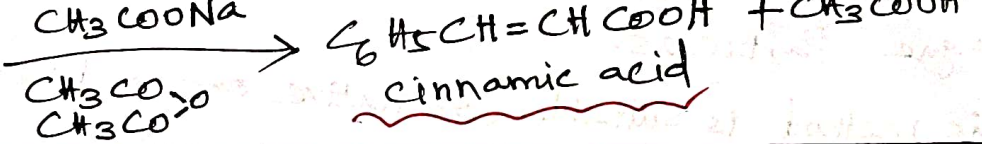
19. $Al(OH)_3$ is positive sol and As_2S_3 is negative sol are mixed with each other mutual precipitation takes place.

20. **Antibiotics:**
The medicines that have the ability to kill the Pathogenic bacteria are grouped as antibiotics. eg: Amoxicillin

21. **Buffer solution:**
It consists of a mixture of a weak acid and its conjugate base (or) a weak base and its conjugate acid.
1. Acidic buffer : $CH_3COOH + CH_3COONa$
2. Basic buffer : $NH_4OH + NH_4Cl$

22.


2-methoxy-2-methylpropane

23. **Perkin's reaction:**


24. **[Compulsory] :-**
Given: $m = 1.5g$, $I = 1.5A$, $z = \frac{\text{molar mass of Ag}}{96500} = \frac{108}{96500}$

$m = zIt$

$t = \frac{m}{zI} = \frac{1.5}{\frac{108}{96500} \times 1.5} = \frac{1.5 \times 96500}{108 \times 1.5} \Rightarrow 893.51\ s$ (or) $14.85\ m$.

3 Marks:- **Part-III** $6 \times 3 = 18$

25. 1. Bakelite → Monomers are Phenol (C_6H_5OH) and formaldehyde ($HCHO$)

2. Teflon ⇒ Tetrafluoroethylene ⇒ $CF_2 = CF_2$

3. PHBV → 3-hydroxy butanoic acid [$CH_3 - \underset{OH}{CH} - CH_2COOH$] & 3-hydroxy Pentanoic acid [$CH_3CH_2\underset{OH}{CH} - CH_2COOH$]

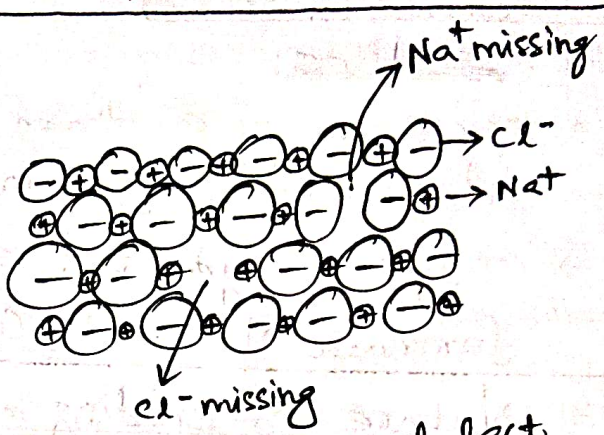
26. **Aniline ⟶ Phenol :-**

$$C_6H_5NH_2 \xrightarrow[273-278K]{NaNO_2/2HCl} C_6H_5N_2Cl \xrightarrow[\Delta/283K]{H_2O} C_6H_5OH + N_2$$

Aniline — $-NaCl, -2H_2O$ — $-HCl$ — Phenol.

27. **Schottky defect :**

* Schottky defect arises due to the missing of equal number of cations and anions from the crystal lattice.
* This effect does not change the Stoichiometry of the crystal.
* Ionic solids in which the cation and anion are of almost of similiar size show schottky defect. Eg: NaCl
* Presence of large number of schottky defects in a crystal, lowers its density.



28. Let $[A_0] = 100$ When $t = t_{99.9\%}$, $[A] = (100 - 99.9) = 0.1$

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

$$t_{99.9\%} = \frac{2.303}{k} \log \left(\frac{100}{0.1}\right)$$

$$t_{99.9\%} = \frac{2.303}{k} \log 1000 = \frac{2.303}{k}(3)$$

$$= \frac{6.909}{k} = 10 \times \frac{0.69}{k}$$

$$t_{99.9\%} = 10\ t_{1/2}$$

$\left(\because t_{1/2} = \frac{0.693}{k}\right)$

29. Chemical adsorption	Physical adsorption
1. It is very slow	It is instantaneous
2. It is very specific	It is non-specific
3. When temperature is raised Chemisorption first increases and then decreases.	It decreases with increase in temperature.
4. It involves transfer of electrons between the adsorbent and adsorbate	No transfer of electrons.
5. Heat of adsorption is high.	Heat of adsorption is low.
6. Monolayer of the adsorbate is formed	Multilayer of the adsorbate is formed

Chemical adsorption	Physical adsorption
7. Adsorption occurs at fixed sites.	It occurs on all sides
8. It involves the formation of activated complex with appreciable activation energy	Activation energy is insignificant

30. **Zeolites:**

* Zeolites are three dimensional crystalline solids containing Al, Si and Oxygen in their regular three dimensional framework.
* They are hydrated sodium alumino silicates with general formula $NaO \cdot (Al_2O_3) \cdot X(SiO_2) \cdot Y H_2O$ ($X = 2$ to 10, $Y = 2$ to 6).

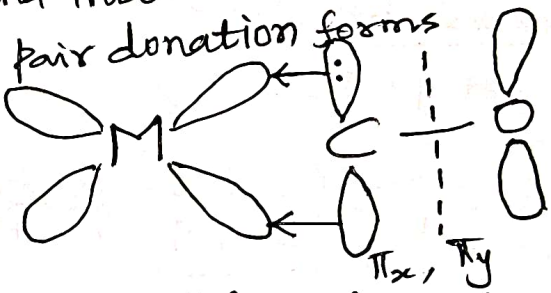
31. **Nature of Bonding in Metal Carbonyls:**

In metal carbonyls, the bond between metal atom and the carbonyl ligand consists of 2 components.

1. The first component is an electron pair donation from the Carbon atom of Carbonyl ligand into vacant d-orbital of Central metal atom. This e⁻ pair donation forms σ bond.

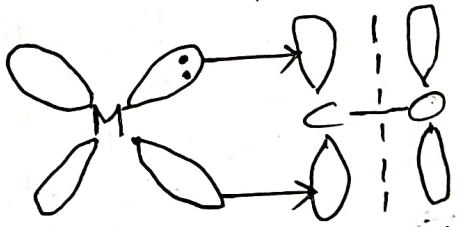
M ← σ bond CO bond.

This σ bond formation increases the e⁻ density in metal 'd' orbitals.



π-forward bond.

2. In order to compensate for this increased e⁻ density, a filled metal d-orbital interacts with the empty π^* orbital on the Carbonyl ligand and transfers the added e⁻ density back to the ligand. This is called π-back bonding.



π-back bond

32. **Interstitial Compounds:**

An Interstitial compound (or) alloy is a compound that is formed when small atoms like H, B, C (or) N are trapped in the interstitial holes in a metal lattice. They are non-stoichiometric compounds. eg: TiC, $ZrH_{1.92}$, Mn_4N.

Properties:

1. They are hard and show electrical and thermal conductivity.

2. They have high melting points higher than those of pure metals.
3. Transition metal hydrides are used as powerful reducing agents.
4. Metallic Carbides are chemically inert.

33. [Compulsory]:

$CH_3CH_2OH \xrightarrow{PCC} CH_3CHO \xrightarrow[H^+]{HCN} CH_3\underset{OH}{CH}-COOH \xrightarrow{CaO/NaOH} CH_3CH_2OH$

(A) (B) (C)

Ans: A → CH_3CHO → Ethanal, B → Lactic acid, C → Ethanol.

5 Marks: Part-IV 5×5=25

34. a) (i) Electrometallurgy of Al: (Hall-Herold process)

Cathode: Fe tank lined with C, Anode: Carbon blocks

Electrolyte: 20% Alumina, Cryolite + $CaCl_2$. It helps to lower the melting point of the mixture.

Ionisation: $Al_2O_3 \xrightarrow{1270K} 2Al^{3+} + 3O^{2-}$

At Cathode: $2Al^{3+}_{(melt)} + 6e^- \longrightarrow 2Al_{(l)}$

At anode: $6O^{2-}_{(melt)} \longrightarrow 3O_2 + 12e^-$ $(3O^{2-} \times 2)$

At anode the following reaction also takes place on it.

$C_{(s)} + O^{2-}_{(melt)} \longrightarrow CO + 2e^-$

$C_{(s)} + 2O^{2-}_{(melt)} \longrightarrow CO_2 + 4e^-$

Due to the above two reactions, anodes are slowly consumed pure Al is formed at the Cathode and settles at the bottom. The net reaction can be written as

$4Al^{3+}_{(melt)} + 6O^{2-}_{(melt)} + 3C_{(s)} \longrightarrow 4Al_{(l)} + 3CO_{2(g)}$

34. a)(ii) Role of silica in the extraction of copper:-

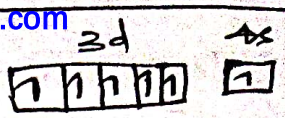
silica act as acidic flux. In the extraction of Cu it is to remove the FeO as $FeSiO_3$ (slag).

$FeO_{(s)} + SiO_{2(s)} \longrightarrow FeSiO_{3(s)}$

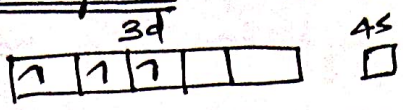
(Gangue) (flux) (slag)

(OR)

34. b)(i) $[Cr(NH_3)_6]^{3+}$ is Paramagnetic :- $Cr \rightarrow 3d^5 4s^1$

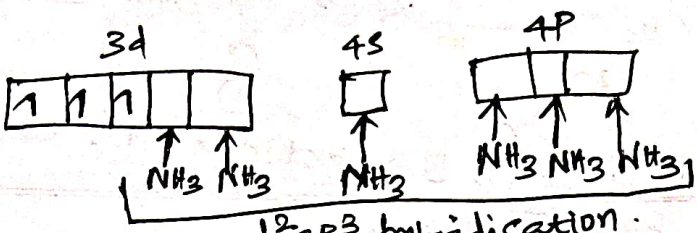


$Cr^{3+} \rightarrow 3d^3 4s^0$



NH_3 is a weak ligand so pairing of e⁻s does not takes place inside the orbitals. It contains 3 unpaired electrons. Hence it is Paramagnetic.

$[Cr(NH_3)_6]^{3+}$



Hybridisation → d^2sp^3 hybridisation.

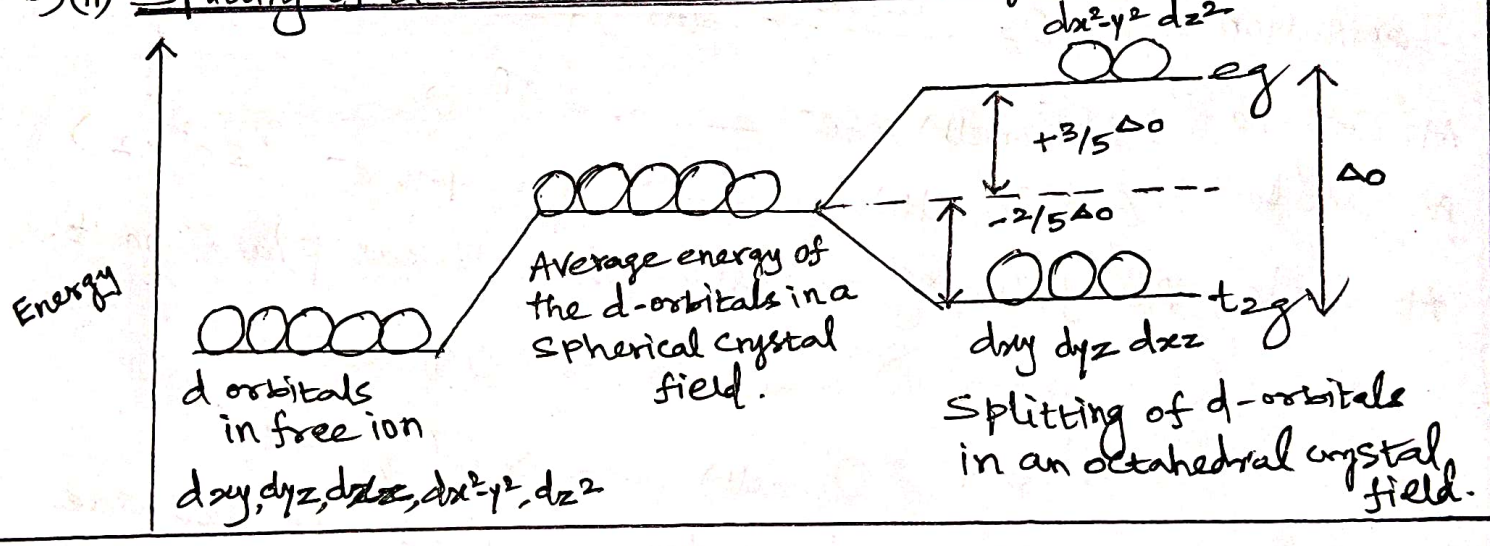
Geometry → Octahedral

No of unpaired e⁻s n = 3

Magnetic property → Paramagnetic

$\mu_s = \sqrt{n(n+2)} = \sqrt{3(3+2)} \Rightarrow \sqrt{15} \Rightarrow 3.86\,BM.$

34. b)(ii) Splitting of d orbital in an Octahedral crystal field :-

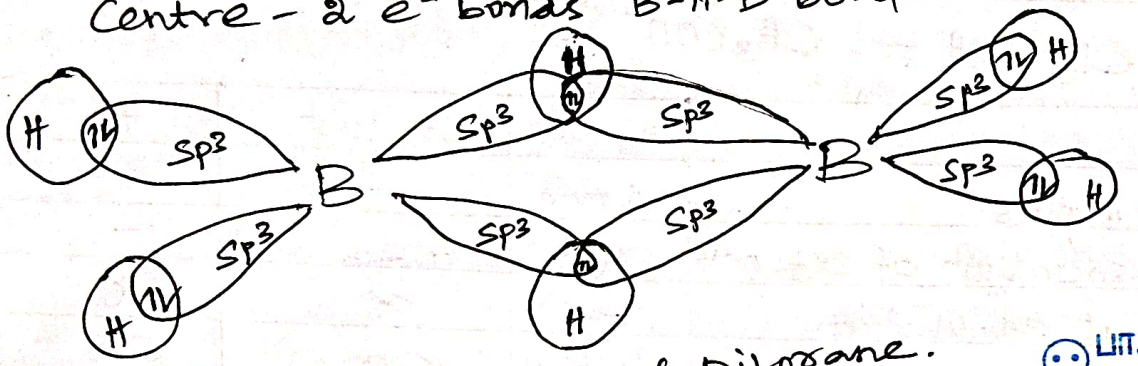


35. a) (i) Structure of Diborane :

1. In diborane two BH_2 units are linked by two bridged hydrogens. Therefore, it has 8 B-H bonds.
2. Diborane has only 12 Valence electrons.
3. 8 e⁻s react with 4 'H' atom to form 4 terminal B-H Covalent bonds. (2 Centre - 2 e⁻ bond)
4. The remaining 4 e⁻s have to be used for the bridged bonds (two 3 centred B-H-B bonds).

Hybridisation in B_2H_6 :-

1. In diborane, the boron has 4 sp^3 hybridised orbitals out of 4 sp^3 orbitals, 3 sp^3 hybridised orbitals contains one e^- and the 4th orbital is empty.
2. Two sp^3 orbitals of each boron overlap with the 2 hydrogens to form 4 terminal 2 centre - 2 electron bonds.
3. Remaining sp^3 orbital and one empty orbital of each boran atom reacts with 1s orbital of Hydrogen to form three Centre - 2 e^- bonds B-H-B bond (3c-2e-bond).



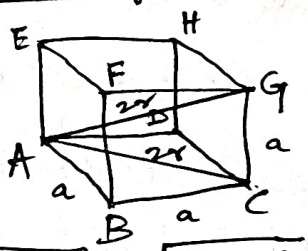
Structure of Diborane.

35. a)(ii) **Interhalogen compounds:**

Each halogen combines with other halogen to form a series of compounds. eg: ClF, ClF_3, IF_7.

(OR)

35. b)(i) **The Percentage efficiency of packing in BCC crystal:**



In $\triangle ABC$: $AC^2 = AB^2 + BC^2$

$AC = \sqrt{AB^2+BC^2} = \sqrt{a^2+a^2} = \sqrt{2a^2} = \sqrt{2}\,a$

In $\triangle ACG$: $AG^2 = AC^2 + CG^2$; $AG = \sqrt{AC^2+CG^2} = \sqrt{(\sqrt{2}a)^2+a^2} = \sqrt{2a^2+a^2} = \sqrt{3a^2}$

$AG = \sqrt{3}a$: $\sqrt{3}a = 4r$, $r = \frac{\sqrt{3}}{4}a$

$\therefore$ Volume of the sphere with radius $r \Rightarrow 4/3\,\pi r^3 = 4/3\,\pi\left(\frac{\sqrt{3}a}{4}\right)^3 = \frac{\sqrt{3}}{16}\pi a^3$

Total Volume of the Spheres $= 2 \times \frac{\sqrt{3}}{16}\pi a^3 = \frac{\sqrt{3}}{8}\pi a^3$

Packing fraction $= \frac{\frac{\sqrt{3}\pi a^3}{8}}{a^3} \times 100 = \frac{\sqrt{3}\,\pi}{8} \times 100 = \sqrt{3}\pi \times 12.5$

Packing fraction of Bcc $= 1.732 \times 3.14 \times 12.5 \Rightarrow 68\,\%$

35.

b)(ii) **Uses of He:-**

1. He-O_2 mixture is used by divers in place of air oxygen mixture. This prevents the painful dangerous condition called bends.
2. To provide inert atmosphere in electric arc welding of metals.
3. It has lowest boiling point hence used in cryogenics (low temperature science).
4. Used for filling air baloons.

36. a)(i) **Ostwalds dilution law:-**

$$CH_3COOH \rightleftharpoons CH_3COO^- + H^+$$

	CH_3COOH	CH_3COO^-	H^+
Initial No. of moles	1 mole	–	–
Degree of dissociation of CH_3COOH	α	–	–
No of moles at equilibrium	$1-\alpha$	α	α
Equilibrium Concentration	$C(1-\alpha)$	$C\alpha$	$C\alpha$

$$K_a = \frac{[CH_3COO^-][H^+]}{[CH_3COOH]} = \frac{C\alpha \cdot C\alpha}{C(1-\alpha)} = \frac{\alpha^2 C}{1-\alpha}$$

We know that weak acid dissociates only to a very small extent Compared to one. The above expression now becomes,

If α is too small and $(1-\alpha) = 1$

$$K_a = \alpha^2 C, \quad \alpha^2 = \frac{K_a}{C}, \quad \boxed{\alpha = \sqrt{K_a/C}}$$

The concentration of H^+ (H_3O^+) can be calculated using the K_a

Equilibrium molar Concentration $[H^+] = \alpha C$

$$[H^+] = \sqrt{\frac{K_a}{C}} \cdot C = \sqrt{\frac{K_a \cdot C^2}{C}} = \sqrt{K_a \cdot C}, \quad \boxed{[H^+] = \sqrt{K_a \cdot C}}$$

For a weak base,

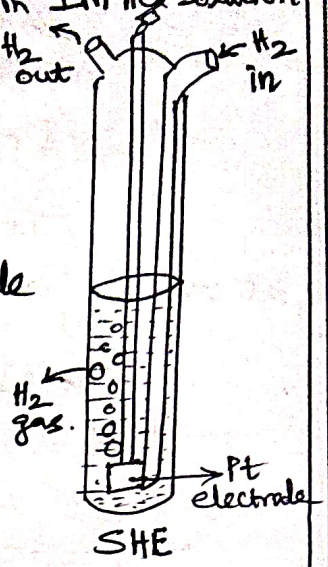
$$[OH^-] = \sqrt{K_b \cdot C}, \quad \alpha = \sqrt{\frac{K_b}{C}}.$$

36. a)(ii) **Standard Hydrogen electrode: (SHE)**

1. Standard Hydrogen Electrode (SHE) is used as the reference electrode. It has been assigned an orbitary emf of exactly zero Volt.

2. It consists of a platinum electrode in contact with 1M HCl solution and 1 atm hydrogen gas.

3. The hydrogen gas is bubbled through the solution at 25°C. SHE can act as a cathode as well as an anode.



* Half cell reactions :- If SHE is used as a cathode the reduction reaction is,

$$2H^+_{(aq.\,1M)} + 2e^- \longrightarrow H_{2\,(g,\,1atm)} \quad E^\circ = 0V$$

If SHE is used as an anode, the oxidation reaction is,

$$H_{2\,(g,\,1atm)} \longrightarrow 2H^+_{(aq.\,1M)} + 2e^- \quad E^\circ = 0V$$

(OR)

36.b)(i) H_2-O_2 fuel cell :-

The galvanic cell in which the energy of combustion of fuels is directly converted into electrical energy.

It requires a continuous supply of reactant to keep functioning,

H_2	acts as fuel
O_2	an oxidant
Electrolyte	aqu. KOH
Electrode	Porous graphite with Ni NiO – inert electrode
Temperature	200°C
Pressure	20-40 atm.

* Hydrogen and oxygen gases are bubbled through the anode and cathode respectively.

Oxidation occurs at the anode:

$$2H_{2(g)} + 4OH^-_{(aq)} \longrightarrow 4H_2O_{(l)} + 4e^-$$

Reduction occurs at the cathode:

$$O_{2(g)} + 2H_2O_{(l)} + 4e^- \longrightarrow 4OH^-_{(aq)}$$

The overall reaction is

$$2H_{2(g)} + O_{2(g)} \longrightarrow 2H_2O_{(l)}$$

36.b)(ii) Given : $pKa = 4.74$

Degree of hydrolysis $\}$ * $K_h = \dfrac{Kw}{Ka}$

$$= \frac{1 \times 10^{-14}}{1.8 \times 10^{-5}} = 5.56 \times 10^{-10}$$

$pka = -\log ka$

ka = antilog of $(-pka)$

= antilog of (-4.74)

= antilog of $(-5 + 0.26)$

$ka = 10^{-5} \times 1.8$

[antilog of 0.26 is 1.82 ≃ 1.8]

37. a) (i) Integrated Rate law for a zero order reaction:

$A \longrightarrow$ Product, The rate law can be written as,

$Rate = k[A]^0$

$$-\frac{d[A]}{dt} = k(1) \qquad \hookrightarrow [A]^0 = 1$$

$$-d[A] = k\,dt$$

Integrate the above equation between the limits of [A$_0$] at zero time and [A] at some later time 't'

$$-\int_{[A_0]}^{[A]} d[A] = k\int_0^t dt \;,\quad -\left([A]\right)_{[A_0]}^{[A]} = k\,(t)_0^t$$

$$-[A]+[A_0] = kt - k(0) \;,\quad [A_0]-[A] = kt$$

$$\boxed{k = \frac{[A_0]-[A]}{t}}$$

37. a)(ii) Arrhenius equation:

$$k = Ae^{-Ea/RT}$$

k ⇒ Rate Constant, A ⇒ Frequency factor, Ea ⇒ Activation energy of the reaction.

R ⇒ Gas constant, T ⇒ Absolute Temperature (in K)

(OR)

37. b)(i) Primary, secondary structure of protein:

Primary Structure: The relative arrangement of the amino acids in the poly peptide chain is called primary structure of proteins. (i.e,) the order in which what aminoacid is bound the other with a peptide bond.

Secondary Structure: How the chains on aminoacids intracts with each other to form β-strands and α-helix. This structure determined by hydrogen bonds between the carbonyl oxygen and the neighbouring amine hydrogen of the main chain.

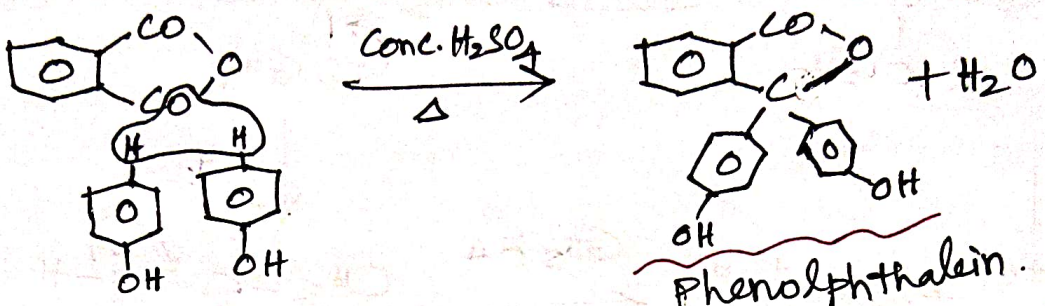
37. b) (ii) Glucose does not give schiff's test and the penta acetate derivative of glucose was not oxidised by Tollen's reagent (or) Fehling's solution. This behaviour could not be explained by open chain structure.

B.KAVIYARASU M.Sc.,B.Ed.,
P.G.Asst in Chemistry,
Govt.Model Hr.Sec.School,
Mulanur,Tiruppur-638 106.

பா.கவியரசு M.Sc.,B.Ed., முதுகலை வேதியியல் ஆசிரியர்

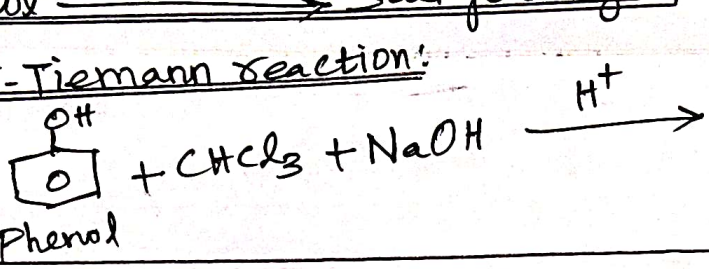
38. a)(i) Phenol ⟶ Phenolphthalein:

Phthalein fusion reaction:

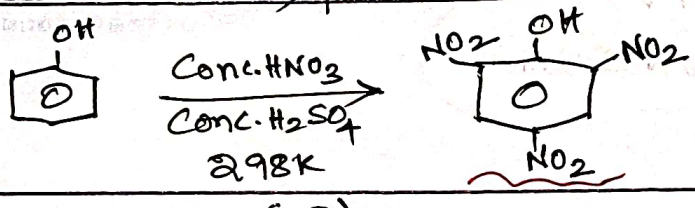


38.a)(ii) Phenol ⟶ Salicylaldehyde:

Riemer-Tiemann reaction:



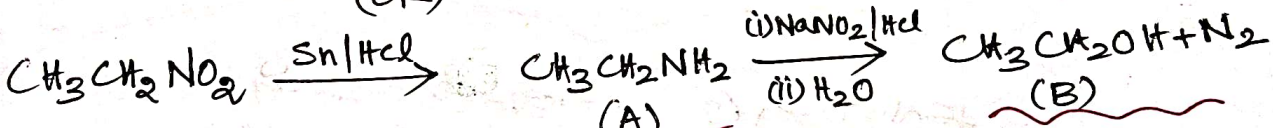
38. a)(iii) Phenol ⟶ picric acid:



Picric acid (or) 2,4,6-trinitro phenol.

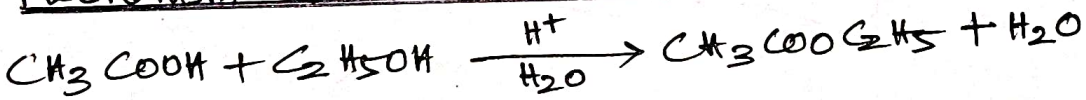
(OR)

38. b)(i)



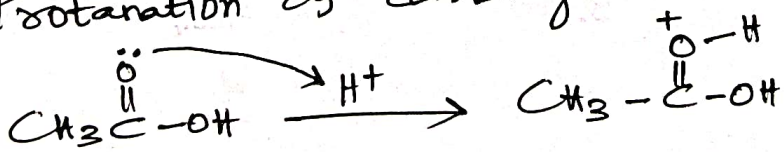
Ans: A → $CH_3CH_2NH_2$ (Ethylamine), B → CH_3CH_2OH (Ethanol).

38. b)(ii) Mechanism of esterification:

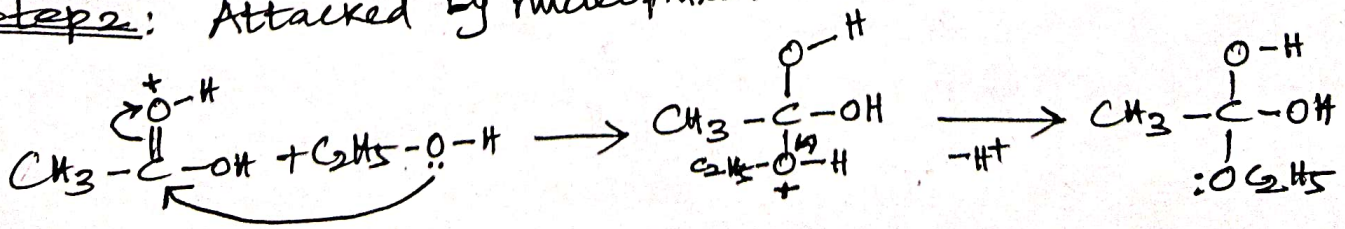


Mechanism:-

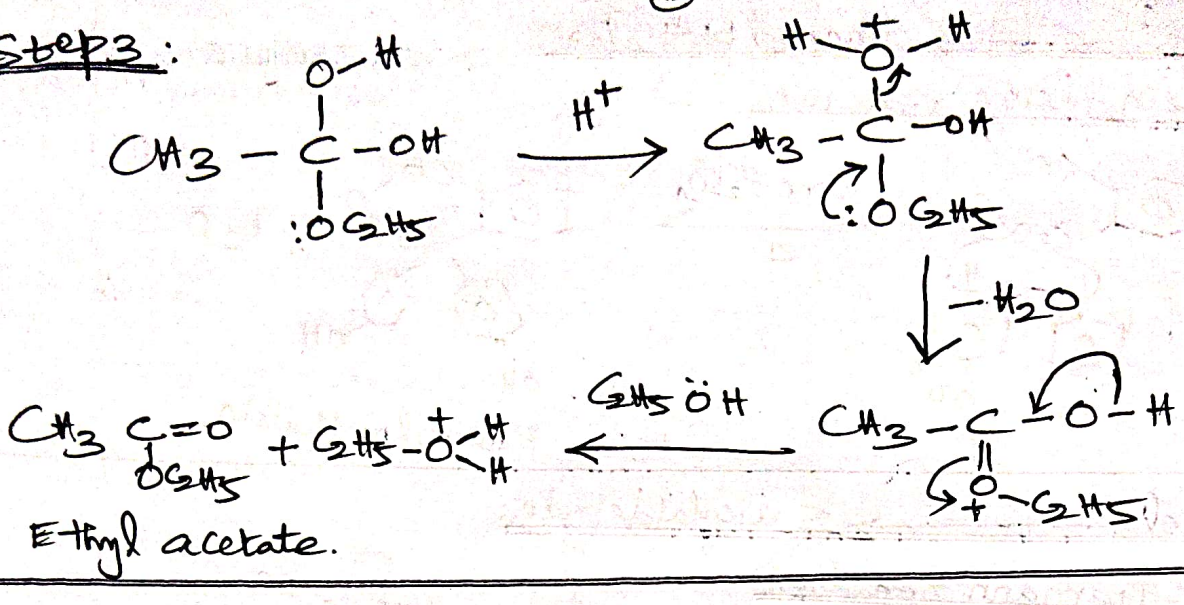
Step 1: Protonation of Carboxylic acid



Step 2: Attacked by nucleophile:



Step 3:



Ethyl acetate.

Prepared

By

பா. கவியரசு M.Sc.,B.Ed.,
முதுகலை வேதியியல் ஆசிரியர்

"கவலைகளே மனிதனே - உன்
கனவு நனவாகும் ஒரு தினமே"

— கண்ணதாசன்

B.KAVIYARASU M.Sc.,B.Ed.,
P.G.Asst in Chemistry,
Govt.Model Hr.Sec.School,
Mulanur,Tiruppur-638 106.