माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल 32 पृष्ठीय

केवल परीक्षक द्वारा भरा जावे। प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	में)	प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1			17		
2			18		
3			19		
4			20		
5			21		
6			22		
7			23		
8			24		
9			25		
10			26		
11			27		
12			28		
13					
14					
15					
16					

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

प्रमाणित किया जाता है कि अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अंकों का योग सही है।

निर्धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित संस्था के नाम की मुद्रा लगाएं।

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा   परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा

प्रवीण सिंह राजपूत
V.N.4448

ARCHANA MAHORE
V. N. -4999

Question - 01

(i) Ans → (a) Acidic

(ii) Ans → (a) 0.5 M

(iii) Ans → (b) cm^{-1}

(iv) Ans → (d) Ionisation Isomerism

(v) Ans → (a) 8 minutes

(vi) Ans → (c) Maltase

Question - 02

(i) Ans → Picric acid

(ii) Ans → NH_3

(iii) Ans → more

(iv) Ans → Henry's

(v) Ans → 96500

(vi) Ans → Hexadetate

Question - 03

(i) Ans → False

(ii) Ans → True

(iii) Ans → False

(iv) Ans → True

(v) Ans → True

(vi) Ans → True False

18 + 8 = 26

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Question – 04

(i) Hinsberg reagent — $C_6H_5SO_2Cl$

(ii) Vitamin B_{12} — Cobalt

(iii) Protein — Keratin

(iv) Vitamin D — Rickets

(v) Diazonium salt — $C_6H_5N_2Cl$

Question – 05

(i) Ans. → $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$

(ii) Ans → F. Werner's Werner

(iii) Ans → Formalin is a solution (aq.) contain 40% formaldehyde

(iv) Ans → Molality is defined as the no

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number of moles of solute present in one kg of solvent.
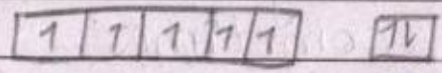
(v) Ans → mho cm^{-1} $(gram\ eq)^{-1}$ litre

Question - 06

Ans Transition metals shows variable or changed oxidation state because in these metals two subshell d and s have almost same energy. They both are participate in bond formation. That's why transition element shows variable valancy.

For example : $_{25}Mn$: $[Ar]\ 3d^5\ 4s^2$

| ↑ | ↑ | ↑ | ↑ | ↑ | | ↑↓ |

Mn can show +3, +4, +7 etc oxidation state

Answer - 7 (OR)

(i) Potassium Tetrahydroxydo Zincate (II)

Ans: $K_2[Zn(OH)_4]$
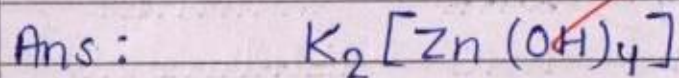
(ii) Tetracarbonickel (0)

Ans. $[Ni(CO)_4]$
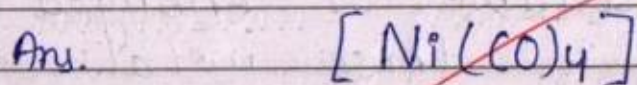
Answer - 08

Complex ion is the electrically charged entity which is formed by the combination of positively charged ions with negative ions, neutral molecules or sometimes with positive ions. They are enclosed in a square brackets. ligand donate electron pair to the central metal atom.

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Example :   Anion   → $[Zn(OH)_4]^{-2}$

Cation → $[Cu(NH_3)_4]^{+2}$

Neutral → $[Ni(CO)_4]^0$

Answer - 9 (OR)

There are some uses of Carbon tetrachloride (CCl_4) :-

(i) Carbon tetrachloride is used in fire extinguisher.

(ii) It is used aerosole propellants.

(iii) They are also used as solvents.

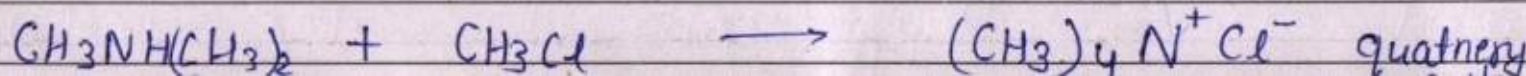(iv) They are also used in manufacturing of refrigrators.

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Answer - 10
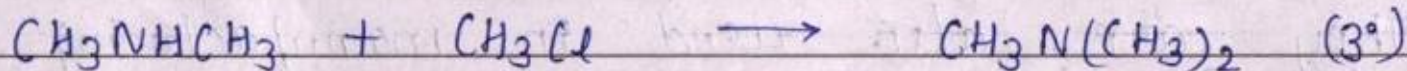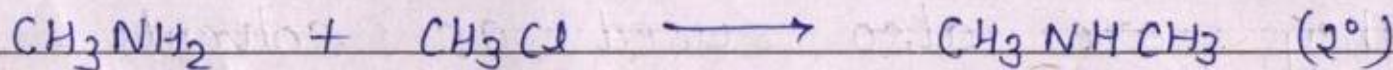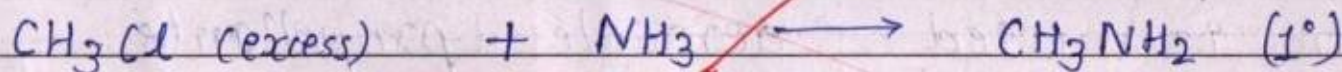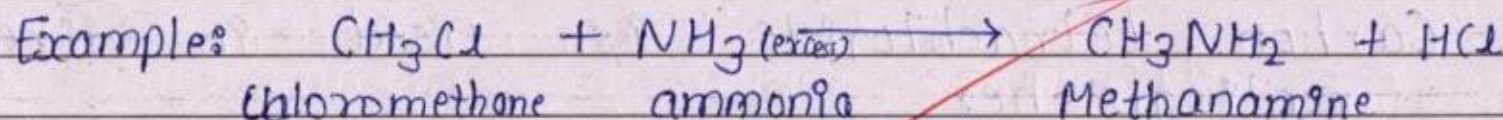
B S E

When ammonia (NH_3) is react with alkyl halides then mixture of primary, secondary and tentiary and quaterary salt is formed. if we take alkyl halide in excess. But when we take ammonia in excess then primary ammines is formed. This is called hofmaan Ammolysis.

Example: $CH_3Cl + NH_{3\,(excess)} \longrightarrow CH_3NH_2 + HCl$
$\quad\quad$ Chloromethane $\quad$ ammonia $\quad\quad$ Methanamine

$CH_3Cl\,(excess) + NH_3 \longrightarrow CH_3NH_2 \;(1°)$

$CH_3NH_2 + CH_3Cl \longrightarrow CH_3NHCH_3 \;(2°)$

$CH_3NHCH_3 + CH_3Cl \longrightarrow CH_3N(CH_3)_2 \;(3°)$

$CH_3NH(CH_3)_2 + CH_3Cl \longrightarrow (CH_3)_4N^+Cl^- \quad$ quatnery

B S E

<u>Answer – 11</u>

Resistivity is defined as the resistance offered by the cell of length 1 cm and cross section area is $1 cm^2$. It is denoted by ρ (rho).

Its SI unit is – ohm cm

$$\rho \propto l \qquad \therefore R \propto l$$

$$R \propto \frac{1}{A}$$

$$\rho \propto \frac{1}{A} \qquad R \propto \frac{l}{A}$$

$$R = \rho \frac{l}{A}$$

$$\boxed{\rho = R \frac{A}{l}}$$

ρ – resistivity
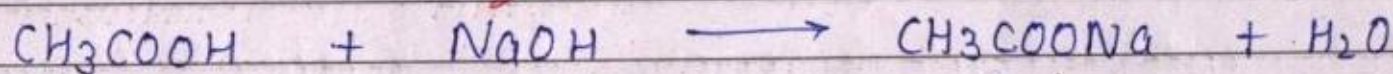R – Resistance
A – Area of cross section
l – length of conductor

Answer - 12 (OR)

Molecularity of a chemical reaction is defined as the number of molecules of reactants which must collide simultaneously so as to result in a chemical reaction.

$$CH_3COOH + NaOH \longrightarrow CH_3COONa + H_2O$$

Molecularity of this reaction is two.

→ It is always a whole number
→ It is applicable for elementary reactions.

Answer - 13 (OR)

Essential Amino acid

Essential Amino acids are those amino acids which can not be synthesize our body

and they have to be obtained from diet. Hence they are called essential amino acids.

Example : luicine, Lysine, Histidene, Isoluicine are some essential amino acids.

Non - Essential Amino acids.

Non essential amino acids are those which can be synthesize our body and that's why they are called non- essential amino acids. Our body can synthesize them.
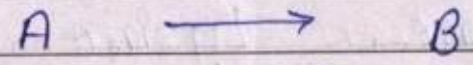
Examples : Glycine , alynine , etc are some non- essential amino acids.

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Answer — 14 (OR)

let a general reaction

$$A \longrightarrow B$$

Its initial concentration is $[A_0]$
after $t_{1/2}$ time the initial values
becomes half,
so the final concentration is $\frac{[A_0]}{2}$

Here, k is rate constant

For ~~first~~ zero order,

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

here, $t = t_{1/2}$, and $[A] = \frac{[A_0]}{2}$

So,

$$k\, t_{1/2} = [A_0] - \frac{[A_0]}{2}$$

$$k\, t_{1/2} = \frac{[A_0]}{2}$$

$$\Rightarrow \quad k\, t_{1/2} = \frac{[A_0]}{2}$$

$$\Rightarrow \quad t_{1/2} = \frac{1}{k}\, \frac{[A_0]}{2}$$

if k is constant then,

$$\Rightarrow \quad t_{1/2} = \frac{1}{k}\, \frac{[A_0]}{2}$$

$$\Rightarrow \quad \boxed{t_{1/2} \,\propto\, [A_0]}$$

so, it is proved that half life $(t_{1/2})$ is directly proportional to initial concentration $[A_0]$ of reatants.

Answer - 15

D - block elements are those elements in which last electron enters in d - subshell. The last electron enters in $(n-1)$ d shell. The general electronic configuration of d-block element is $(n-1)d^{1-10}\, ns^{1-2}$.

In those elements two shells n and $(n-1)$ are incomplete.

Example :   Scandium , Zinc, Mercury , etc.

Some   characters   of   d - block elements.

(i) D - block elements are show variable oxidation state. Because ns and $(n-1)d$ orbitals have alsmost same energy. So, they can participate in bonding.

Mn can show $+3, +4, +5, +7$ oxidation states
Fe can show $+2, +3, \ldots$ oxidation states
Cu can show $+2, +1, \ldots$ oxidation states.

(ii) D - block elements can form complex compounds. Because they have vacant d - orbitals which exp except lone pair of electrons of ligands.
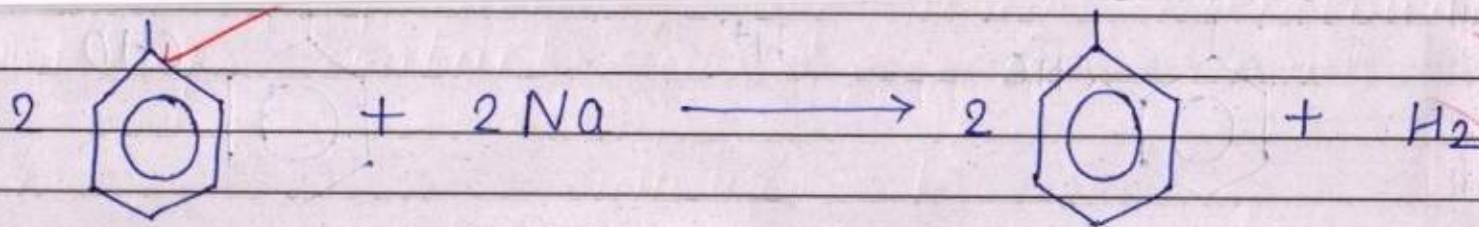Ex : $[Ni(CO_4)]$, $K_4[Fe(CN)_6]$

(iii) They can form coloured ions
(iv) They are metal.

<u>Answer - 16</u>

(i) Reaction of phenols with sodium

When phenols react with sodium
then sodium phenoxide is formed: which
show acidic in nature of phenols.

$$2 \, C_6H_5OH + 2Na \longrightarrow 2 \, C_6H_5ONa + H_2$$
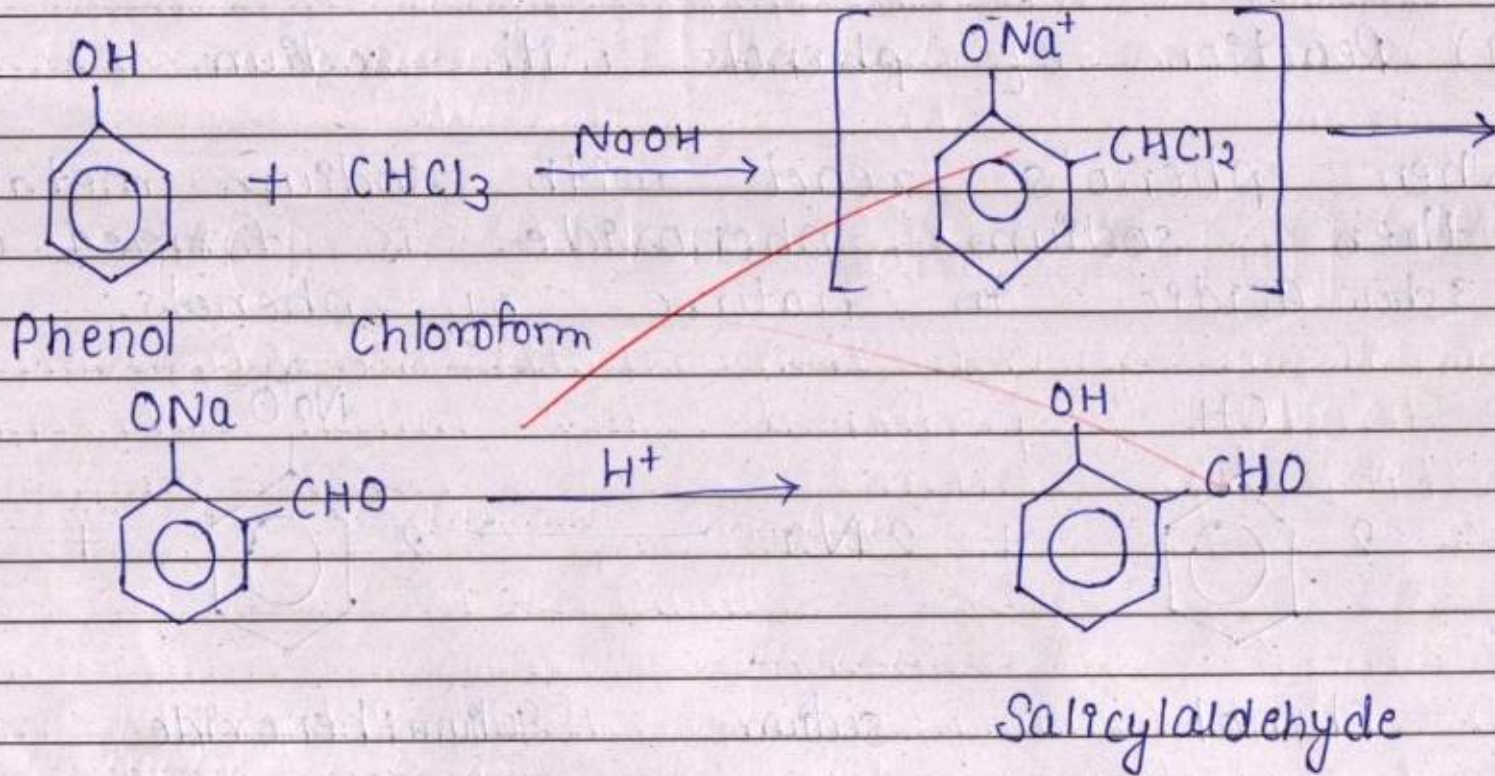
Phenol   Sodium   Sodium Phenoxide

(ii) Reimer - Tiemann reaction.

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When phenol is react with Chloroform in presence of NaOH then an intermediate is formed then followed on react with H+ gives salicylPaldehge.

B
S
E

Phenol   Chloroform

Salicylaldehyde
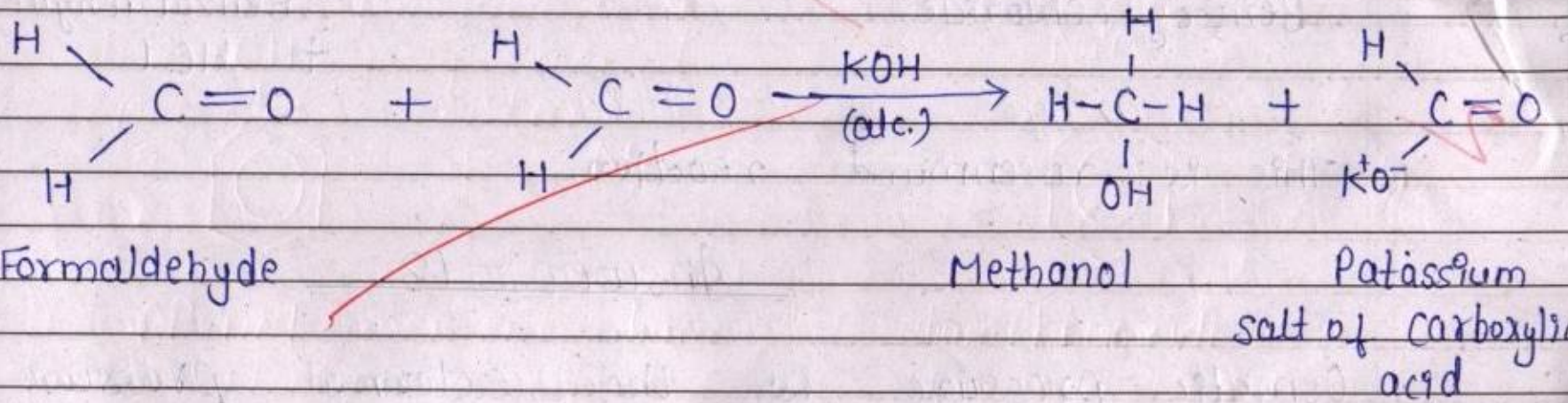
This is Reimer - Tiemann reaction.

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Answer – 17

(1) Cannizaro reaction

When the aldehydes which do not have any α-hydrogen react sodium or potassium hydroxide (alc.) then it undergoes disproportione reaction. and then salt of carboxylic acid and alcohol is formed. This is called cannizaro reaction.

B
S
E

Formaldehyde   Methanol   Patassium salt of carboxylic acid
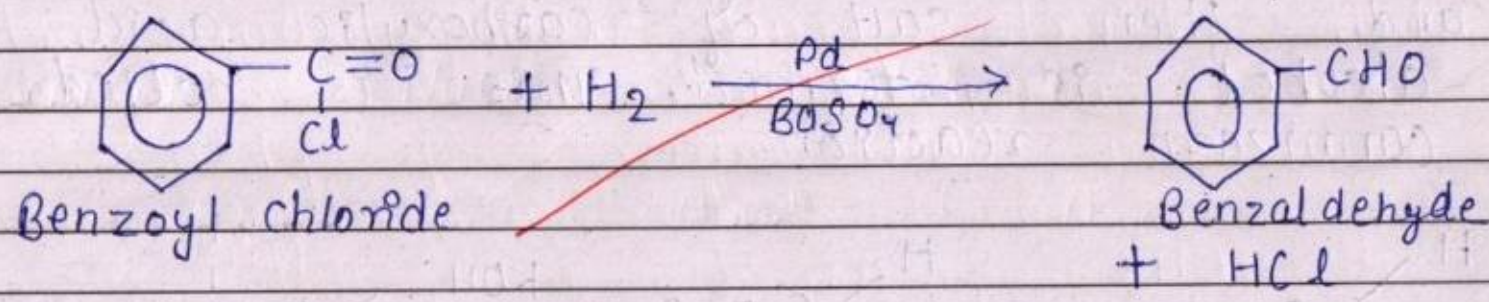
This is cannizaro reaction.

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(ii) Rosenmund reaction.

When acid chlorides are react with hydrogen in the presence of finely divided catalysed on $BaSO_4$ then H corresponding aldehyde is formed.

B
S
E

$$\text{Benzoyl chloride} \quad + H_2 \xrightarrow[BaSO_4]{Pd} \quad \text{Benzaldehyde} + HCl$$

This is rosenmund reaction.

Answer - 18

Osmotic pressure is the external pressure applied on solution to prevent the flow of particles from solvent side to solution through a semipermeable

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membrane. It is denoted by π.

we know,

$$\pi \propto R$$
$$\pi \propto T$$
$$\pi = CRT$$
$$\pi = \frac{n}{V} RT \qquad \left\{ \because C = \frac{n}{V} \right\}$$

B S E

we know that,

$$n = \frac{W_B}{M_B}$$

So,

$$\pi = \frac{W_B \times R \times T \times 1000}{M_B \times V \text{ (in mL)}}$$

$$\boxed{M_B = \frac{W_B \times R \times T \times 1000}{\pi \times V \text{(in mL)}}}$$

where, M_B = Molecular mass of solute
R = Universal gas constant
T = Temperature
π = osmotic pressure
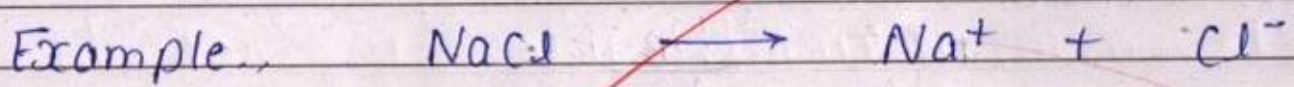W_B = Given mass of solute
V = Volume of solution in mL.

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Question — 19

Ans. Kohlrausch's law states that the, solution's molar conductivity at infinite dilution is the sum of the molar conductivity of its cations and anions at infinite dilution. in the solution.

B S E

Example., $NaCl \longrightarrow Na^+ + Cl^-$

$$\Lambda^0_{NaCl} = \Lambda^0_{Na^+} + \Lambda^0_{Cl^-}$$

Applications of Kohlrausch's law

(i) Kohlrausch's law is used find the molar conductivity of weak electrolyte at infinite dilution. Because it can not found by simple graph plotting

(ii) It is used to determine the degree of dissociation and to

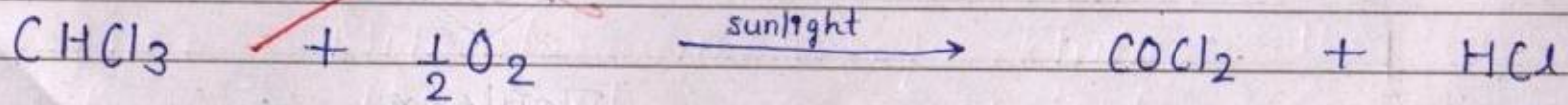$$62 + 5_2 = 67_2$$

find the dissassociation constant.

The value of α can be determined by using this law.

Answer - 20

(i) Oxidation of Chloroform.

When chloroform ($CHCl_3$) is react with oxygen then a Carbonyl Chloride is formed. It is done in presence of sunlight. Carbonyl Chloride is poishous gas called phosgene.

$$CHCl_3 + \frac{1}{2}O_2 \xrightarrow{\text{sunlight}} COCl_2 + HCl$$

Chloroform   phosgene
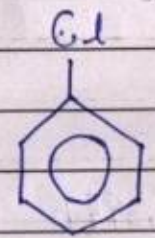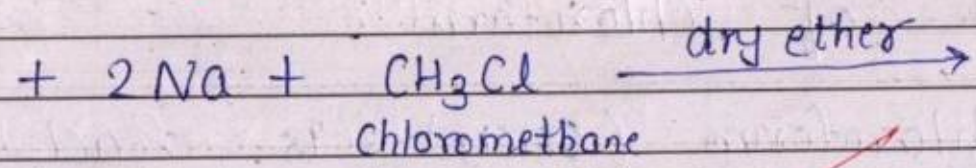
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(ii) Wurtz - Fitting Reaction

When a aryl halide and alkyl halide is react with sodium in the presence of dry ether then alkyl aryl halide is formed. This is called wurtz fitting reaction.
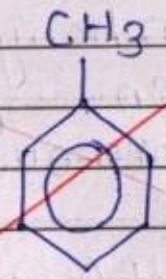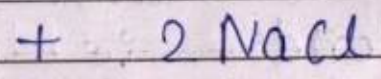
B
S
E

$$\text{Chlorobenzene} + 2Na + CH_3Cl \xrightarrow{\text{dry ether}} \text{Toulene} + 2NaCl$$

Chloromethane