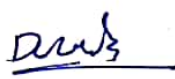


Department of Chemistry
Kisan Veer Mahavidyalaya, Wai
Date: 21.09.2024

Notice

All the students of M.Sc. II are hereby informed that the department of chemistry has organized seminar on various topics from Monday, 23/09/2024. So all students should remain present for the same.




Head
Department of Chemistry
Kisan Veer Mahavidyalaya, Wai

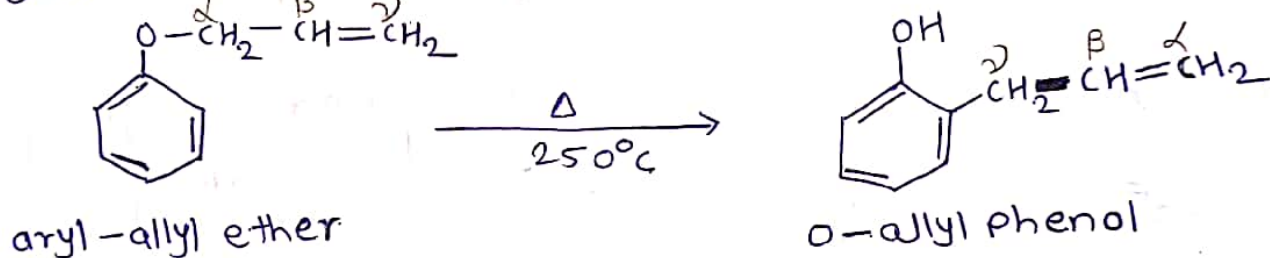
Janata shikshan Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II
Report

A seminar of Priyanka D.Thorave student of M.Sc. II was conducted on Wednesday, 25/09/2024 at 11:00 am on topic "Isotope labelling technique". The points included in her seminar are as follows-

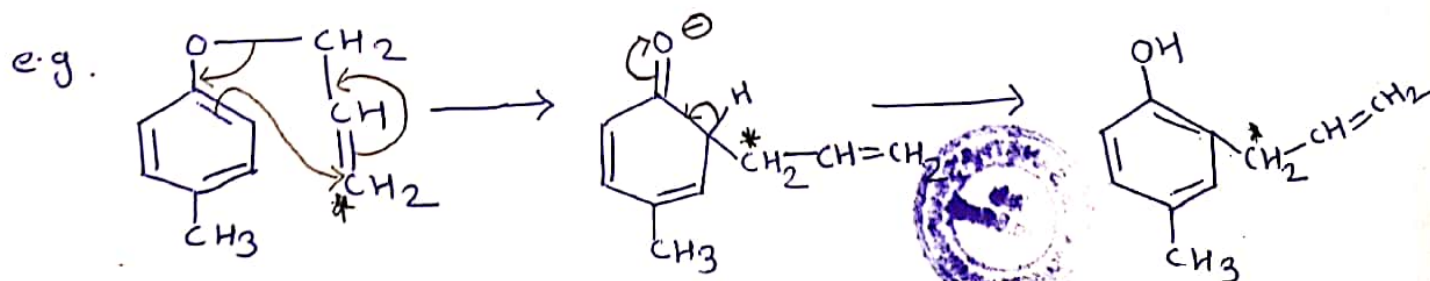
Isotope labelling Technique :-

This technique is used to study the reaction mechanism where, old bond is broken & new bond is formed. Some isotopes - C^{14} , O^{18} , P^{32} , N^{15} , H^2 , H^3 etc.

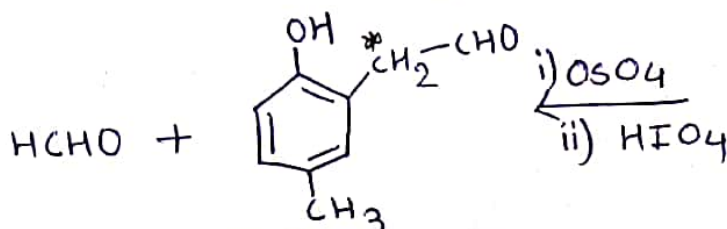
e.g. ① claisen - rearrangement Reaction -



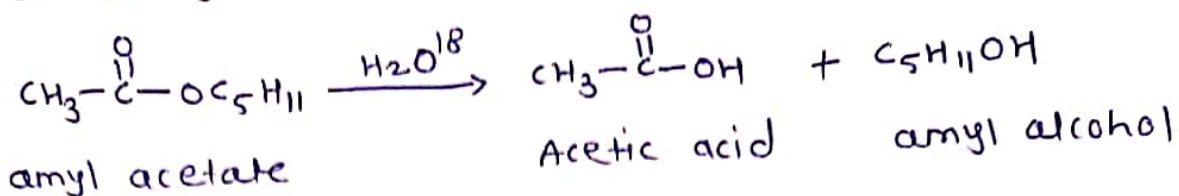
- In this reaction whether α -carbon or γ carbon attaches to ortho position, this can be proved by C^{14} labelling techniques.
- In claisen rearrangement allyl-allyl ether changes to o-allyl phenol at $250^\circ C$ on heating.



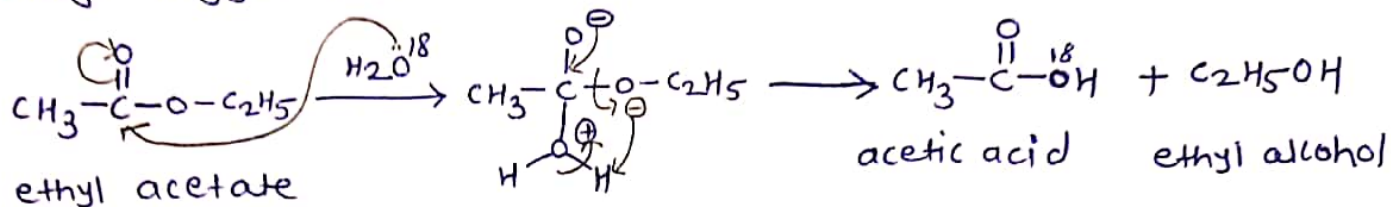
from this techniques only γ -carbon attaches to ortho-position & it is intramolecular reaction.



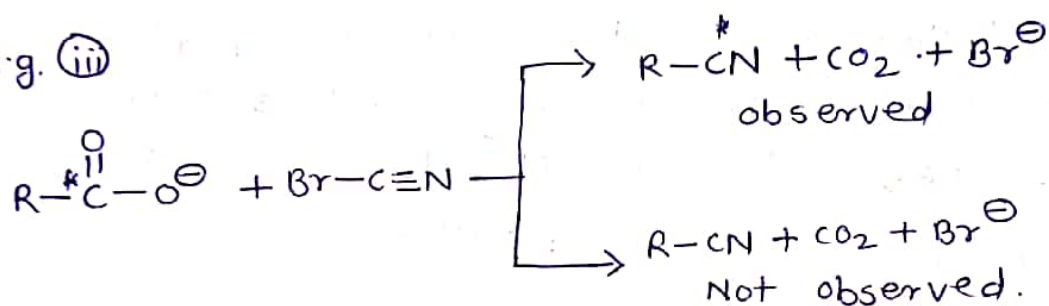
e.g. (ii) Hydrolysis of ester -



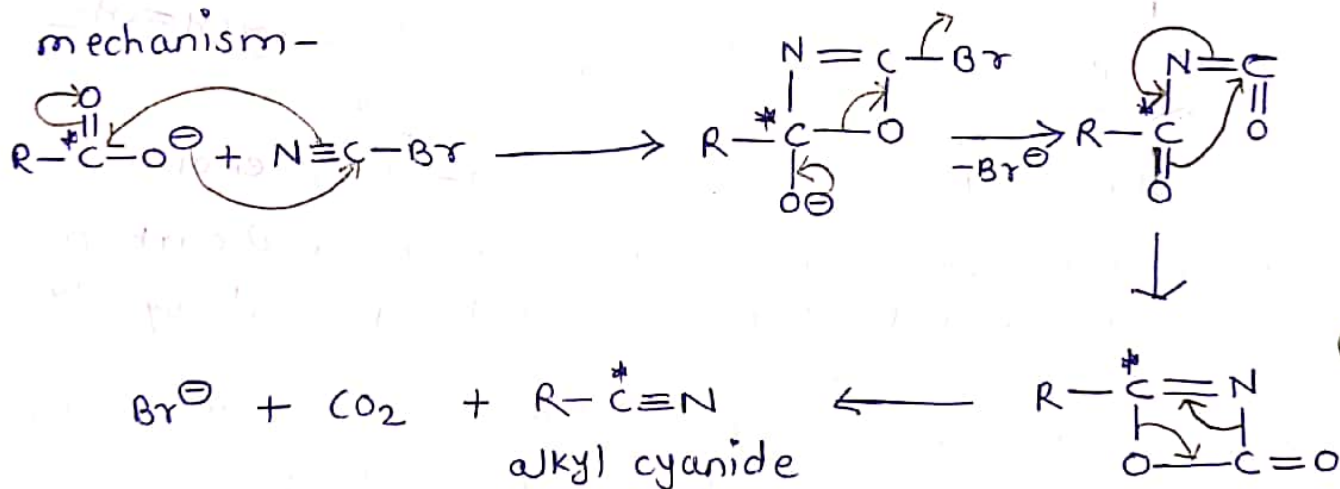
The red^n undergoes acyl-oxygen fission & not the alkyl-oxygen fission during hydrolysis.



e.g. (iii)



mechanism -



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Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II

Report

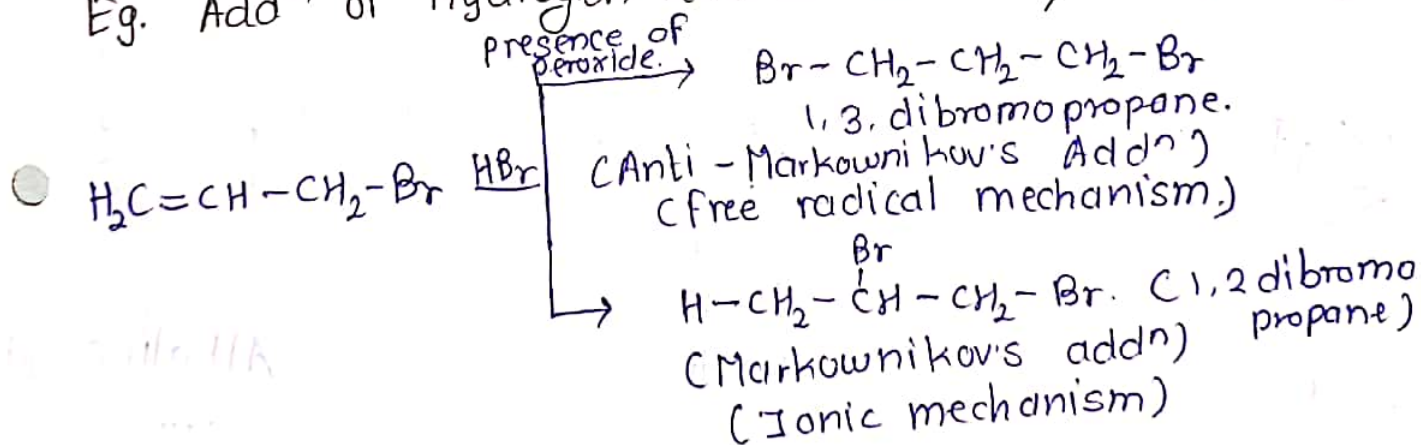
A seminar of Priti D. Kochale student of M.Sc. II was conducted on Wednesday, 25/09/2024 at 11:30 am on topic "Evidence from reaction catalysis". The points included in her seminar are as follows-

Topic : Evidence From reaction catalysis.

Most of the reaction are catalysed by either acids or bases. The manner in which the reaction is catalysed one can draw the conclusion about the mechanism of the reaction.

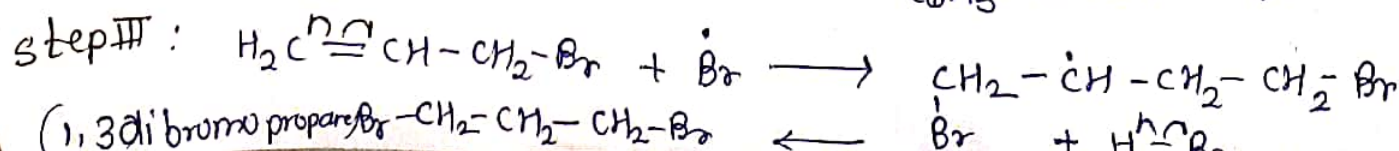
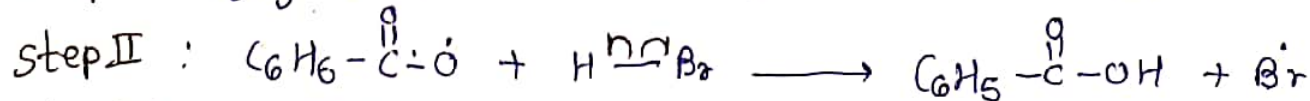
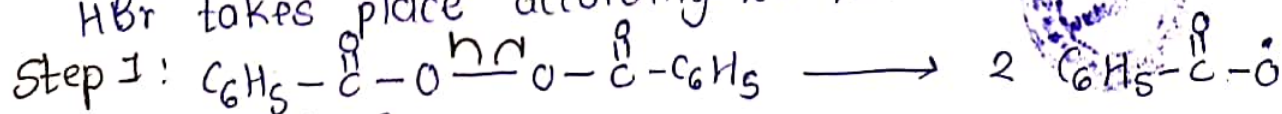
Generally we know that when reaction is catalysed by acid, cation is the intermediate & in base catalysed reaction anion is the intermediate.

Eg. Addition of hydrogen halide across $>C=C<$

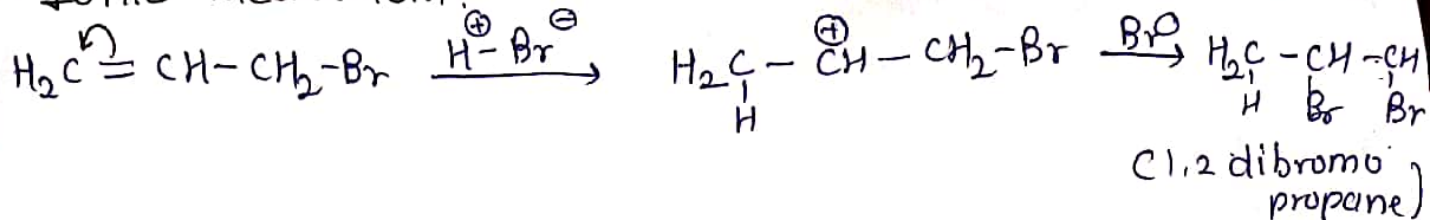


a) Free radical Mechanism.

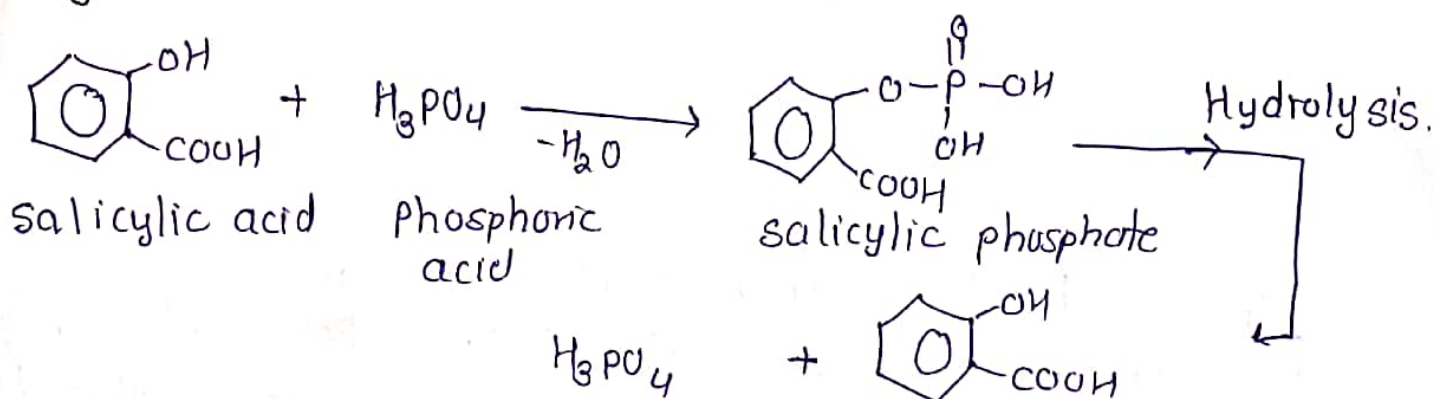
It is observed due to peroxide (benzoyl peroxide) Addition of HBr takes place according to Anti-Markownikov's rule.



b) Ionic mechanism.



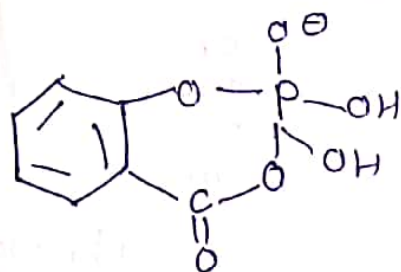
Eg. 2) Hydrolysis of salicylic phosphate.



When the reanⁿ is studied under diff. pH it is found^{log} that at pH = 5.4 state of hydrolysis is very fast.

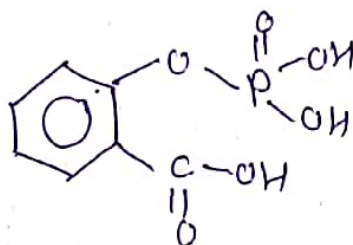
But, when pH is more i.e. alkaline the rate of reanⁿ is slow & also when pH is acidic then rate of reanⁿ is slow.

Intermediates formed at different pH.



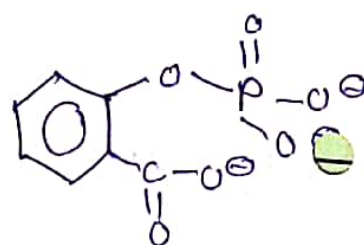
pH = 5.4

I



Acidic pH

II



Alkaline pH

III



Janata Shiksha Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar Attendance sheet
M.Sc. II

25/09/2024

Sr. No.	Roll No.	Name of Students	Signature	Teacher Name
1	10	Wagh Omkar Shinaji	<i>[Signature]</i>	
2	15	Sanas Abhishek R	<i>[Signature]</i>	
3	11	More Suyog Pramod	<i>[Signature]</i>	
4	18	Bagwan Shahista H.	<i>[Signature]</i>	
5	19	Pujari Kirti Chenna	<i>[Signature]</i>	
6	4	Mandhare Shivani R.	<i>[Signature]</i>	
7	5	Nikam Kajal Vikas	<i>[Signature]</i>	
8	17	Karnthe Ankita Prashant	<i>[Signature]</i>	
9	16	Kochale Priti Dagadu	<i>[Signature]</i>	
10	12	Pisal Sushma Ajit	<i>[Signature]</i>	
11	24	Thorve Priyanka D.	<i>[Signature]</i>	
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[Signature]
25/09/2024
Miss. A. S. Sankpal

Total = 11

Male = 03

Female = 08



Janata shikshan Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II

Report

A seminar of Kirti Pujari student of M.Sc. II was conducted on Friday, 27/09/2024 at 11:30 am on topic "Study of physical properties and kinetic method". The points included in her seminar are as follows-

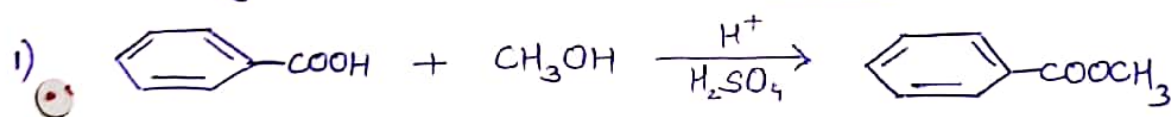
Study of Physical Properties

In some reaction, the presence of intermediate that may be difficult or impossible to isolate from reaction mixture may be detected or identified by physical properties.

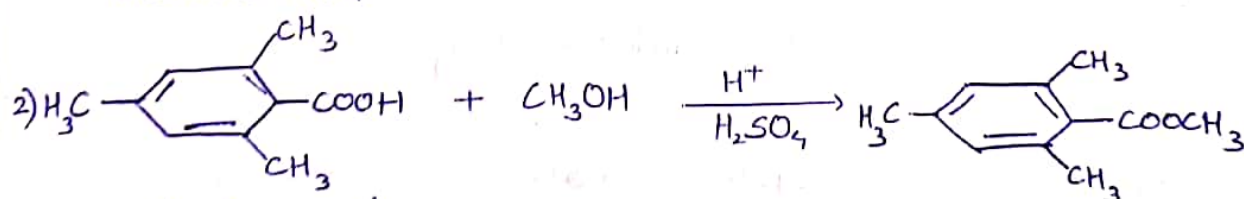
eg- i) Nitronium ion (NO_2^+) is examined by Raman spectroscopy. It shows Raman line at 1400 cm^{-1} .

ii) The radical species formed in the reaction detected by Electron spin Resonance (ESR) spectroscopy.

* Study of Esterification reaction-



Benzoic acid



Mesitylic acid

Under normal condition mesitylic acid has slow rate of esterification than benzoic acid because steric factor. But when benzoic acid as well as mesitylic acid dissolved in H_2SO_4 then the rate of mesitylic acid is greater than benzoic acid.

Kinetic Methods -

Chemical Kinetics - "It is the branch of chemistry which deal with the measurement of rate of chemical reaction". It also gives the relation between reaction rate & concentration of reacting substance. This also include effect of temp on the reaction velocity.

I] Methods of studying kinetics of the reaction -

1) Titrimetric Method -:

This is the simplest method for determining the rate of reaction. After certain time intervals, the small portion of reaction mixture is removed & titrated against standard solution for estimation of reactant consumed or product formed. eg - Hydrolysis of ester in presence of base.

2) Spectroscopic Method -:

This method is based on the measurement of colour density, which is based upon Beer-Lambert's law. i.e. absorption & conc & is given by $\log \frac{I}{I_0} = \epsilon c l$

In this O.D. & conc & plot of O.D. Vs time is drawn $\frac{O.D.}{T}$

3) Refractometry -:

In this method, the change in R.I is measured w.r.t time for determining rate of reaction.

4) Dilatometry -:

In this change in volume by dilatometry is measured.

5) Polarimetry -

In this method change in optical rotation w.r.t time is measured. Change in initial optical rotation at time 't' & '∞' time, measured.

Initial conc. = $\alpha_{\infty} - \alpha_0$

conc. after time 't' = $\alpha_{\infty} - \alpha_t$

where α = angle of rotation

$$k = \frac{2.303}{t} \log_{10} \frac{\alpha_{\infty} - \alpha_0}{\alpha_{\infty} - \alpha_t}$$

$$\& \frac{\alpha_{\infty} - \alpha_0}{\alpha_{\infty} - \alpha_t} = \frac{a}{a-x}$$

Graph - $\log \frac{a}{a-x}$ Vs time 't'



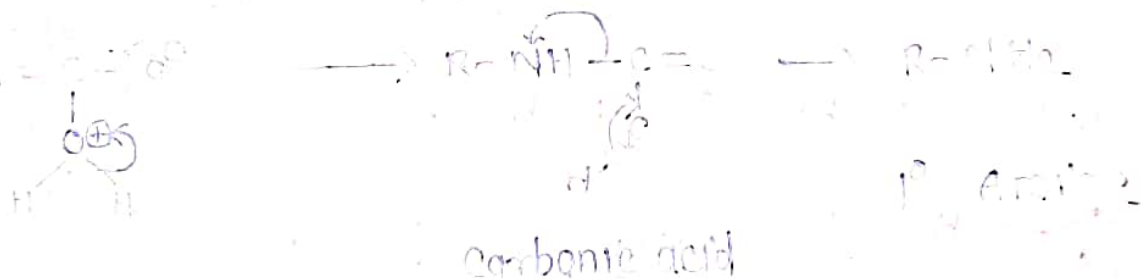
Janata shikshan Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II

Report

A seminar of Sayali Satpute student of M.Sc. II was conducted on Friday, 27/09/2024 at 11:00 am on topic "Testing of possible intermediates". The points included in her seminar are as follows-

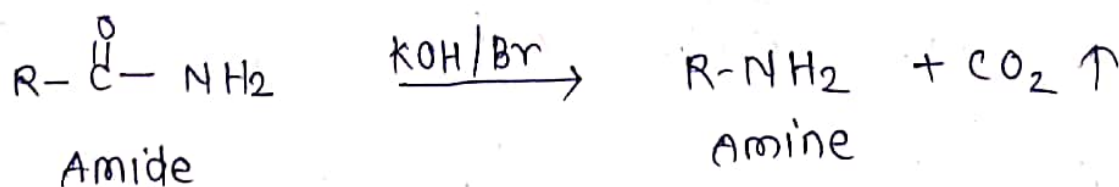
Testing of the possible intermediates -

- In this method intermediates formed during trans-formation are isolated, identified be subjected to further reaction.

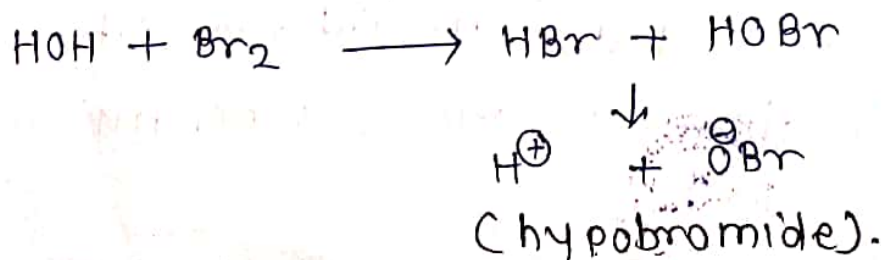


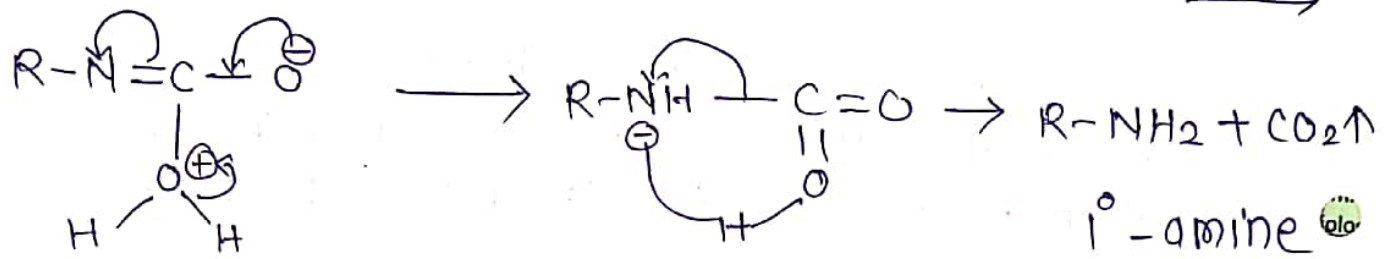
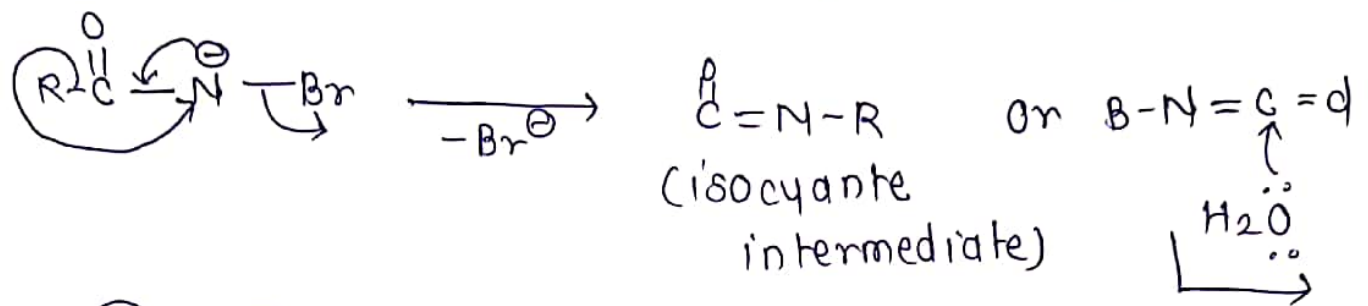
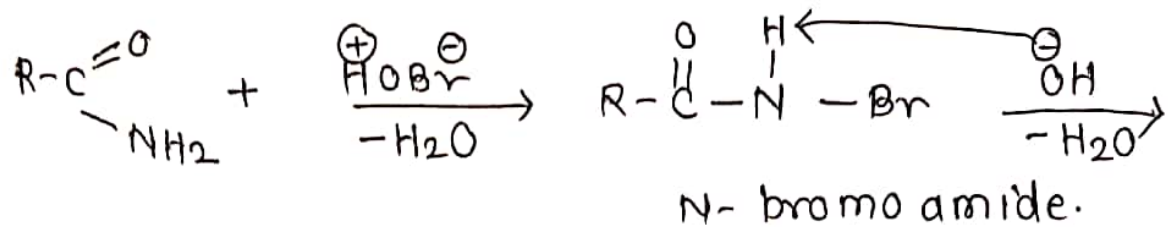
This mechanism has been suggested on the basis of the intermediates isolated during the course of reaction.

(iii) Hoffmann Rearrangement (or) Hoffmann Bromamide Reaction.



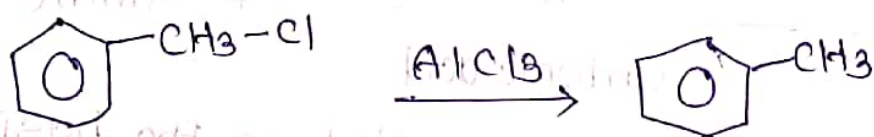
Mechanism -



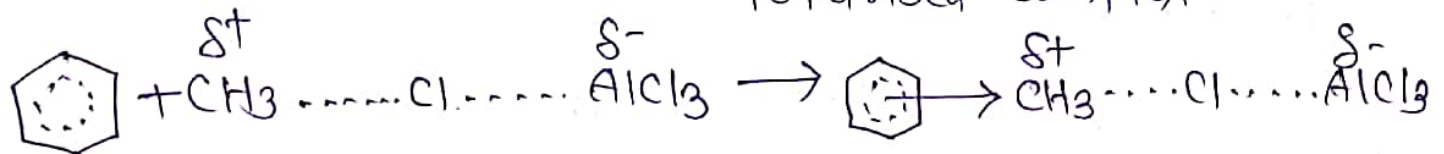
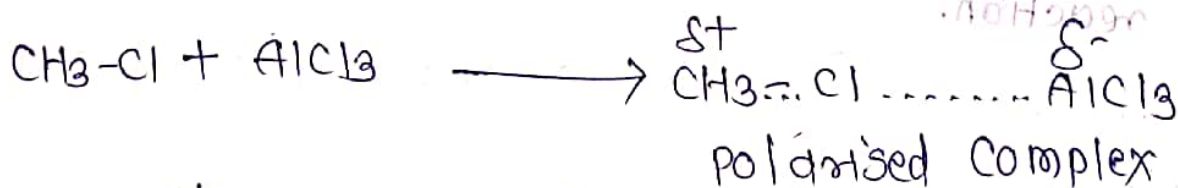


Carbonic Acid.

ii] Friedel - Craft - Alkylation.



mechanism -



Polarised complex formed as an intermediate indicates that the above reaction mechanism is correct one.



Janata Shiksha Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar Attendance sheet
M.Sc. II

27/09/2024

Sr. No.	Roll No.	Name of Students	Signature	Teacher Name
1	17	Kamthe Ankita Prashant	A.P. Kamthe	 Miss. A. S. Sankpal
2	25	Chikane Siddhi Ramesh	-Chikane	
3	19	Pujari Kirti Chenna	Pujari	
4	24	Thorave Priyanka Dinesh	Thorave	
5	12	Pisal Sushma Ajit	S. A. Pisal	
6	16	Kochale Prihi Dagadu	Kochale	
7	15	Sanas Abhishek Rajkumar	Sanas	
8	14	Pawar Prathmesh Rajendra	Pawar	
9	21	Satpute Sayali Ananda	S. A. Satpute	
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Total = 09

Male = 02

Female = 07



Janata shikshan Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II

Report

A seminar of Prajakta Jagtap student of M.Sc. II was conducted on Tuesday, 08/10/2024 at 11:30 am on topic "Identification of reaction". The points included in her seminar are as follows-

★ Reaction Mechanism :-

Reaction mechanism is a hypothetical motion picture of the behaviour of the participating atoms & molecules in the reaction.

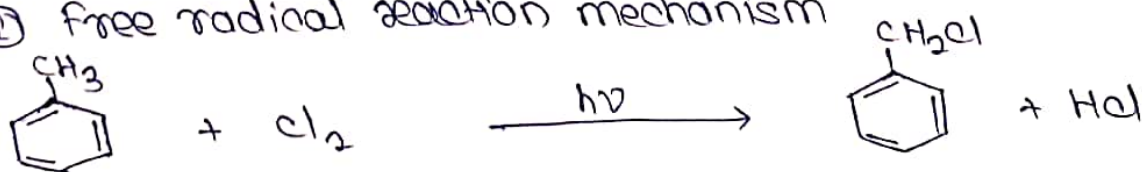
Organic reactions are those where exchange of bonds around the carbon atom take place.

★ Non-kinetic methods of determining reaction mechanism

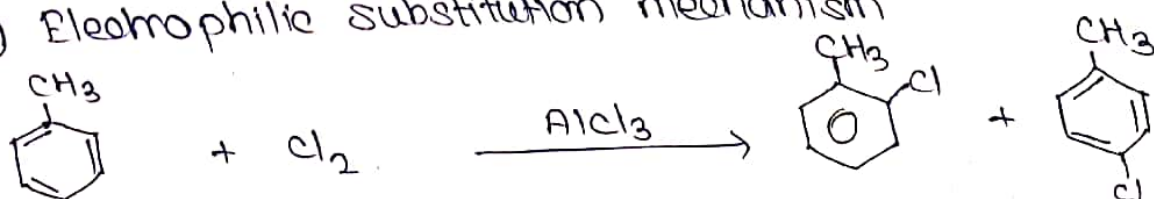
① Identification of reaction :-

- This is one of the important method for the determination of reaction mechanism.
- The identification & isolation of the product form during the reaction is essential to formulate the reaction mechanism, because unless identifying reaction product, we cannot say that reaction follows which particular path.

E.g. ① Free radical reaction mechanism

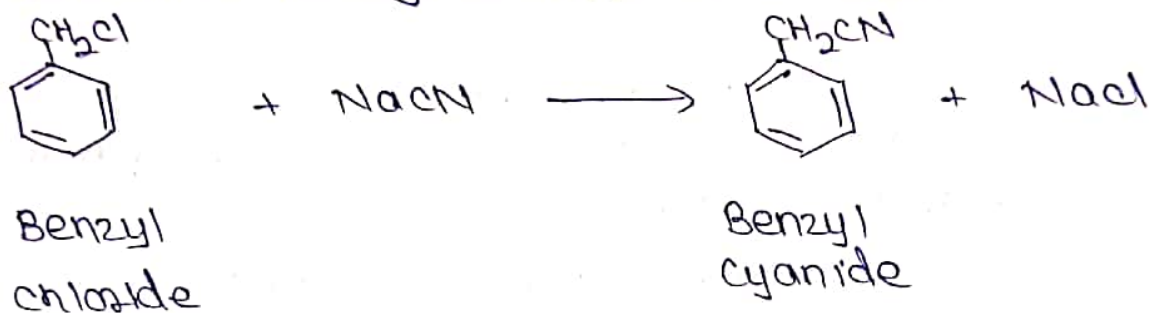


② Electrophilic substitution mechanism



- In above reaction reactants are same, but products obtained are different.
- In $[I]^{st}$ reaction free radical path is followed while in $[II]^{nd}$ electrophilic substitution path is followed.
- The products are identified by HPLC, NMR, IR, UV etc. Unless products are identified we can not say that reaction follows above two paths.

(III) Reaction of benzyl chloride with NaCN:



By observing the product, it indicates the reaction follows nucleophilic substitution reaction mechanism. This is simple mechanism in which NaCl is removed.

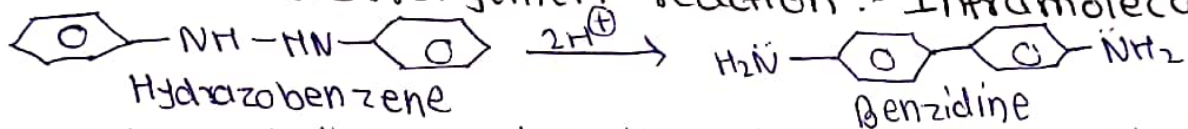
Janata shikshan Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II
Report

A seminar of Siddhi Chikane student of M.Sc. II was conducted on Tuesday, 08/10/2024 at 11:00 am on topic "Cross over experiment". The points included in her seminar are as follows-

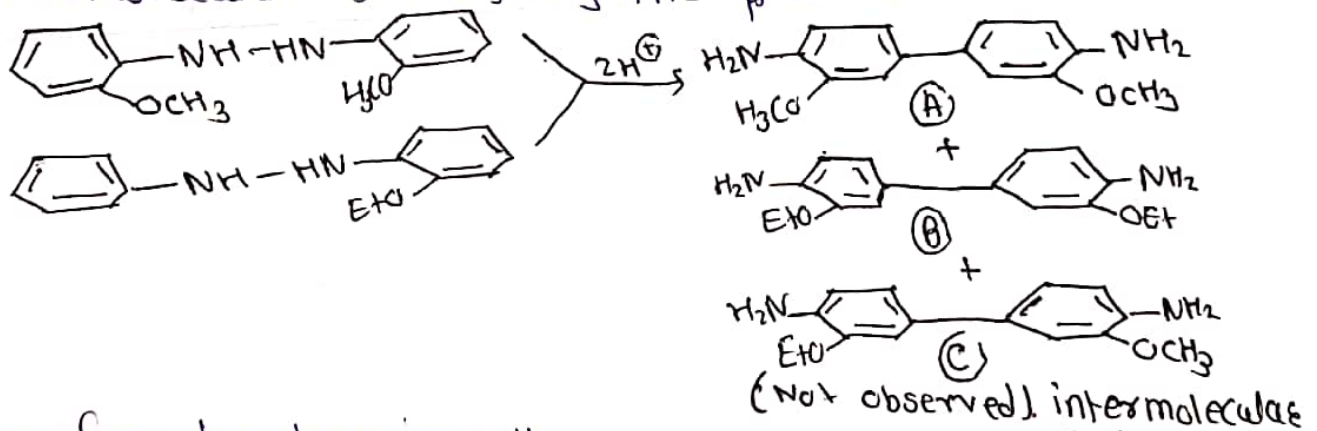
Cross over Experiment :- (i) In the rearrangement reaction, the fragment of molecule is broken from one position & gets attached in another position in same or in different molecule.

(ii) By identification of the product one can conclude that the reaction is intermolecular or intramolecular on the basis of cross-over of fragment molecules.

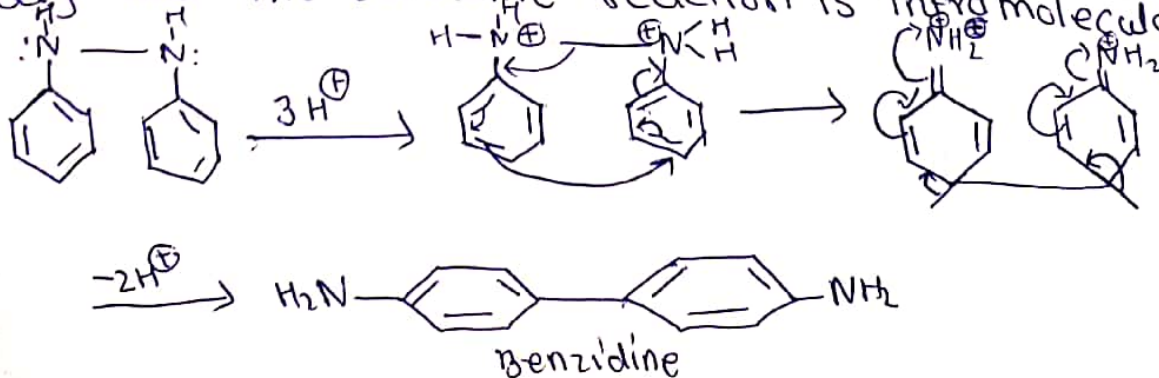
eg. (i) Benzidine rearrangement reaction :- Intramolecular



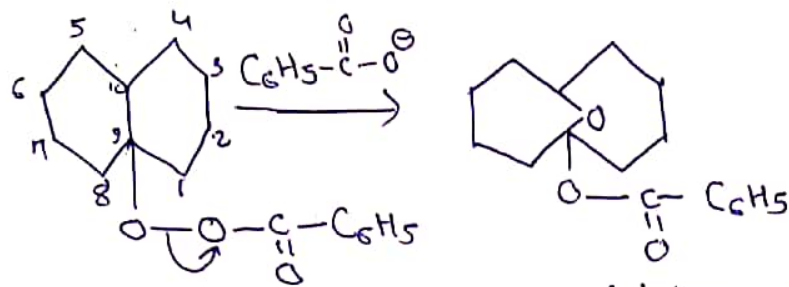
By carrying out the reaction with similar but non identical hydrazobenzene, it is possible to know whether the reaction is intermolecular or intramolecular by analysing the products.



Therefore by observing the above product we can say that the Benzidine reaction is intramolecular.

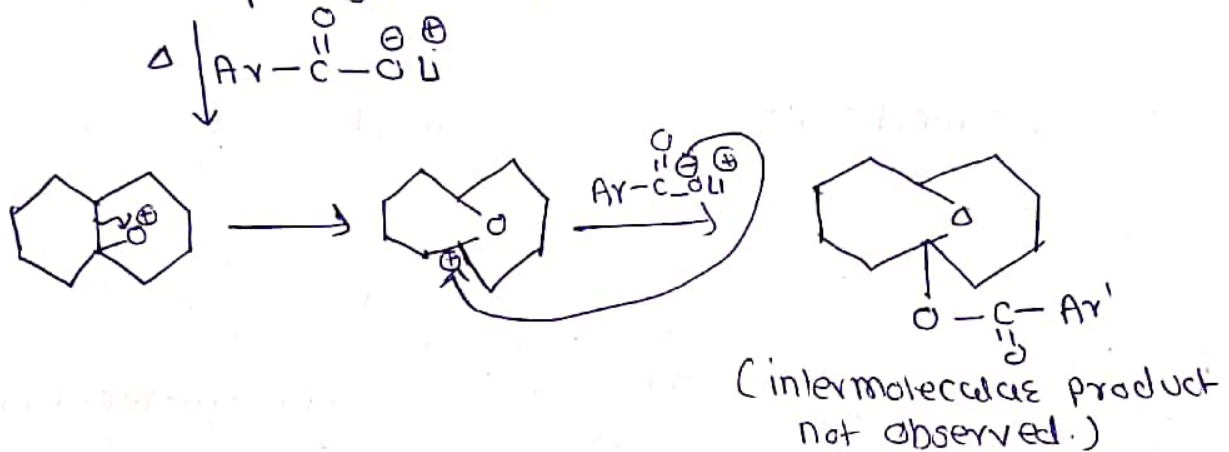


Eg ii)



9-Decylperoxybenzoate

(intramolecular observed product)



In above reaction no cross-over product is observed hence reaction is intramolecular, where breaking of O-C bond & formation of C-O bond is concerted.

Janata shikshan Sanstha's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar M. Sc. II

Report

A seminar of Shahista H. Bagwan student of M.Sc. II was conducted on Friday, 30/09/2024 at 9:30 am on topic "Hammett equation". The points included in her seminar are as follows-

Hammett equation-

It is quantitative relationship between structure and reactivity of compound. Which relates to both rate constant & equilibrium constant meta & para substituted benzene ring derivatives.

$$\log \frac{k}{k_0} = \rho \sigma \quad \text{or} \quad \frac{k_x}{k_H} = 10^{\rho \sigma}$$

where - k & k_0 = Rate constant for substituted & non substituted compound

σ = It is the substituent constant. represent the ability of attract or repel the electron.

ρ = It is the reaction constant.

• Determination of σ values -

The σ value is determined by measuring the effect of substitution on ionisation of benzoic acid in water at 25 °C

$$\sigma = \log \left(\frac{k_x \text{ C}_6\text{H}_4\text{COOH}}{k \text{ C}_6\text{H}_5\text{COOH}} \right)$$

where $k_x \text{ C}_6\text{H}_4\text{COOH}$ & $k \text{ C}_6\text{H}_5\text{COOH}$ are the ionisation constant for substituted and non substituted benzoic acid

ρ value for benzoic acid is 1.00

• Significance of σ value on the basis of m & p substituted benzoic acid

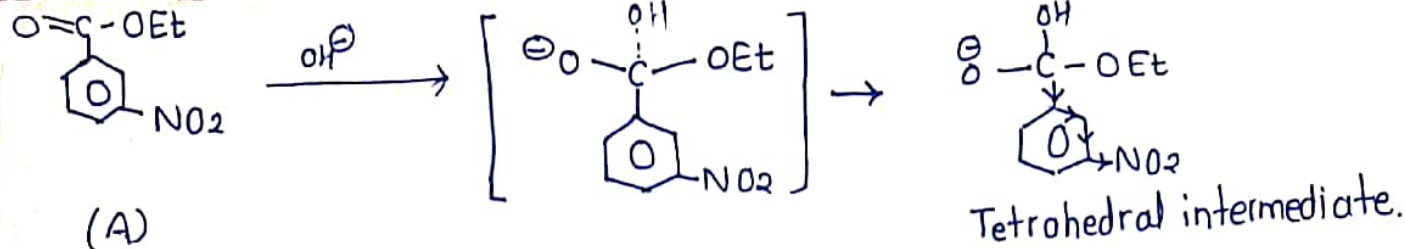
- we can see that m-Me & m-Me each have a small -ve value

- H has the value 0.

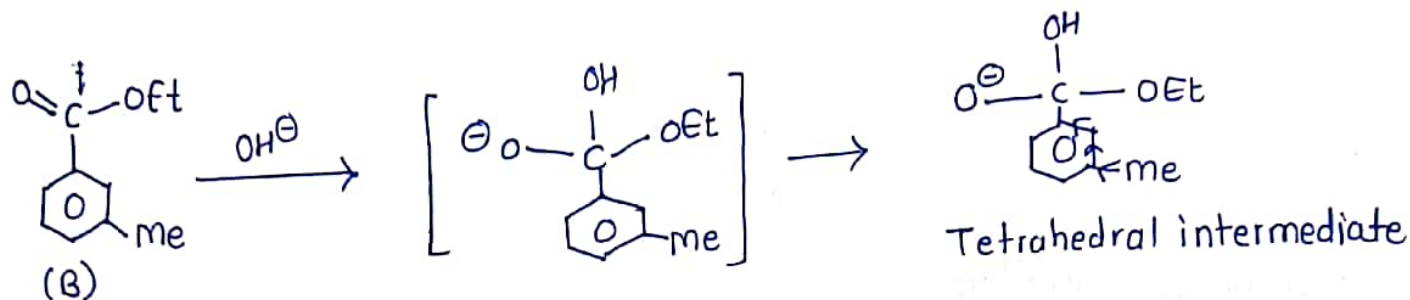
- while all other m-substituents have increasing +ve values.



Eg. - comparison of the rates of base catalysed hydrolysis of m-NO₂ & m-Me substituted ethyl benzoate with that of unsubstituted ester.



$$\sigma_{m-\text{NO}_2} = +0.71$$



$$\sigma_{m-\text{me}} = -0.07$$

It indicates that, the substituent is strong electron withdrawing or e^- attractor. & have +ve value.

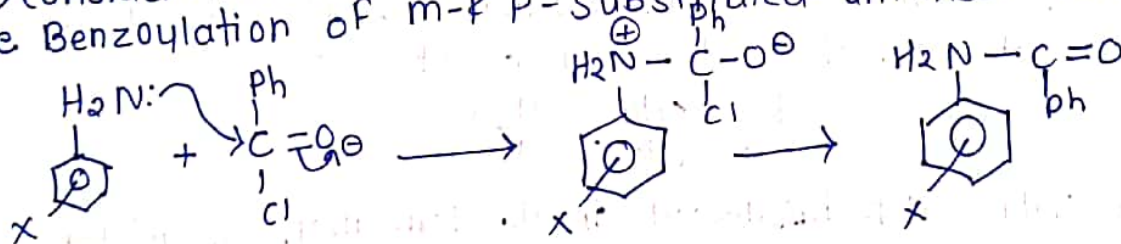
It indicates that, the substituent is weak electron attractor than hydrogen & have -ve σ value.

• Determination of ρ value (Reaction constant)

To obtain the ρ values for a given reaction series. It is necessary to measure equilibrium constant and each having a reaction centre. By plotting the graph of $\log (k_x/k_H)$ vs. σ_x we get the straight line will be the value of ρ for this reaction.

• Physical significance of ρ -

a) i) Consider the reaction with -ve ρ value
i.e. Benzoylation of m-p-p-substituted anilines. with $\rho = -2.69$



In this reaction, the lone pair present on nitrogen atom of substituted aniline attacks the carbonyl carbon.

Due to this there is formation of +ve reaction centre

And Due to formation of +ve reaction centre the rate of this reaction is accelerated only by electron donating group/substituent.

i.e. the -ve ρ value induces +ve charge at reaction centre & the rate of reaction is accelerated by e^- donating substituent

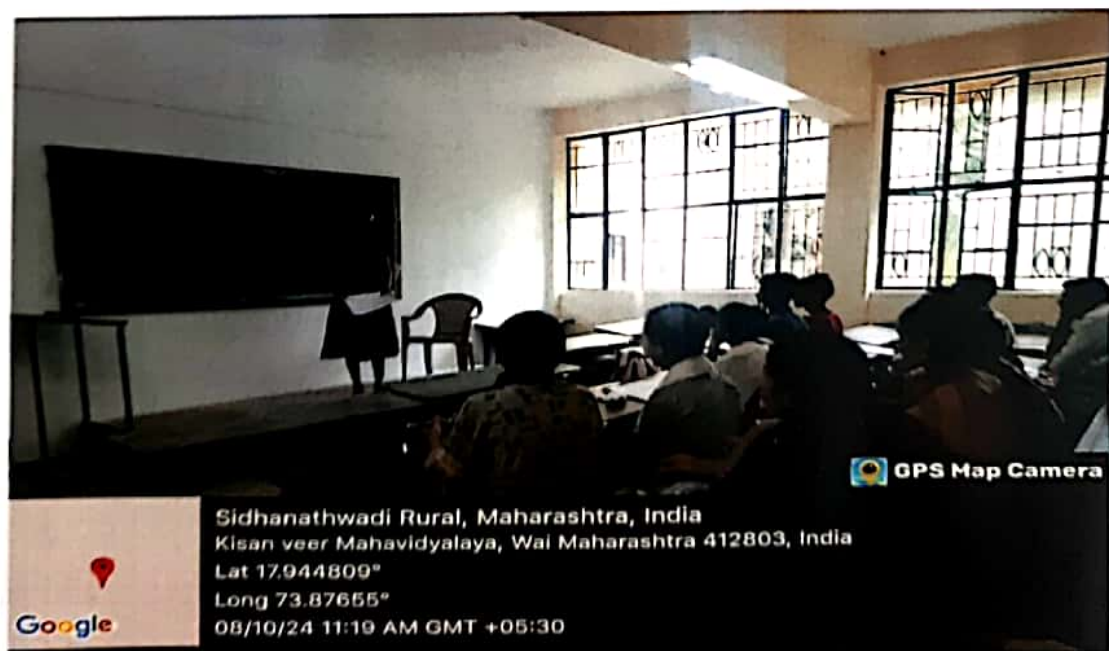
Janata Shikan Sansth's
Kisan Veer Mahavidyalaya, Wai
Department of Chemistry
Seminar Attendance sheet
M.Sc. II

08/10/2024

Sr. No.	Roll No.	Name of Students	Signature	Teacher Name
1	17	Ankita Prashant Kamthe	A.P.Kamthe	Miss. A. S. Sankpal
2	12	Sushma Ajit Pisal	S.A.Pisal	
3	16	Kochale Priti Dagadu	P.Kochale	
4	18	Bagwan Shahista Hasan	B.Bagwan	
5	21	Seetpate sayali Ananda	S.A.Seetpate	
6	19	Pujari Kirti Chenna	K.Pujari	
7	26	Salunkhe Sushant Santaji	S.Salunkhe	
8	13	Dhumal Abhishek Nandkumar	A.Dhumal	
9	10	Wagh Omkar Shivaji	O.Wagh	
10	11	Mare Suryog Pramed.	S.Mare	
11	15	Sanas Abhishek Rajkumar	A.San	
12	14	Power Prathmesh Rajendra	P.Power	
13	23	JAGTAP PRAJAKTA PRANV	P.Jagtap	
14	25	Chikane Siddhi Ramesh	S.Chikane	
15				Miss. A. S. Sankpal
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SEMINAR:- 2024-25

TOPIC NAME:- 1) Cross over experiment
2) Identification of reaction



SEMINAR:- 2024-25

TOPIC NAME:- 1) Testing of possible intermediates.
2) Study of physical properties and kinetic method.



SEMINAR:- 2024-25

TOPIC NAME:- 1) Isotope labeling technique.
2) Evidence from reaction catalysis



SEMINAR:- 2024-25

TOPIC NAME:- 1) Hammett equation

