

PUX-32]



**GOVERNMENT OF KARNATAKA
KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD
II YEAR P.U.C. EXAMINATION OF**

Answer Book Sl. No.

2069355

MARCH -2019

MAIN ANSWER BOOK


Register No. of the Candidate

7 7 7 9 3 7

Please read the instructions overleaf before filling in

Subject Code: **34**

Subject: **Chemistry**

Sl. No. of Additional answer sheets used	No. of pages used in		Total No. of Pages used
	Main Answer book	Addnl. answer book/s	
1.	22	—	22
2.			
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Certified that the entries made above by the Candidate are found to be correct			
<div style="text-align: right;">  Signature of the Invigilator with date </div>			

FOR THE USE OF EXAMINERS ONLY											Total Marks
Part	1	2	3	4	5	6	7	8	9	10	
A	1	1	1	1	1	1	1	1	1	1	09
B	2	2	2		2		2				10
C		3	3	2		3	3	3			15
D	5	5		5							15
	4	5	3		4	5					18
R											66
Sixty six											

Grand Total in Words	Sixty seven	Grand Total in Figures	67
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Signature of the Dy. Chief Examiner with date **26/3/19**

Signature of the Reviewer with date **26.3.19**

Signature of the Assistant Examiner with date **26/3/19**



INSTRUCTIONS TO CANDIDATES

1. Write your register number Correctly on the space provided on the Facing Sheet of the Answer book and the top left side of Additional answer sheets. Over writing should be attested by the Room Invigilator.
2. Write answers in both sides of the sheet using BLUE/BLACK ink or ball point pen.
3. Obtain Additional Sheets, Graph Sheets, Mathematical table from the Invigilator if required. Enter the serial numbers of all the Additional sheets used.
4. Intimate disorders if any, in the Main Answer book/ Additional sheets to the invigilator.
5. Indicate the Correct question number in the margin.
6. Obtain the permission of the Invigilator for change of PEN / INK.
7. All rough work should be made on a particular page with the heading ROUGH WORK and cross it.
8. Do not write in the margin and leave any page UNUSED except at the end of answers.
9. No Candidate is permitted to leave the examination hall within 30 minutes from the commencement of the examination. Any candidate who leaves after 30 minutes will not be allowed again to the examination hall.
10. If you want to make any request to the Room Invigilator, just stand up to attract his / her attention. Do not shout or leave your place. The invigilator will come to you.
11. During the examination if the candidate wants to go out, for urination etc., same may be informed to the invigilator. While going out, the Answer paper, Question paper etc., should be handed over to the Room Invigilator for safe custody.
12. After completion, just stand up & inform the same to the Room Invigilator who in turn will collect the papers and gets your signature on the diary maintained by the Invigilator.
13. The following misdeeds will attract disciplinary actions and criminal prosecution:
 - a) Breach of silence.
 - b) Use of books, notes, manuscripts, etc., pertaining to the subject in the examination hall.
 - c) Talking or signalling to other Candidates.
 - d) Candidates copying from the answer books of the other candidates or from other source.
 - e) Sending of answer books or additional sheets or question paper out of the examination hall.
 - f) Impersonation.
 - g) Taking the answer books or additional sheets received for writing the answers out of the examination hall during or after the examination.
 - h) Tearing or insertion to the answer books and the additional sheets.
 - i) Writing an appeal or request to the valuator in the answer book.
 - j) Mobile Phones, Pagers are strictly prohibited in the Examination Hall.
 - k) Simple calculators can be used. Scientific calculators allowed only for Statistics paper.
14. After completion of writing, Count the No. of pages used and fill the columns provided on the facing sheet of the main answer book.
15. Candidates suffering from infectious diseases are not allowed to sit in the examination hall.
16. Candidates should strike off the subject which is not applicable



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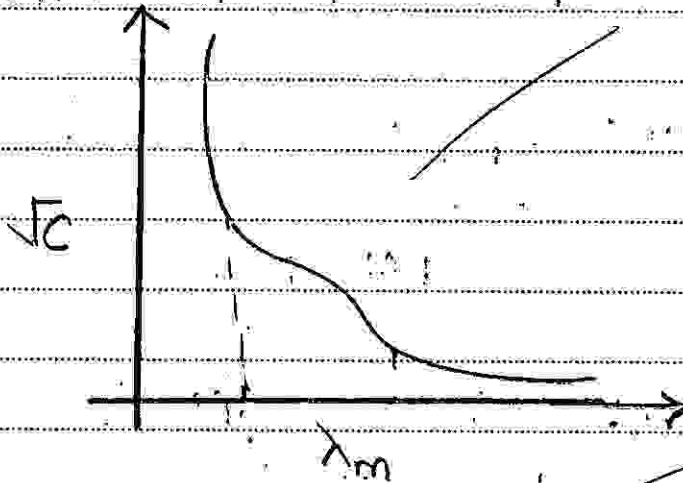
PART-A.

I).

1). Size of the blood cells shrinks, when placed in aq. solⁿ containing $>0.9\% (m/v)$ NaCl.

2). There is no volume change on mixing.
(i.e. $\Delta V = 0$).

3).



4). Zero order reaction.

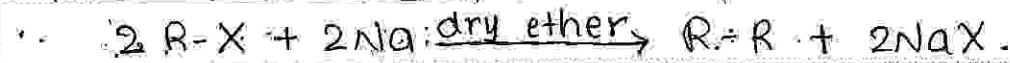
5). Chemisorption has higher enthalpy of adsorption.

6). Role of depressant (NaCN) is, it depresses the froath formed in Froath-floatation method & used to separate ore particles from froath.



7). Helium or He.

8). Wurtz reaction:



The reagent 'A' used in the following equation is $LiAlH_4$ (Lithium aluminium hydride).

10). Vitamin B_{12} .

PART-B

11). Given: $z = 2$ (bcc lattice)

$$a = 352 \text{ pm}$$

$$= 352 \times 10^{-12} \text{ m}$$

$$a = 352 \times 10^{-10} \text{ cm}$$

$$a^3 = 43614208 \times 10^{-30} \text{ cm}^3$$

$$a^3 = 4.3614 \times 10^{-23} \text{ cm}^3.$$

$$M = 7 \text{ g mol}^{-1}.$$

$$N_A = 6.022 \times 10^{23} \text{ atoms mol}^{-1}.$$

$$d = ?$$

3



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We have,

$$d = \frac{Z \times M}{a^3 \times N_A}$$

$$\therefore d = \frac{2 \times 7}{4.3614 \times 10^{-23} \times 6.022 \times 10^{23}}$$

$$= \frac{14}{26.2643}$$

$$d = 0.53304 \text{ g cm}^{-3}$$

$$\text{or } d = 5.33 \times 10^{-1} \text{ g cm}^{-3}$$

12). Faradays II law of Electrolysis:-

It states that - "When same amount of electricity is passed into two different electrolytes, the mass of one element formed to the other element is proportional to their equivalent masses of the elements."

$$\text{i.e. Mass of 'X' formed} = \text{Eq. wt. of 'X'}$$

$$\text{Mass of 'Y' formed} = \text{Eq. wt. of 'Y'}$$

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13) Pseudo-first order reaction:

A chemical reaction in which molecularity is more than one, but obeys kinetics of first order is called pseudo first order.

Ex: Acid Hydrolysis of ethyl acetate

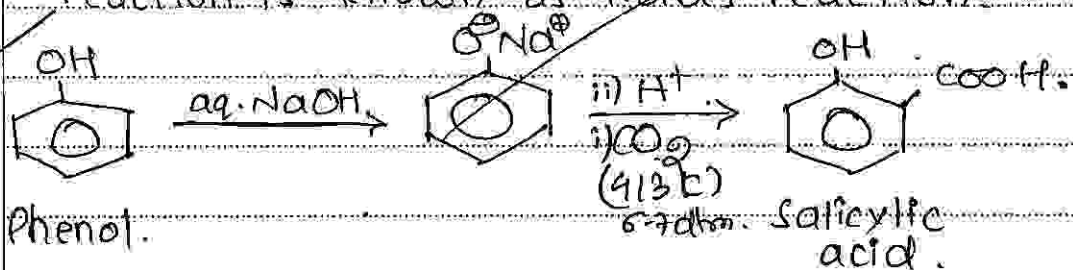


$$r = k' [\text{CH}_3\text{COOC}_2\text{H}_5] [\text{H}_2\text{O}]$$

$$r = k [\text{CH}_3\text{COOC}_2\text{H}_5] \text{ where, } k = k' [\text{H}_2\text{O}]$$

Here, water is taken in large excess & its concentration does not alter the course of a reaction. Hence, it behaves as pseudo first order.

15) Kolbe's reaction: Phenol on treating with aq. NaOH forms sodium salt of phenol called sodium salicylate which on ^{& reacts with CO_2 at 413K} acidification yields salicylic acid. This reaction is known as Kolbe's reaction.





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17) i) Anionic detergents: The detergents formed from long sulphonyl chains of sodium or the sodium detergents of long sulphonyl chains are called anionic detergents.

Ex: Sodium lauryl sulphate.

ii) Saccharin acts as an artificial sweetening agent.

PART-C

19)

a) In the extraction of Aluminium by electrolysis,

i) The overall cell reaction is -



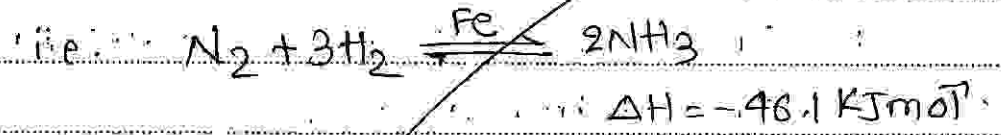
ii) Role of cryolite: It lowers the melting point of pure alumina by increasing conductivity of bauxite & acts as electrolyte.



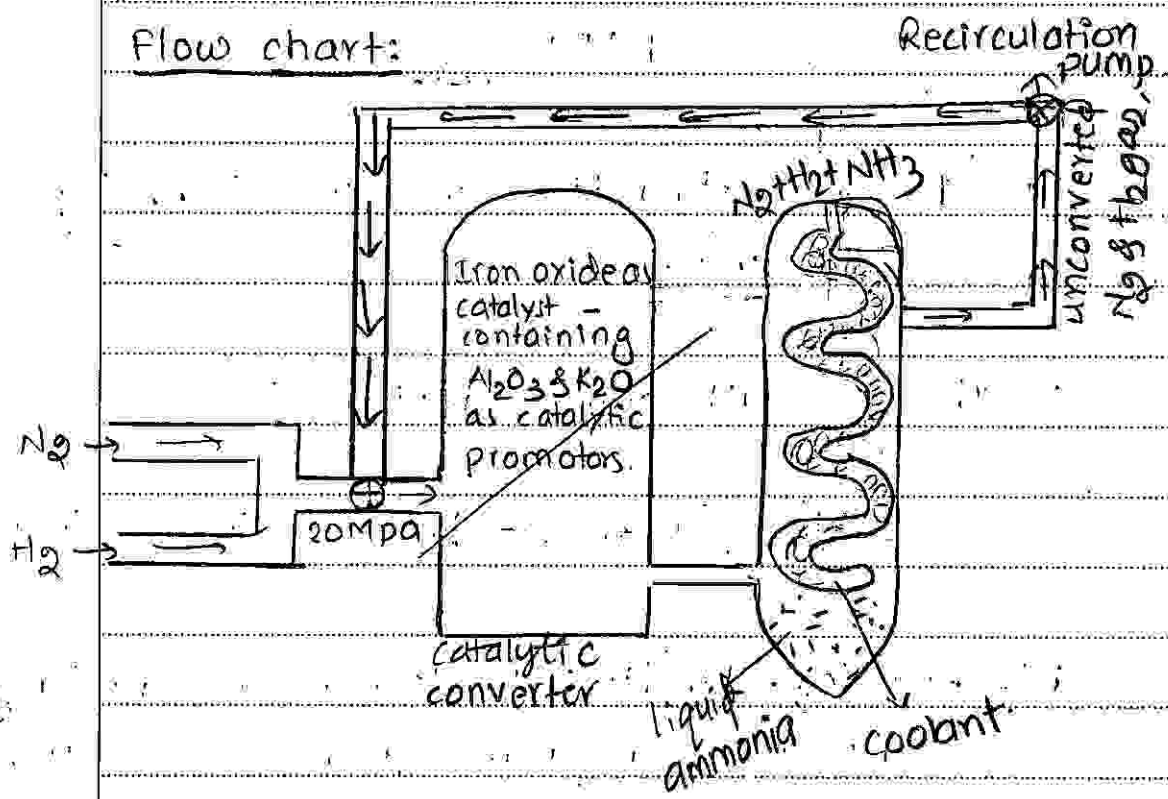
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b1. Nickel or Ni is refined by Mond's process.

20). Manufacture of ammonia by Haber's process: It involves direct combination of Nitrogen & Hydrogen in the ratio 1:3, to form ammonia.



Flow chart:



3



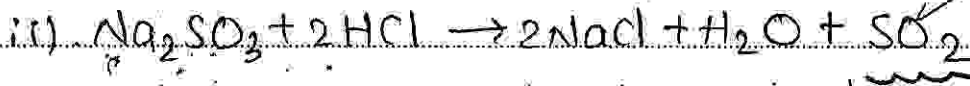
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The necessary optimum conditions for the formation of ammonia are based on Le-Chatelier's principle.

According to LeChatelier's principle,

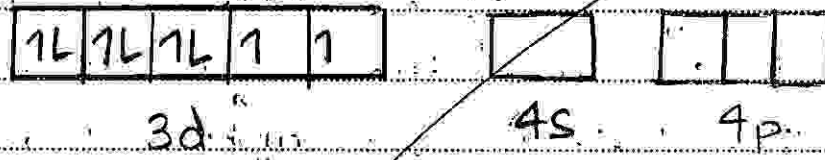
- i) ^{low} Δ temperature of around 700 K
- ii) high pressure upto 200 atm. pressure ^(high)
- iii) reversible & exothermic reaction.
- iv) finely divided iron-oxide is used as catalyst

22)

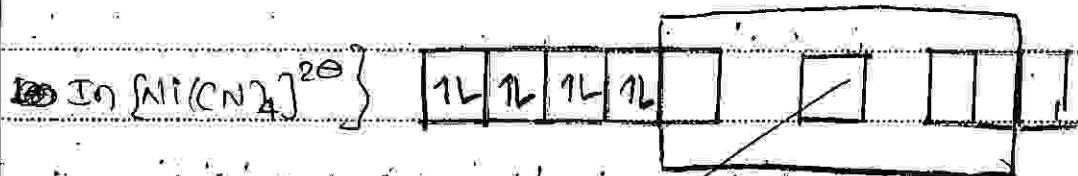




26). Atomic number of Ni is 28. Valence shell electronic configuration of Ni^{2+} is $4s^0 3d^8$.



When ligands like, CN, is approaching towards the central metal atom, some energy is released. This energy is sufficient to pair up ~~all~~ electrons.



In the formation of $[\text{Ni}(\text{CN})_4]^{2-}$, one 'd' orbital, one 's' orbital & two 'p' orbitals are involved. Hence, it undergoes dsp^2 type of hybridization.

Since, the complex undergoes dsp^2 type of hybridization, it is square planar, and with no unpaired electrons, it is diamagnetic and also, as inner $3d$ orbitals are used, it is also called inner orbital complex or low spin complex.

3

3



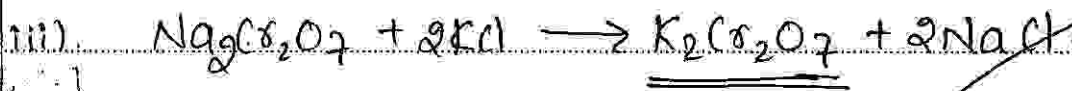
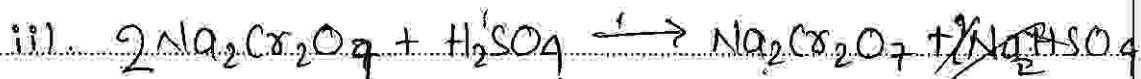
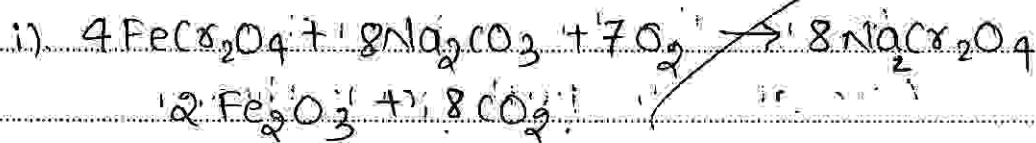
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24) i). Interstitial compounds: The compounds which are formed from interstitial sites. Such compounds are called interstitial compounds.

ii). Transition metals show good catalytic properties. The reasons are,

- i). Due to presence of unpaired d electrons.
- ii). variable oxidation states.
- iii). Formation of intermediate complexes.

23). Manufacture of Potassium di-chromate from Chromite ore.



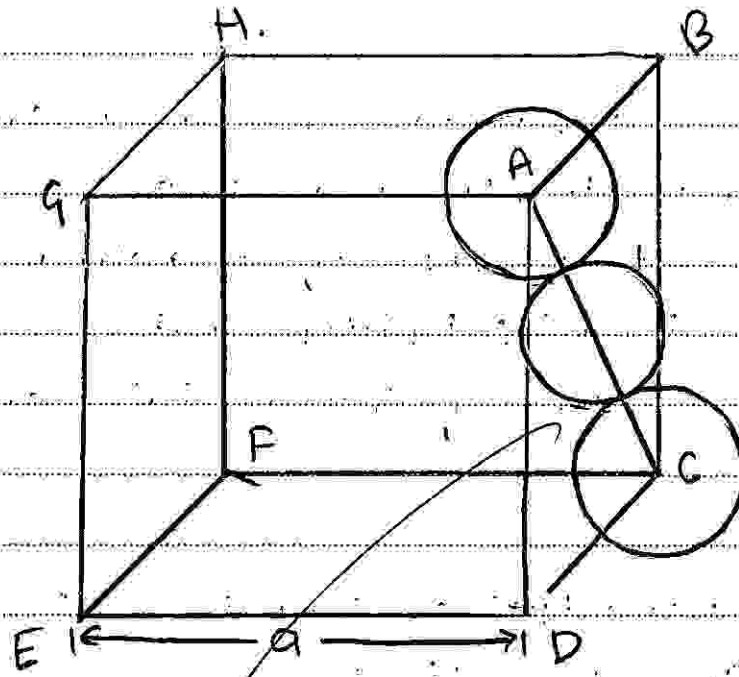
3. Soln on cooling gives orange red crystals of $\text{K}_2\text{Cr}_2\text{O}_7$.



PART-D

IV)

27). a)



Consider a unit cell of edge length 'a' and let \overline{AC} be the face diagonal.

According to Pythagoras theorem,

In $\triangle ABC$,

$$\overline{AC}^2 = \overline{AB}^2 + \overline{BC}^2$$

$$= a^2 + a^2$$

$$\overline{AC}^2 = 2a^2$$

$$\therefore \overline{AC} = \sqrt{2} a \quad \dots (1)$$

P.T.O.

0



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If r is the radius of each sphere, then

$$\overline{AC} = 4r \quad \therefore (2)$$

From (1) & (2)

$$\sqrt{2} a = 4r$$

$$a = \frac{4r}{\sqrt{2}}$$

$$a = 2\sqrt{2}r$$

Also,

$$\begin{aligned} \text{Total vol. of the cube} &= a^3 = (2\sqrt{2}r)^3 \\ &= 16\sqrt{2}r^3. \end{aligned}$$

Since, no. of particles per unit fcc lattice are four (4)

$$\begin{aligned} \text{Vol. occupied by 4 particles} &= 4 \times \frac{4}{3} \pi r^3 \\ &= \frac{16}{3} \pi r^3 \end{aligned}$$

Now,

$$\text{Packing efficiency (PE)} = \frac{\text{Vol. occupied by 4 particles}}{\text{Total vol. of the cube}} \times 100$$

$$= \frac{4 \times 4 \times 22 \times r^3}{16\sqrt{2} \times 3 \times 7 \times r^3} \times 100$$

$$= \frac{35200}{475.1757}$$

$$PE = 74.08\%$$



b). Frenkel defect: It is the dislocation of cation from its normal site to the interstitial site. Such a defect is called Frenkel defect.

Effect on the density of a solid:-
Density of a solid remains same

28)

a). Given: $W_2 = 31 \text{ g} = 31 \times 10^{-3} \text{ kg}$

$W_1 = 500 \text{ g} = 500 \times 10^{-3} \text{ kg}$

$T_f = 271.14 \text{ K}$

$T_f^\circ = 273 \text{ K}$

$K_f = 1.86 \text{ K kg mol}^{-1}$

$\Delta T_f = (T_f^\circ - T_f)$

$= (273 - 271.14) \text{ K}$

$= 1.86 \text{ K}$

We have,

$$\Delta T_f = \frac{1000 \times W_2 \times K_f}{M_2 \times W_1}$$

$$M_2 = \frac{1000 \times W_2 \times K_f}{\Delta T_f \times W_1}$$

$$= \frac{1000 \times 31 \times 10^{-3} \times 1.86}{1.86 \times 500 \times 10^{-3}}$$

$$M_2 = 62 \text{ kg mol}^{-1}$$

5



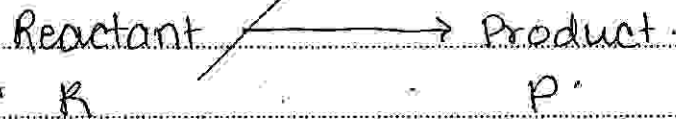
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b). Reverse Osmosis: The process of reversing the direction of osmosis by applying pressure larger than osmotic pressure ($> \pi$) is known as reverse osmosis.

* It is used in desalination of sea water.

30). Integrated rate equation for the rate constant of a first order reaction.

Consider a reactant 'R' forms product 'P'.
Let $[R]_0$ be the initial concentration of the reactant and $[R]$ be the concentration remained after time 't'.



Initially, $[R]_0$: 0
(at $t=0$)

After time, $[R]$: $[R]_0 - [R]$

P.T.O.



According to rate law for 1st order reaction,

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

$$\text{or } \frac{d[R]}{[R]} = -k \cdot dt$$

Integrating on both sides,

$$\int \frac{d[R]}{[R]} = \int -k \cdot dt$$

$$\log_e [R] = -kt + I \quad (1)$$

where, I is called integration constant

Initially, at $t=0$, $[R] = [R]_0$

Eqⁿ (1) becomes

$$\log_e [R]_0 = -k(0) + I$$

$$\text{or } I = \log_e [R]_0 \quad (2)$$

substitute eqⁿ (2) in eqⁿ (1),

$$\log_e [R] = -kt + \log_e [R]_0$$

$$\log_e [R]_0 - \log_e [R] = kt$$

$$\text{or } \log_e \frac{[R]_0}{[R]} = kt$$

$$k = \frac{1}{t} \log_e \frac{[R]_0}{[R]}$$

$$k = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$$

3

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ದ್ವಿತೀಯ ಶಿಕ್ಷಣ ಪರೀಕ್ಷೆ - ಮಾರ್ಚ್ 2019



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b). Given: $T_1 = 30^\circ\text{C} = 303\text{ K}$,

$T_2 = 50^\circ\text{C} = 323\text{ K}$,

$R = 8.314\text{ J K}^{-1}\text{ mol}^{-1}$

$E_a = ?$

$$\frac{k_2}{k_1} = 2^2 = 4$$

We have,

$$\log\left(\frac{k_2}{k_1}\right) = \frac{E_a}{2.303R} \left(\frac{T_2 - T_1}{T_1 T_2}\right)$$

~~$E_a = ?$~~

$$\log 4 = \frac{E_a}{2.303 \times 8.314} \left(\frac{323 - 303}{(323)(303)}\right)$$

$$\log 4 = \frac{E_a}{19.147142} \left(\frac{20}{97869}\right)$$

$$0.6021 = \frac{E_a}{1873911.640}$$

$$0.6021 = E_a \cdot 0.00001067286$$

$$\therefore E_a = 0.6021$$

$$0.00001067286$$

$$E_a = 56414.11955\text{ J}$$

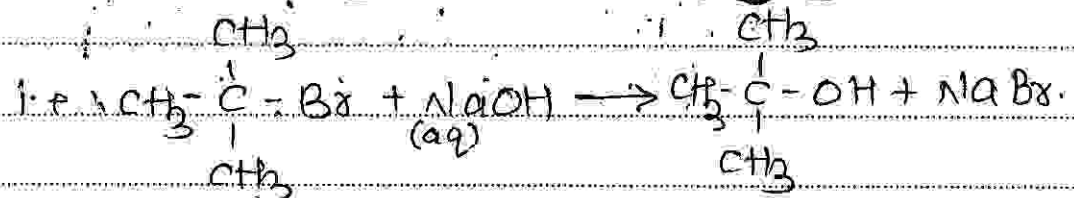
$$\text{or } E_a = 56.414\text{ KJ}$$



∇).

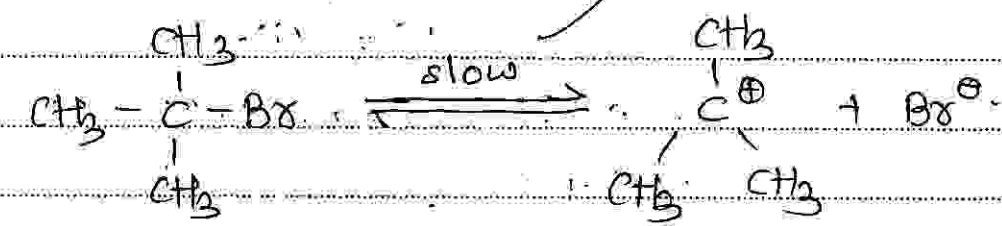
32). a) Tertiary butyl bromide (2-Bromo 2-Methyl propane) undergoes S_N1 mechanism.
 S_N1 mechanism follows first order kinetics.

Ex: t-butyl bromide on mixing with aq. NaOH
converts into t-butyl alcohol.



It involves two steps.

Step I (slow): t-butyl bromide ionizes slowly to give sp^2 hybridized planar tertiary carbocation.



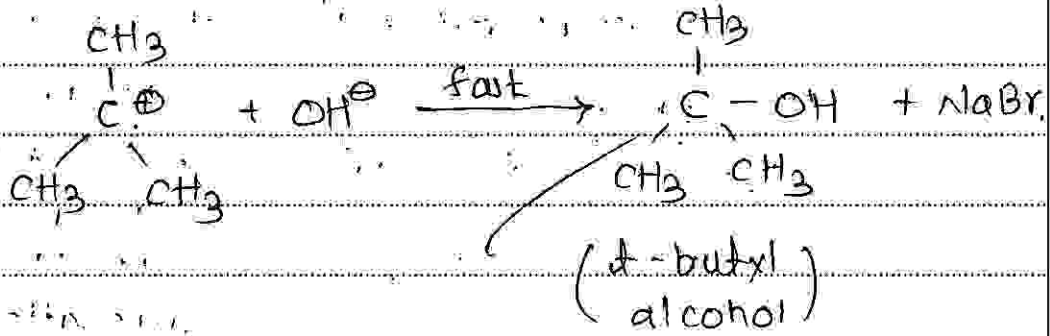
Carbocation.

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Step 2 (fast): The nucleophile OH^- from aq. NaOH attacks on the planar carbocation to form t -butyl alcohol.



The product obtained has racemic configuration.

b) i) propan-2-ol or 2-propanol

ii) Condition for chiral atom:

1. C (carbon)

* It should have four different groups attached to C-atom.

* The objects should be non-super imposable on their mirror images.
(Optically inactive)

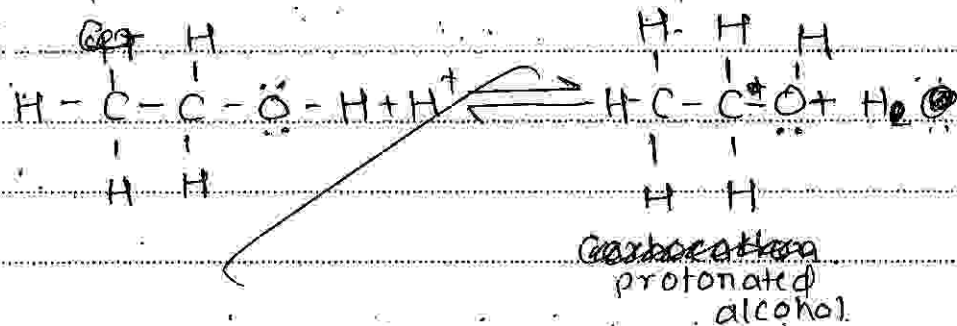
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c) Racemic mixture: Equimolar mixture of dextro & laevo rotatory substances is called racemic mixture.



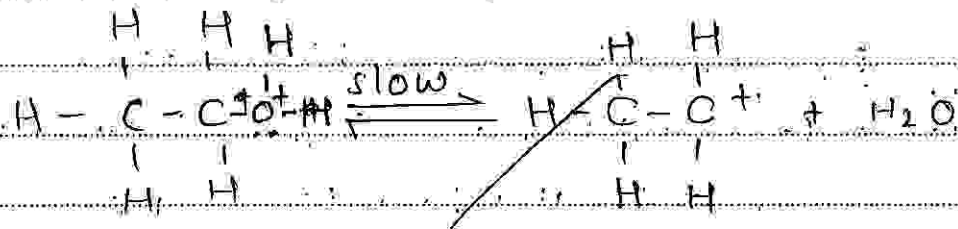
33) Mechanism of acid catalysed dehydration of ethanol to ethene.

Step 1: Protonation of alcohol to form carbocation. Formation of protonated alcohol

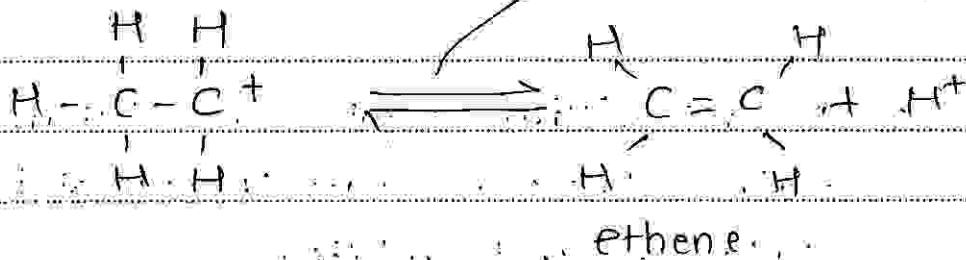


Step 2: Formation of carbocation, protonated alcohol ionizes slowly to form carbocation.

It is the slowest step & hence rate determining step of the reaction.



Step 3: Deprotonation to form ethene.

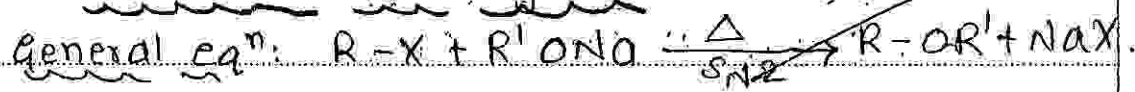


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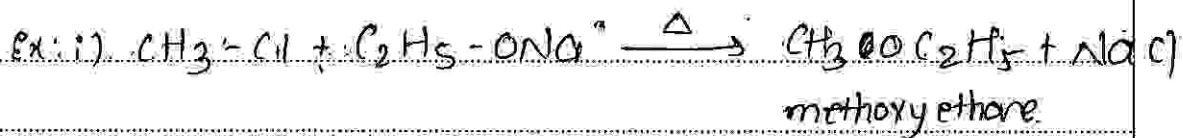
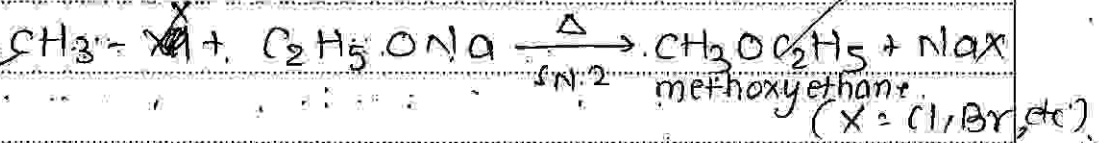
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b). Williamson's ether synthesis:

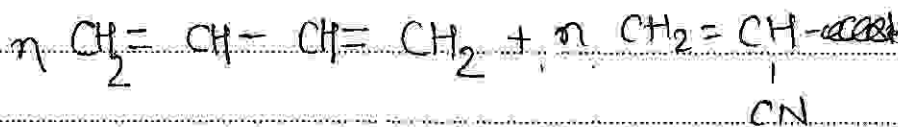


Ex: When methyl halide reacts with ~~ethyl~~

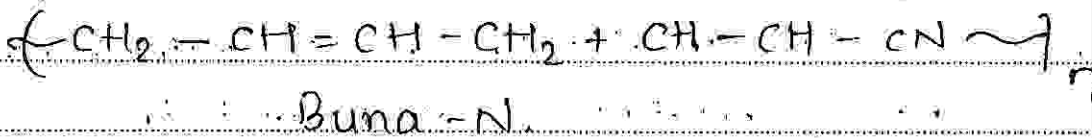
C_2H_5ONa , it forms methoxy ethane (on heating).



37) a). Buna-N: It is prepared by the polymerization of 1,3 butadiene and acrylonitrile.



Polymerization \rightarrow





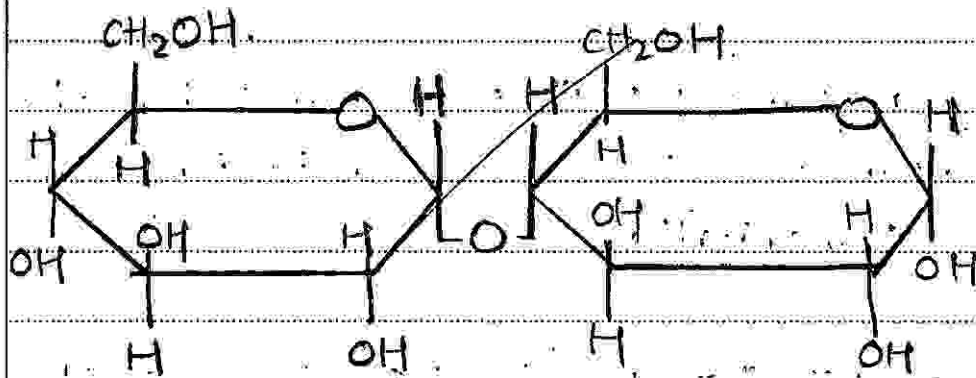
b). Monomers of Nylon 6,6

i). Hexamethylene diamine

ii). Adipic acid

c). Thermosetting polymers: ^{are the} these polymers in which they are hardened by cooling & softened on heating are called thermosetting polymers. They cannot be moulded once they are prepared.

36). a) Haworth structure of maltose
(maltose = Glucose + glucose)



b). Peptide linkage: The linkage between ~~an~~ ^{nitrogen base} and ^{phosphate} ~~group~~ ^{group} is called peptide linkage. No. of peptide bonds = $(n-1)$

No. of peptide bonds present in

tetra peptide = $(4-1) = 3$

three (3) peptide bonds are present

6

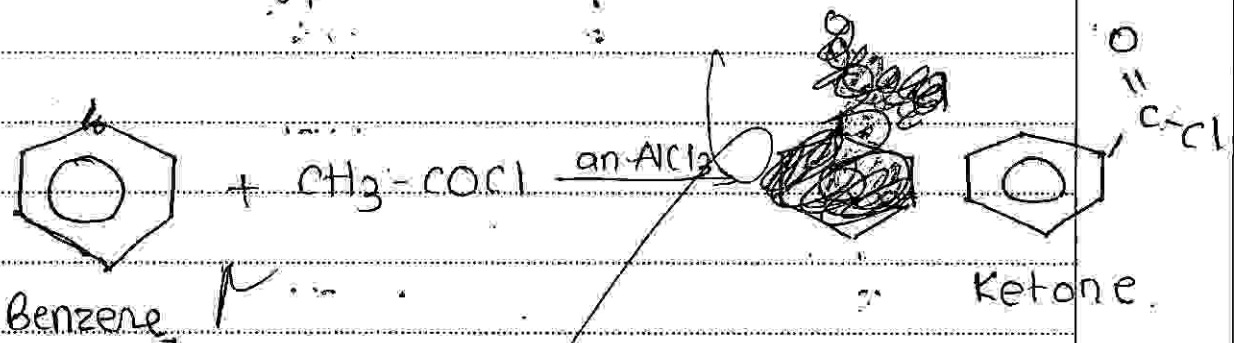


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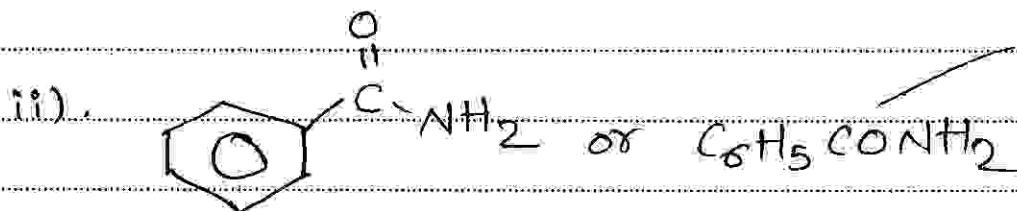
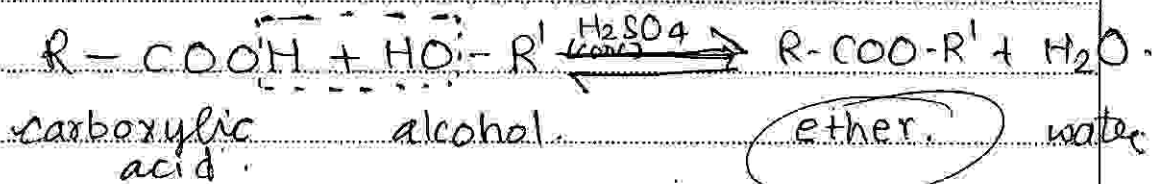
c). Insulin regulates blood sugar level in the body.

34) a) Friedel's Crafts acylation of Benzene:

Benzene reacts with acetyl-chloride in presence of anhyd. $AlCl_3$ to form ketones. This reaction is called Friedel's Crafts acylation of Benzene.



b). i) Esterification reaction:



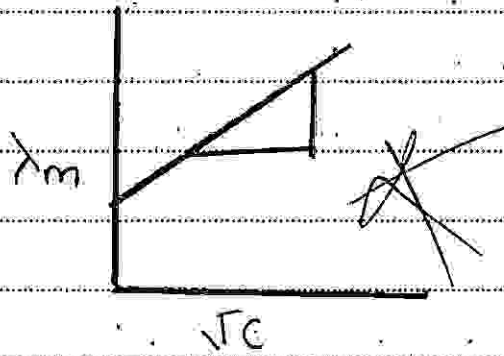


c). In Clemmensen's redⁿ, Zn-Hg amalgam / Zinc-mercury amalgam is used as reagent.

① E

PART A

3)



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ಪ್ರತಿ ಪುಟದ ಒಟ್ಟು ಅಂಕಗಳು

- 22 -

ದ್ವಿತೀಯ ಬಿಡುಗಡೆ ಪರೀಕ್ಷೆ - ಮಾರ್ಚ್ 2019

ಕೊರಡಿ ಮೇಲ್ವಿಚಾರಕರು ಕಡ್ಡಾಯವಾಗಿ ಭರ್ತಿ ಮಾಡಿ ಸಹಿ ಮಾಡುವುದು.

ವಿದ್ಯಾರ್ಥಿ ನೋಂದಣಿ ಸಂಖ್ಯೆ

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ವಿದ್ಯಾರ್ಥಿ/ನ ಪಡೆದಿರುವ ಒಟ್ಟು ಪುಟಗಳ ಸಂಖ್ಯೆ	ಮುಖ್ಯ ಉತ್ತರ ಪತ್ರಿಕೆಯಲ್ಲಿ ಬರೆದಿರುವ ಒಟ್ಟು ಪುಟಗಳ ಸಂಖ್ಯೆ	ಹೆಚ್ಚುವರಿ ಪಾಳೆಯಲ್ಲಿ ಬರೆದಿರುವ ಒಟ್ಟು ಪುಟಗಳ ಸಂಖ್ಯೆ	ಬರೆದಿರುವ ಒಟ್ಟು ಪುಟಗಳ ಸಂಖ್ಯೆ	ಕೊರಡಿ ಮೇಲ್ವಿಚಾರಕರ ಸಹಿ
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