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M.M. 2 up

(22) $R-C\equiv C-R' + H_2 \xrightarrow[BaSO_4]{Pd}$ (Lindlar's Catalyst) $\underset{\text{more Reactive}}{R-C\equiv C-R'} \rightarrow \underset{\text{less Reactive}}{\text{cis-alkene}}$ (100% cis)

(#) Rosenmund Reduction:

M.M. 1 up

(23) $R-C(=O)-Cl + H_2 \xrightarrow[BaSO_4]{Pd} R-C(=O)-H$

(24) $R-C\equiv N + H_2 \xrightarrow[BaSO_4]{Pd} R-CH=NH$ (Syn) $\xrightarrow[BaSO_4\ (Excess)]{H_2-Pd}$

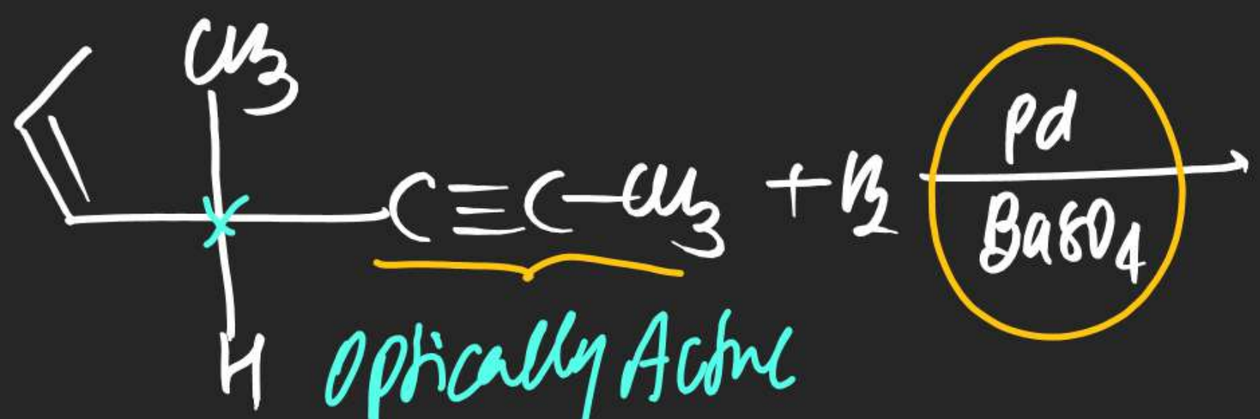
(25) 

(26) $R-CH=CH-R + H_2 \xrightarrow[BaSO_4]{Pd}$ No Rxn

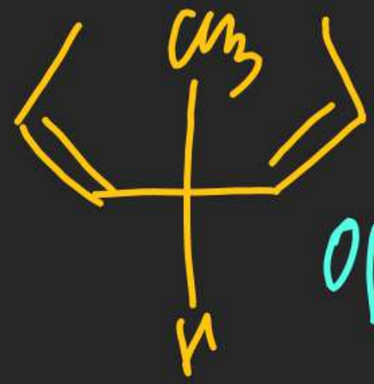
(27) $R-CH=NH + H_2 \xrightarrow{"}$ No Rxn

(28) $R-CH=O + H_2 \xrightarrow{"}$ No Rxn

(29)

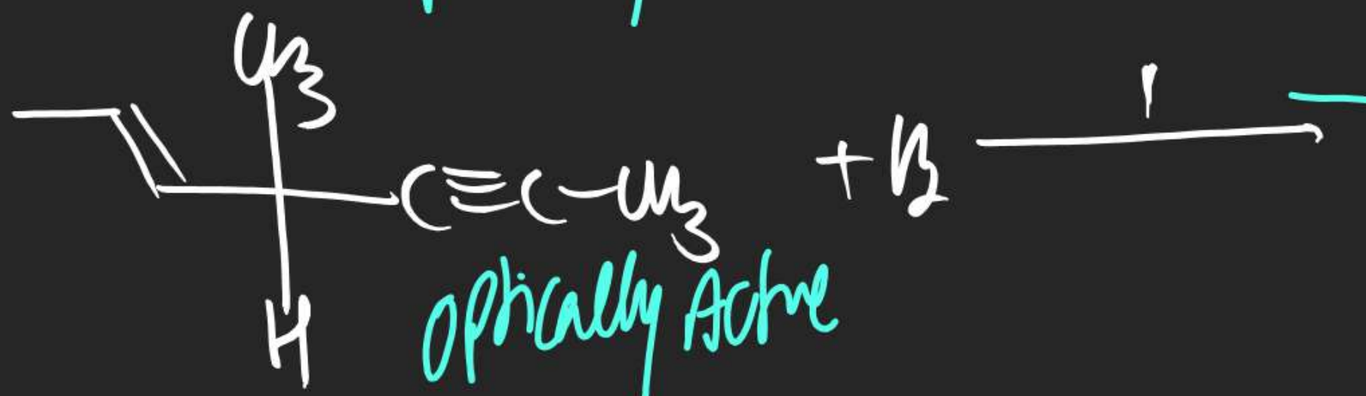


Optically Active

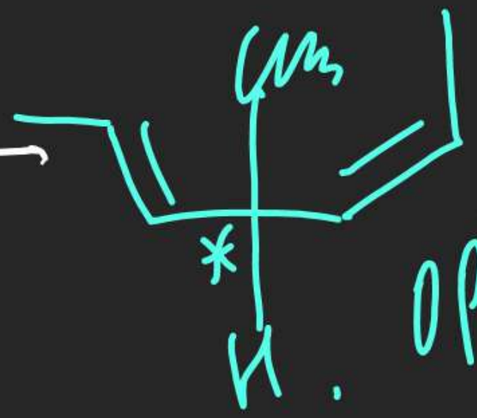


optically inactive

(30)



optically Active



. Optically Active

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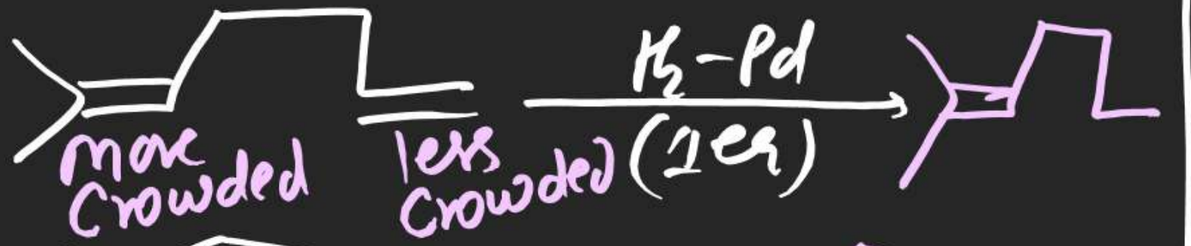
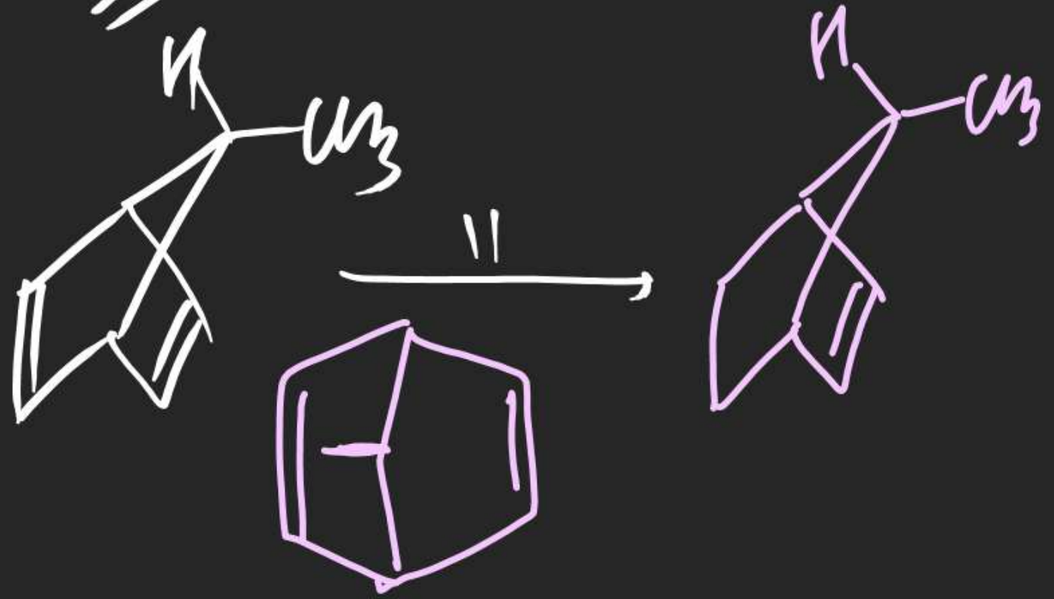
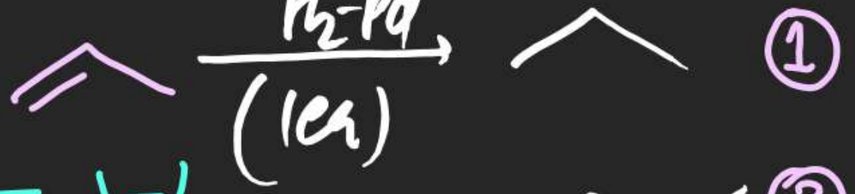
(32) 

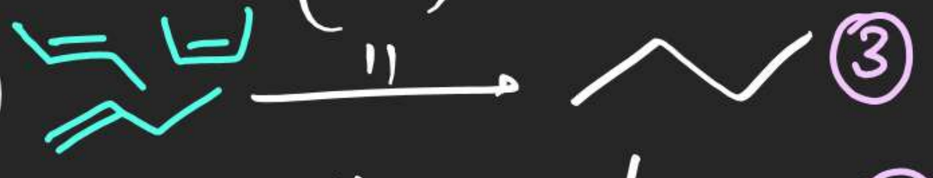
(33) 

(34) 

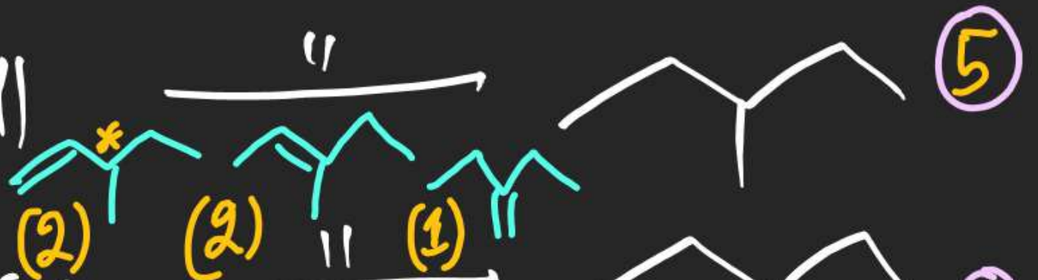
(35) 

(36) Total possible alkene which on hydrogenation gives

(a) 

(b) 

(c) 

(d) 

(e) 

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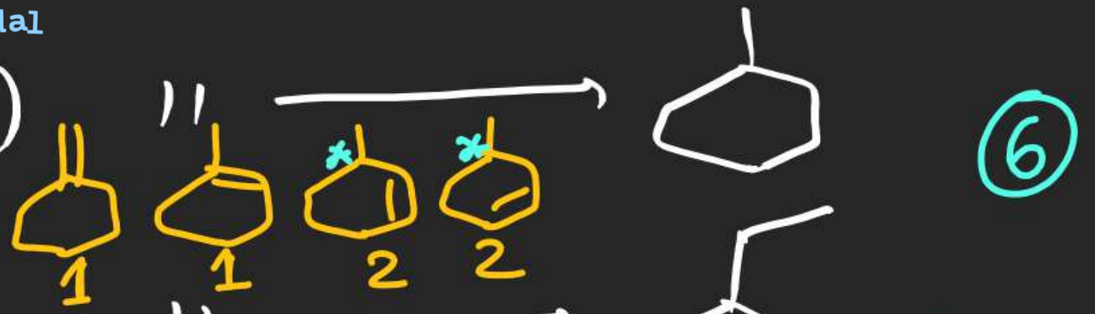
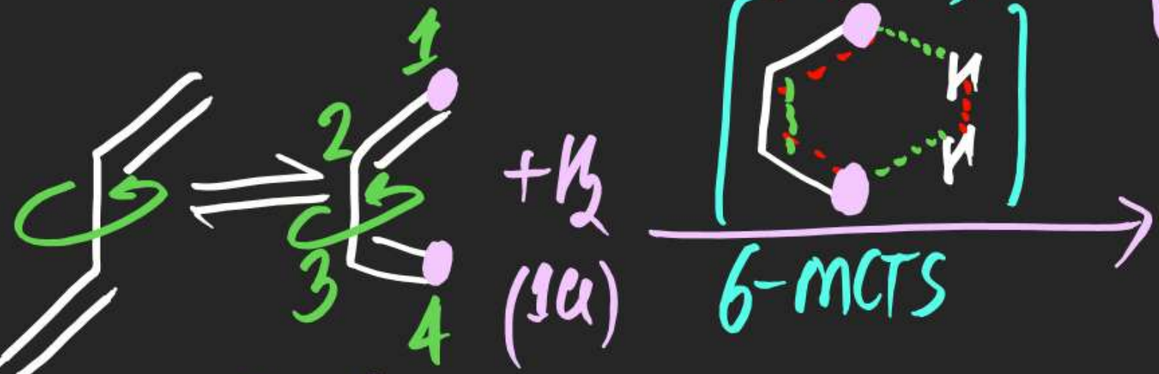
(f)  ⑥

(g)  ⑥

Hydrogenation of Conjugated alkene:

(37) $\overset{1}{C}H_2=\overset{2}{C}H-\overset{3}{C}H=\overset{4}{C}H_2 + H_2 \xrightarrow{Pd}$ (1 eq)

mech^n:



S-Trans S-Cis

(100% Cis Product)

Note (i) 1,4 addn takes place only when Conjugated diene is Either S-Cis or may attain S-Cis Conformation.

(ii) If Conjugated diene is not S-Cis then 1,2 addn takes place

(iii) 6-MCTS is involved.

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(38) 

$\xrightarrow[(1\,eq)]{H_2\text{-}Pd}$ 

(39) 

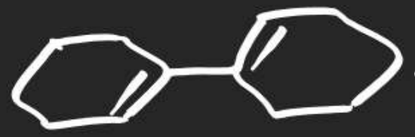
$\xrightarrow{''}$ 

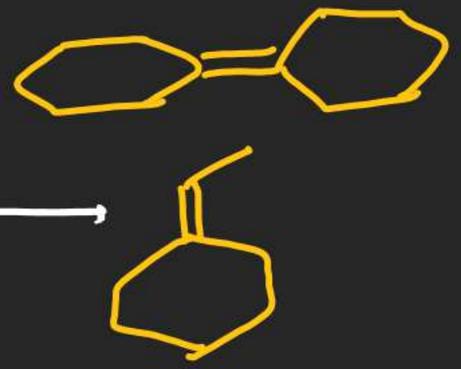
(40) 

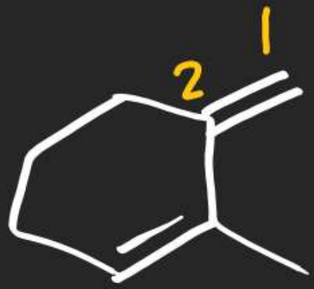
$\xrightarrow{''}$ 

(41) 
$\xrightarrow{''}$ 

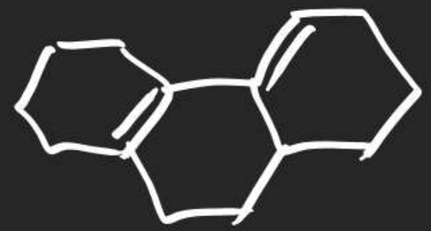
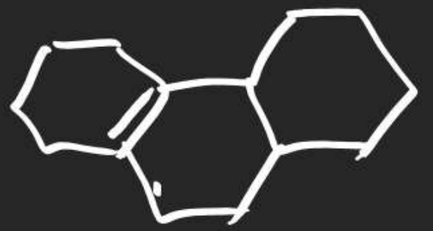
(42) 
$\xrightarrow{''}$ 

(43) 
$\xrightarrow{''}$

(44) 
$\xrightarrow{''}$ 

(45) 

$\xrightarrow{''}$ 

(46) 
$\xrightarrow{''}$ 

(vi) Transfer Hydrogenation

Name Reaction $\rangle C=O$ / $-C=N-$ / $-C\equiv N$

(2)

(3) $CH_2=CH_2$ —
- N_2H_4/H_2O_2 → CH_3-CH_3
- N_2D_4/D_2O_2 → CH_2D-CH_2D

(4)

2(±)

(5)

2(±)

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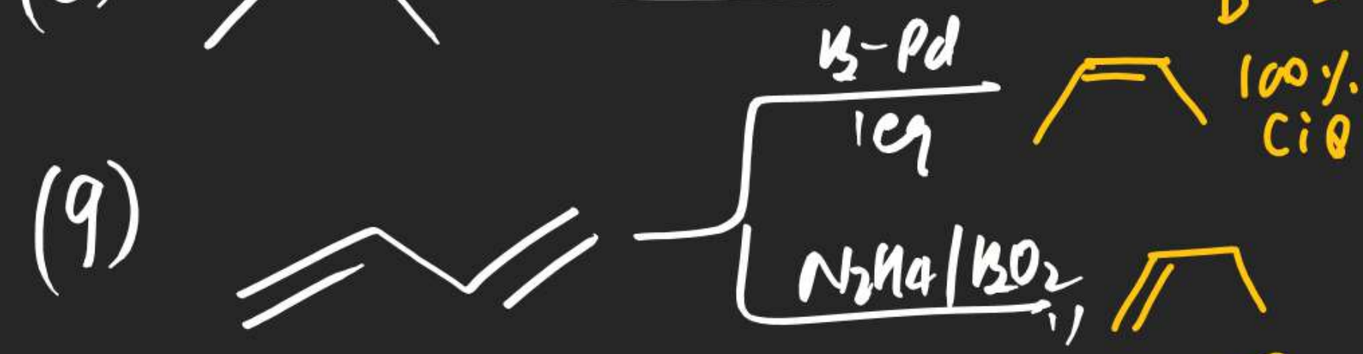
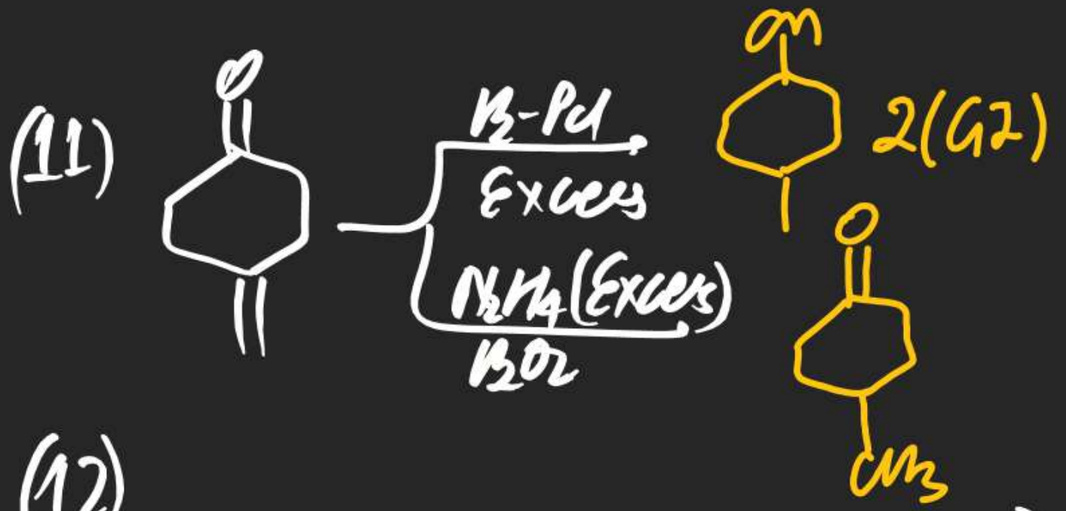
(6) 

(7) 

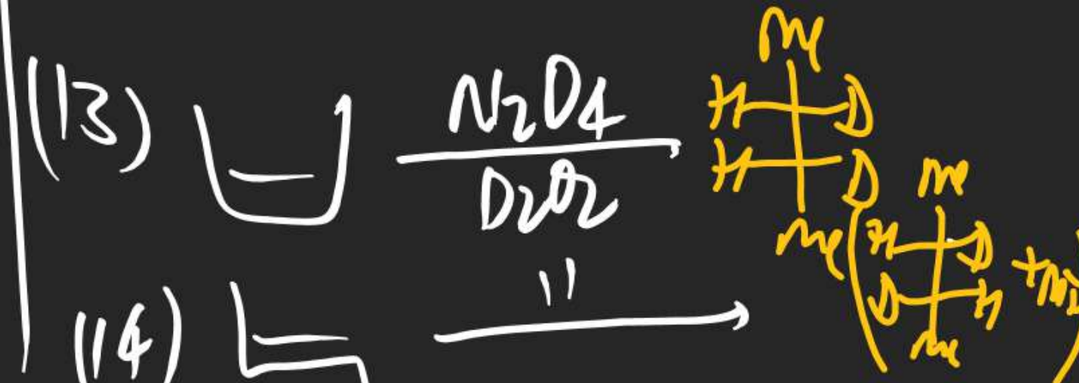
(8) 

(9) 

(10) 

(11) 

(12) 

(13) 

(14)

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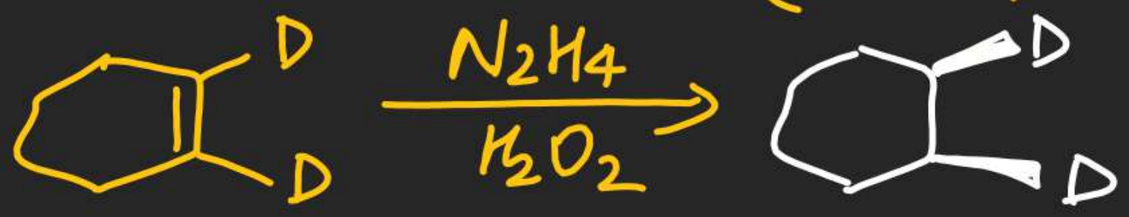
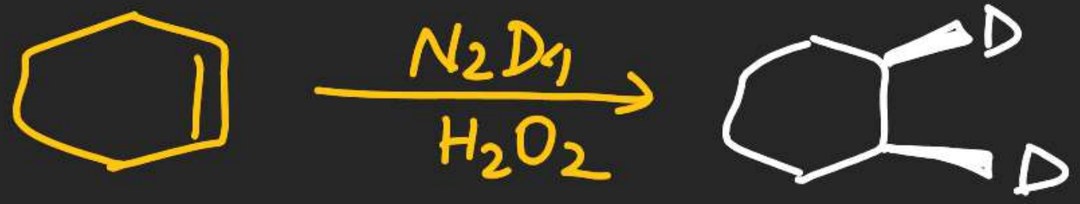
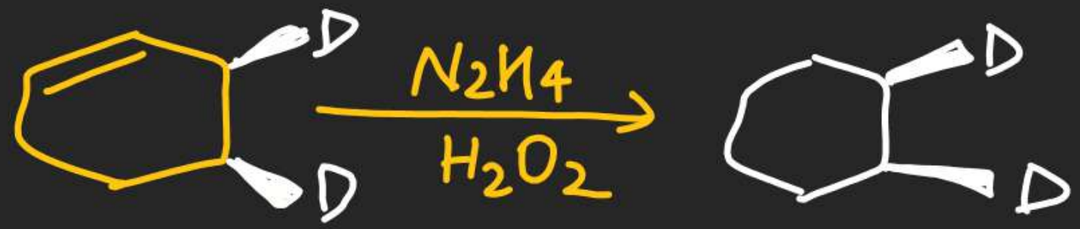
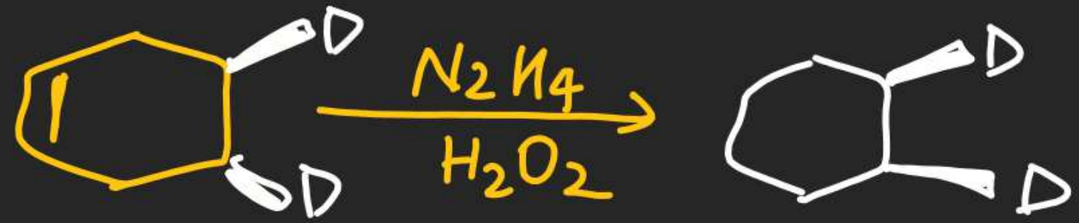
Soln:

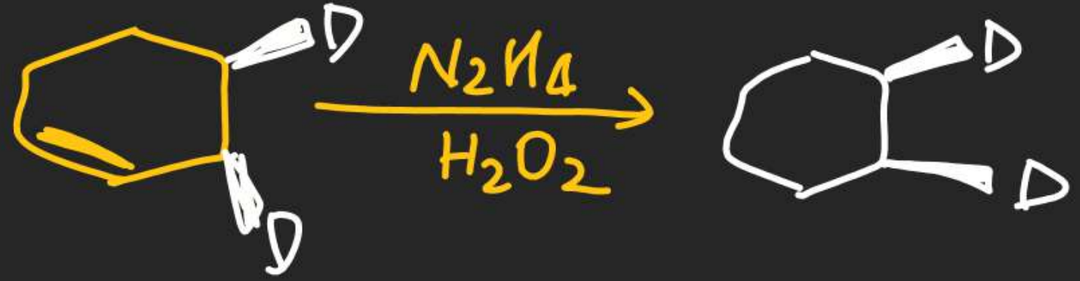
(100 %).

(i) 

(ii) 

(iii) 

(iv) 

(v) 

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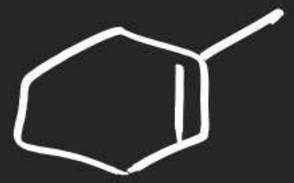
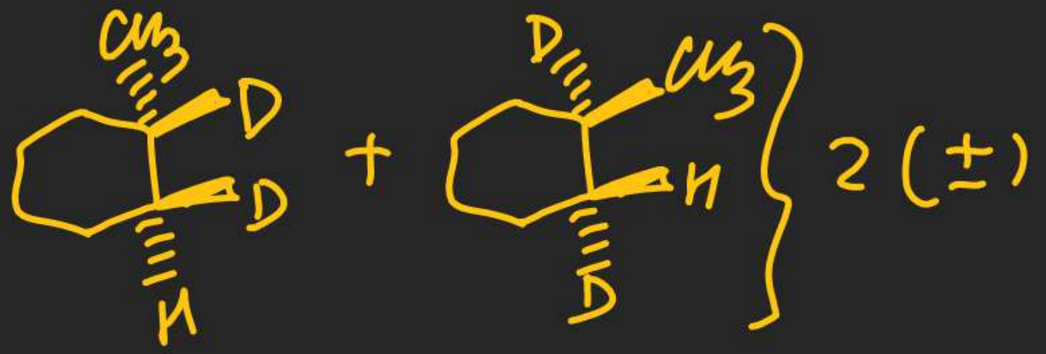
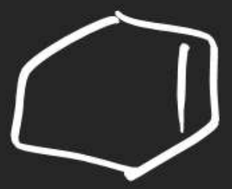
(15)  $\xrightarrow[H_2O_2]{N_2D_4}$ 

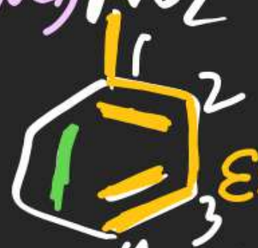
(16)  $\xrightarrow{\text{II}}$ 

(17)  $\xrightarrow{\text{II}}$ 

(5) (EDG) CH_3

$\xrightarrow[\text{liq } NH_3]{Na}$

(6) (EWG) NO_2



$\xrightarrow{h\nu}$

Extended Conjn

$\gamma_6 > \gamma_5$

(7)

$\xrightarrow{h\nu}$

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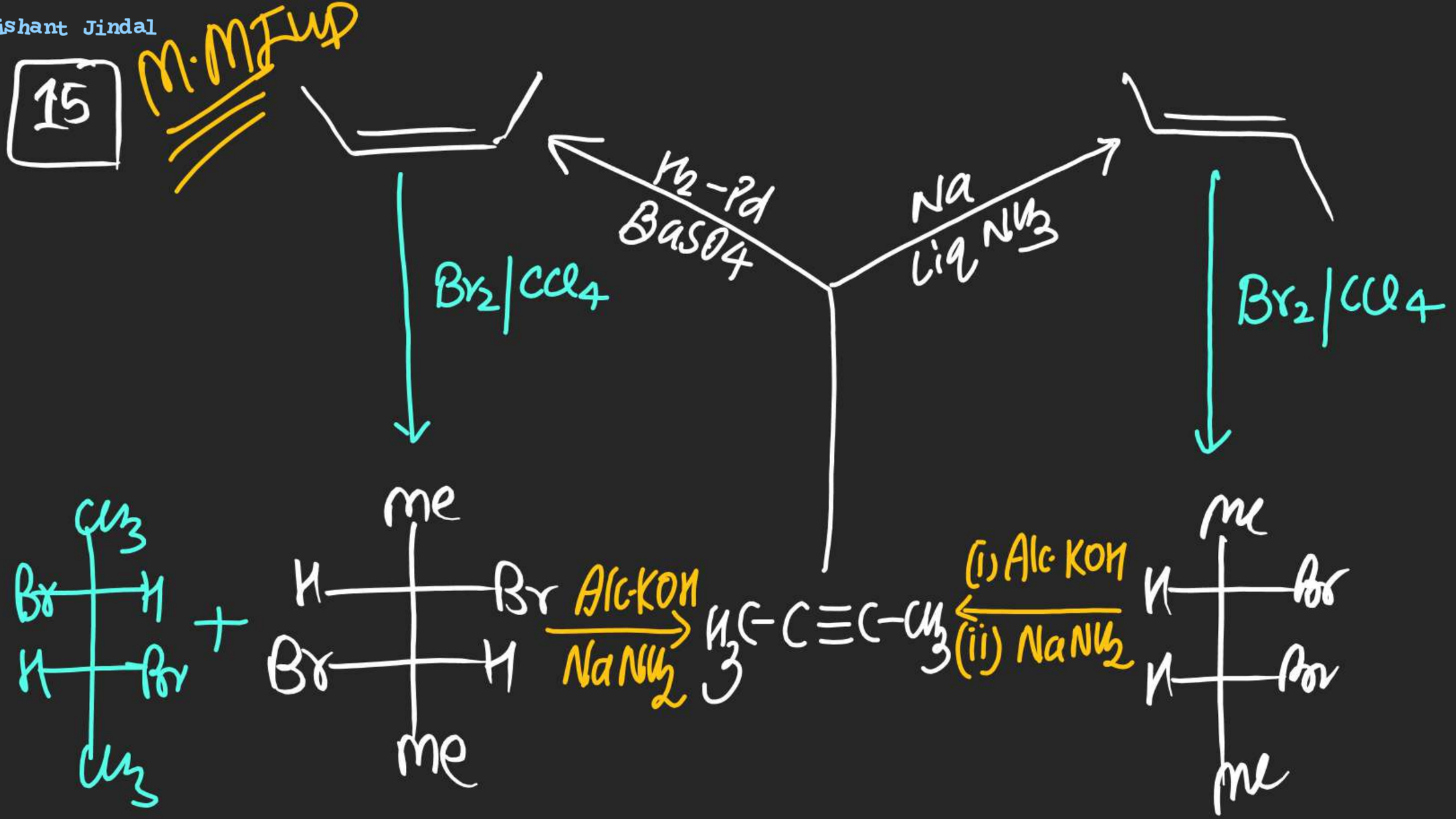
15

M.M.Flip



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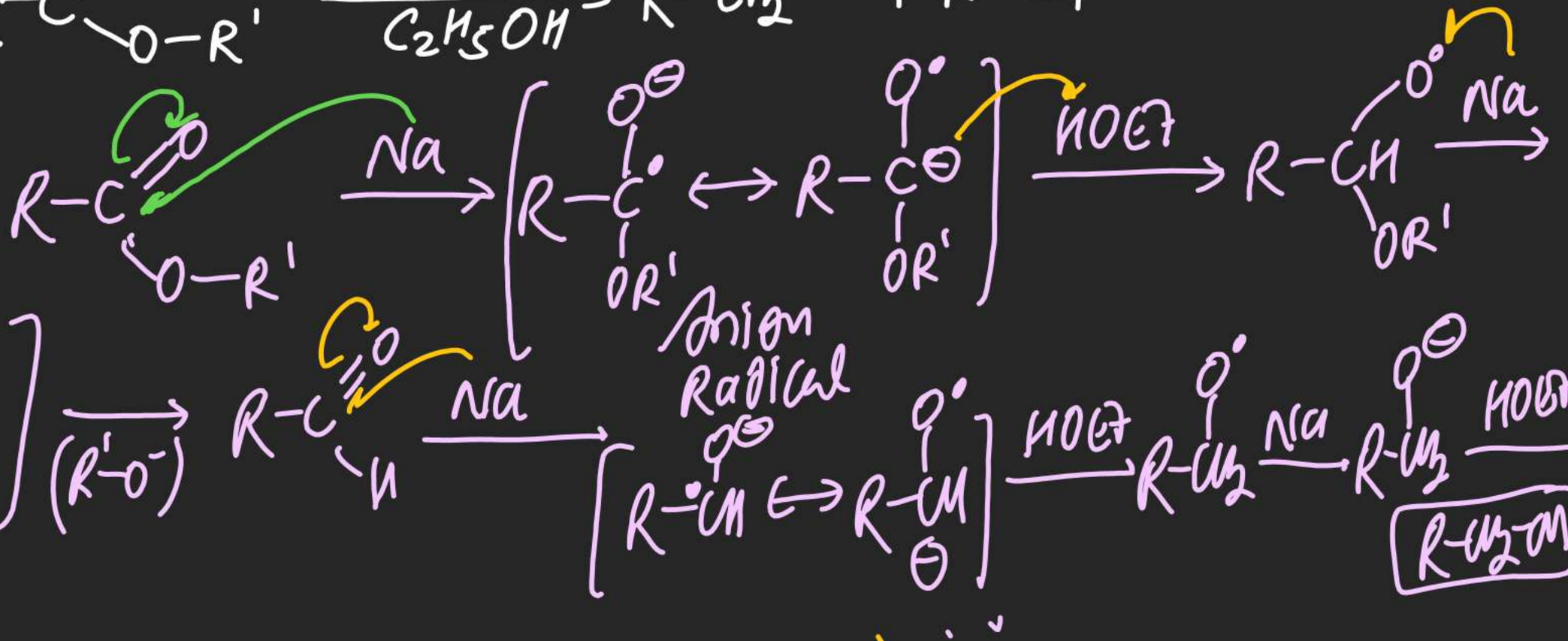
(#) Bovlet Blank Reduction:

⇒ Reduction of Ester By Use of Na-EtOH in to mixture of Alcohols is known as Bov. Blank Reduction.

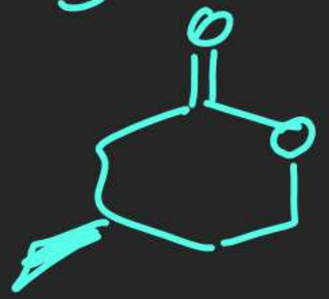
(1) $R-C(=O)-O-R' \xrightarrow[C_2H_5OH]{Na} R-CH_2-OH + R'-OH$

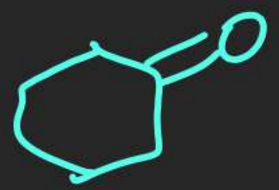
Mechⁿ:



Note (i) Anion Radical Intermidiate
(ii) Two step Reduction for Acid derivatives.

(2) $CH_3-\overset{\overset{O}{\|}}{C}-O-CH_3 \xrightarrow[C_2H_5OH]{Na}$

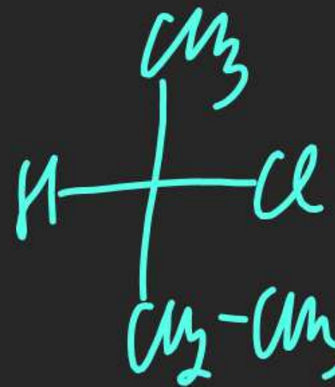
(3)  $\xrightarrow{''}$

(4)  $\xrightarrow{''}$

(5) $CH_3-\overset{\overset{O}{\|}}{C}-H \xrightarrow{''}$

(6) $R-C\equiv N \xrightarrow[C_2H_5OH]{Na}$

(7)  $\xrightarrow[C_2H_5OH]{Na}$

(8)  $\xrightarrow{''}$.

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(#) Stephen's Reduction :-

⇒ In this Reduction Cynide gets reduced in to aldehyde.

(1) $R-C\equiv N \xrightarrow[(ii)\ H_2O]{(i)\ SnCl_2/HCl} R-\underset{H}{\overset{O}{C}}$

Mechⁿ :

$SnCl_2 + 2HCl \longrightarrow SnCl_4 + 2[H]$

$R-C\equiv N \xrightarrow{2[H]} R-CH=NH \xrightarrow{H_2O} R-\underset{H}{\overset{O}{C}}$

Note : One step Reduction of $-C\equiv N$.

(2)  $\xrightarrow[(ii)\ H_2O]{(i)\ SnCl_2/HCl}$

(3) $CH_3-CH_2-CN \xrightarrow{Sn/HCl}$

(4)  $\xrightarrow{SnCl_2/HCl}$

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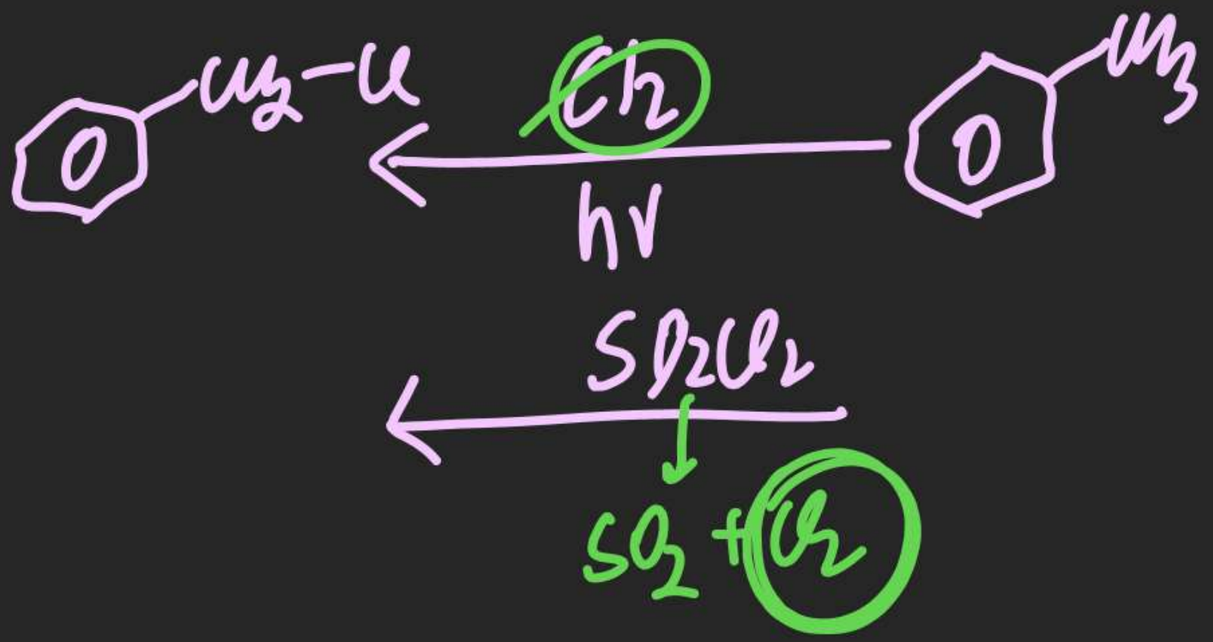
(#) MPV Reduction :-

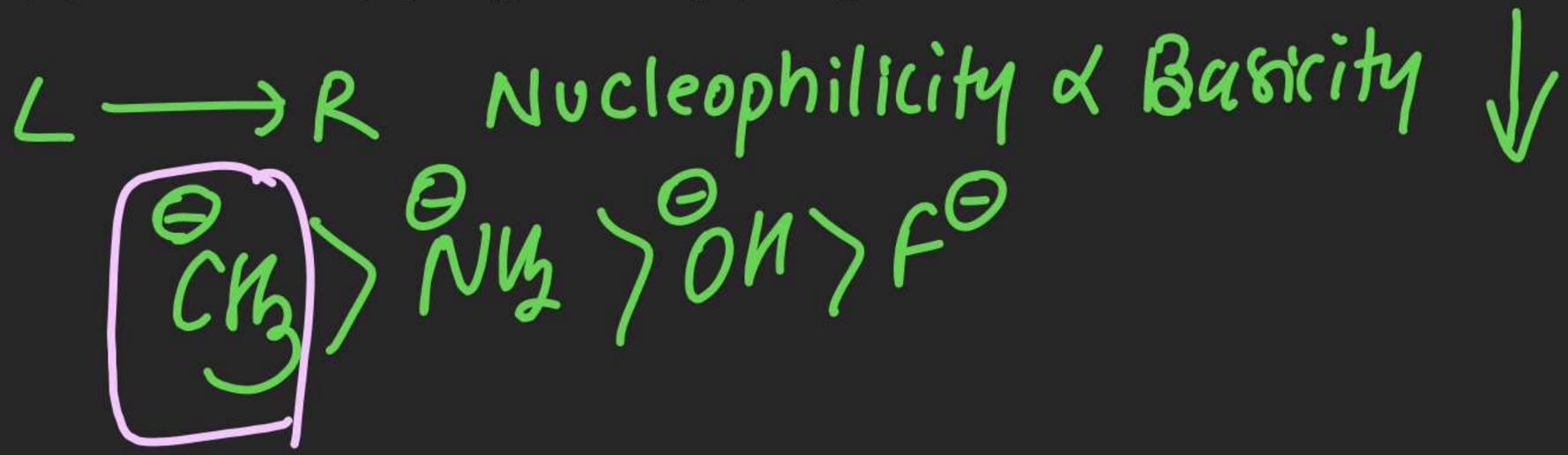
7. **Benzyl chloride $(C_6H_5CH_2Cl)$ can be prepared from toluene by chlorination with:** [IIT 1998]

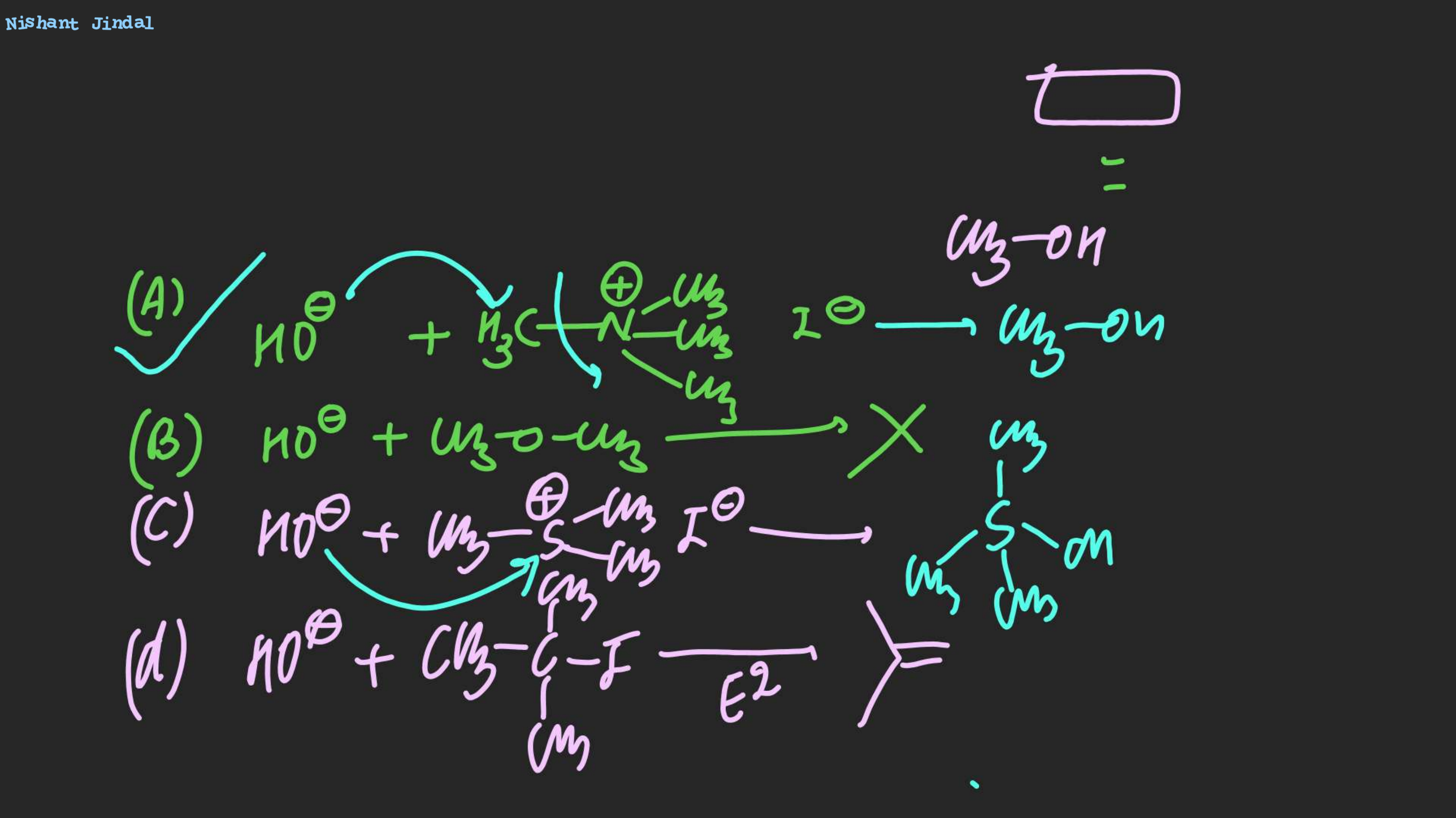
(A) SO_2Cl_2 (B) $SOCl_2$ (C) $Cl_2, (hv)$ (D) $NaOCl$



9. Which of the following has the highest nucleophilicity? [IIT 2000]

(A) F^- (B) OH^- (C) CH_3^- (D) NH_2^-

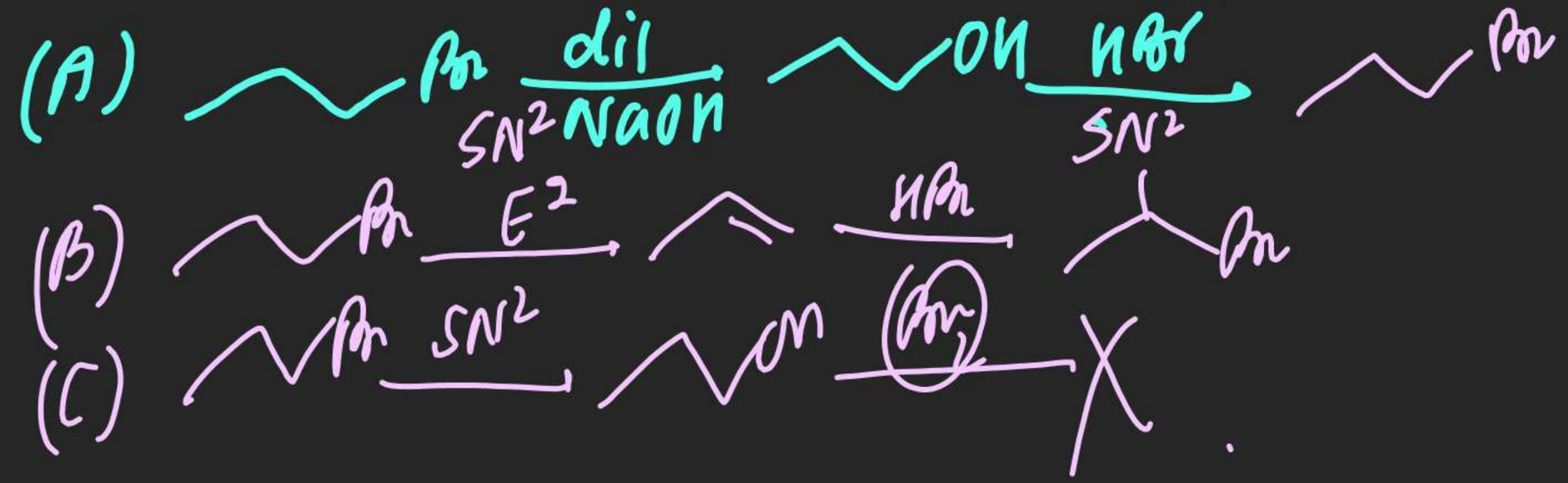




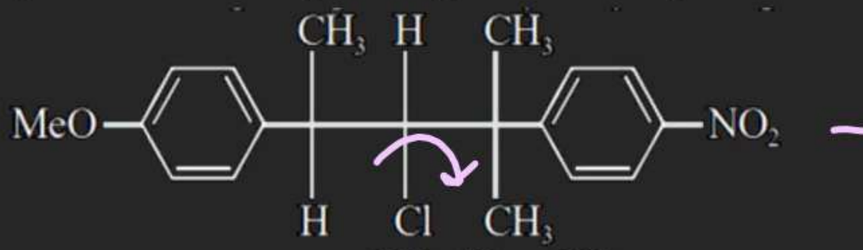
12. Identify the set of reagents / reaction conditions ' X ' and ' Y ' in the following set of transformation: [IIT 2002]

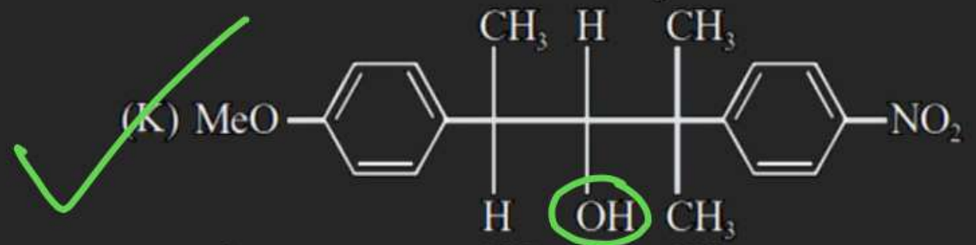
$$CH_3 - CH_2 - CH_2Br \xrightarrow{X} \text{Product} \xrightarrow{Y} CH_3 - \underset{\displaystyle Br}{\underset{|}{CH}} - CH_3$$

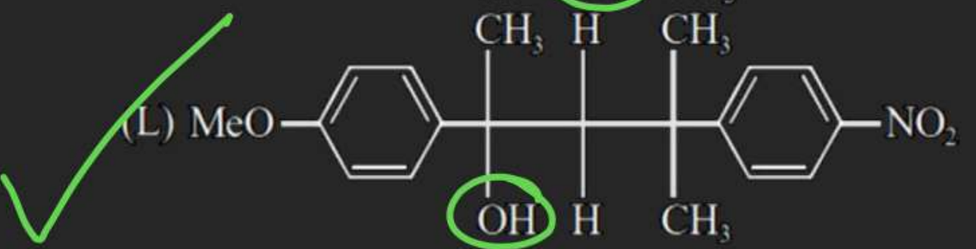
(A) X = dilute aqueous NaOH, 20°C; Y = HBr/ acetic acid, 20°C
(B) X = concentrated alcoholic NaOH, 80°C; Y = HBr/ acetic acid 20°C
(C) X = dilute aqueous NaOH, 20°C; Y = $Br_2/CHCl_3$, 0°C
(D) X = concentrated alcoholic NaOH, 80°C; Y = $Br_2/CHCl_3$, 0°C

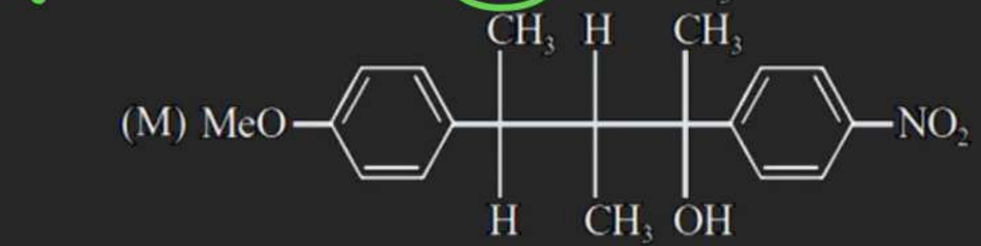


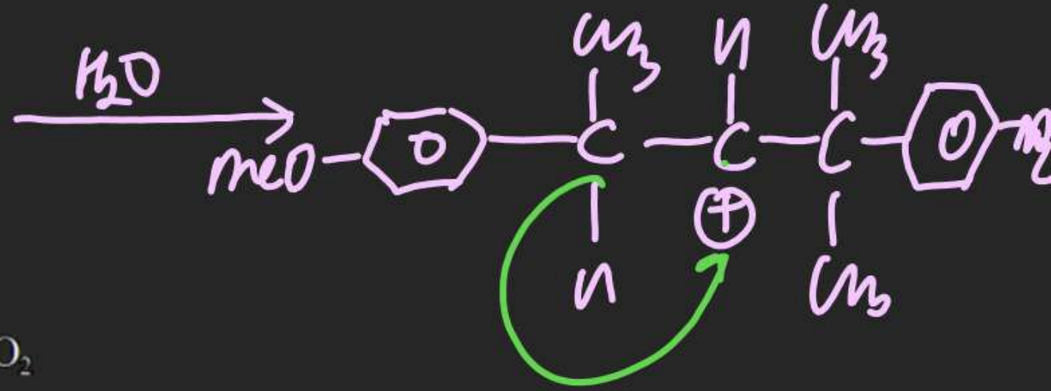
15. The following compound on hydrolysis in aqueous acetone will give: [IIT 2005]

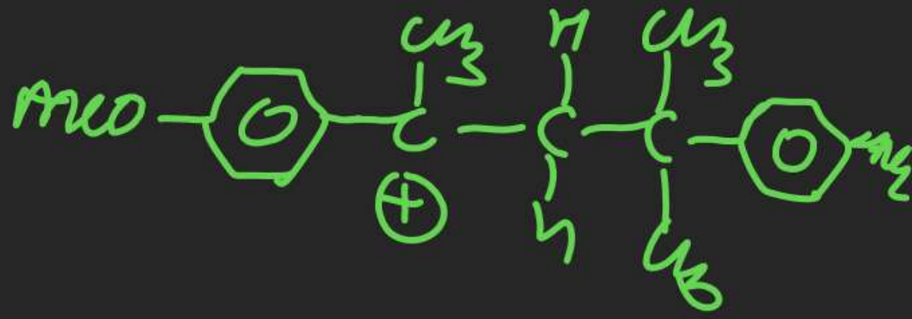












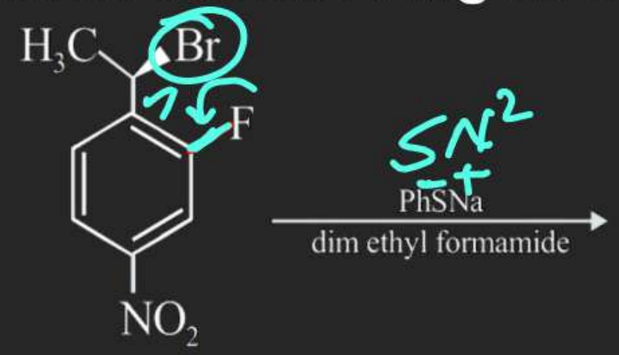
It mainly gives

(A) K and L (B) Only K (C) L and M (D) Only M

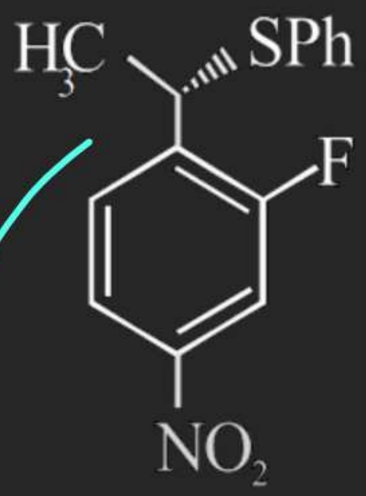
16.Match the following: [IIT 2006]

	Column-I		Column-II
(A)	$CH_3 - CHBr - CD_3$ on treatment with alc. KOH gives $CH_2 = CH - CD_3$ as a major product.	(A)	E1 reaction
(B)	$Ph - CHBr - CH_3$ reacts faster than $Ph - CHBr - CD_3$.	(B)	E2 reaction
(C)	$Ph - CD_2 - CH_2Br$ on treatment with $C_2H_5OD/C_2H_5O^-$ gives $Ph - CD = CH_2$ as the major product.	(C)	E1cb reaction
(D)	$PhCH_2CH_2Br$ and $PhCD_2CH_2Br$ react with same rate.	(D)	First order reaction

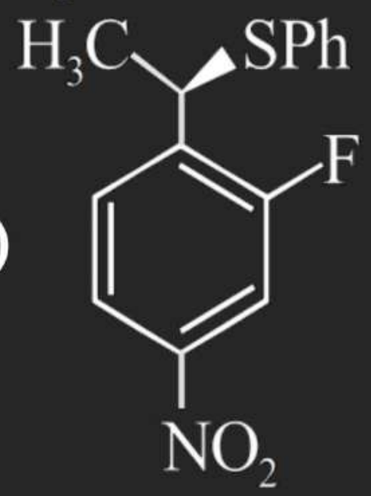
17. The major product of the following reaction is [IIT 2008]



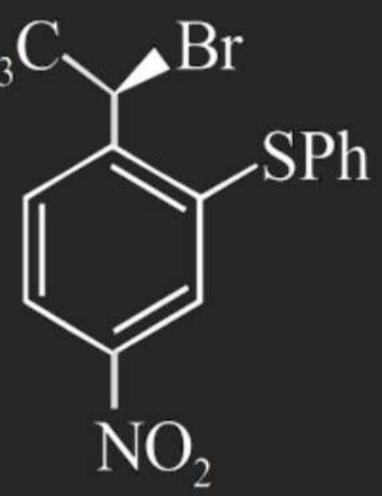
(A)



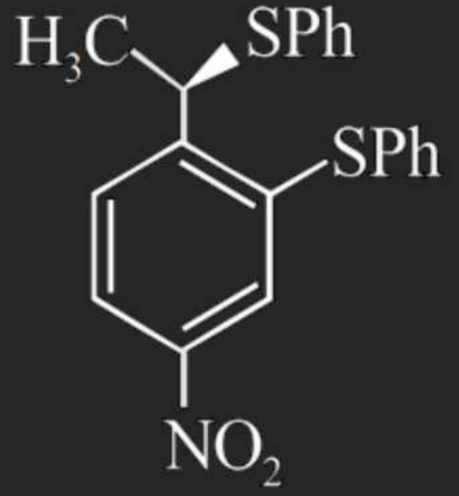
(B)

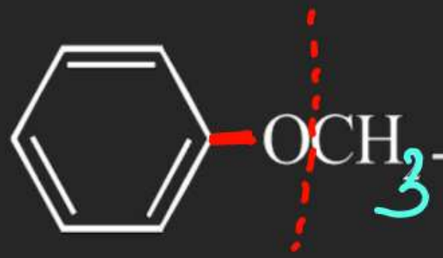


(C)



(D)

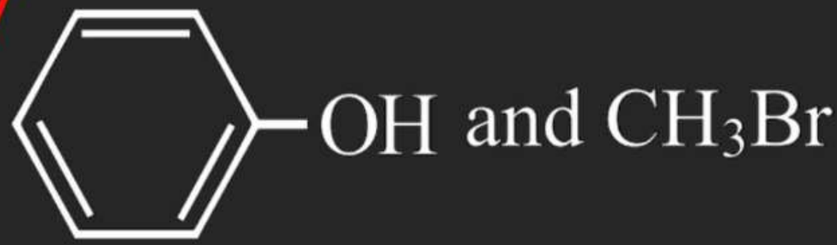


18. In the reaction  the products are [IIT 2010]

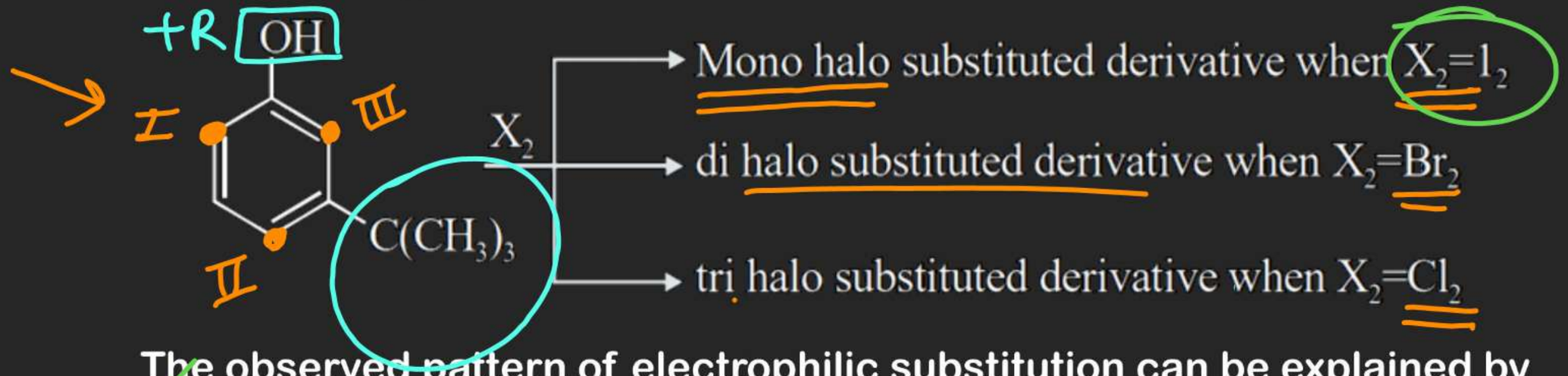
(A) 

(B) 

(C) 

(D) 

20. The reactivity of compound Z with different halogens under appropriate conditions is given below [IIT 2014]



The observed pattern of electrophilic substitution can be explained by

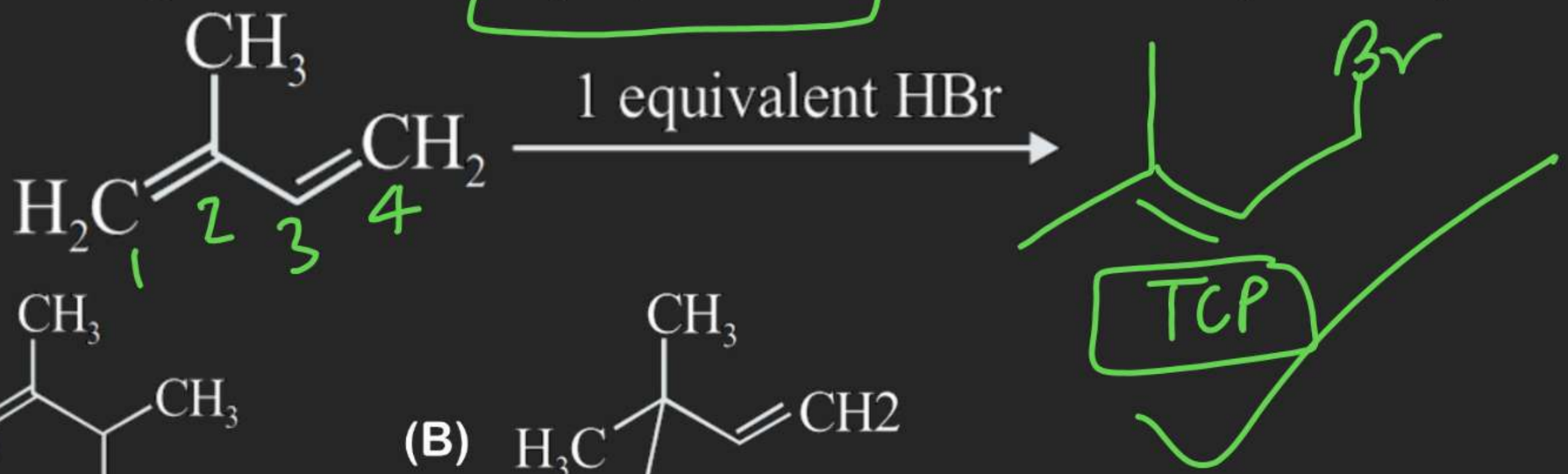
(A) The steric effect of the halogen

(B) The steric effect of the tert-butyl group

(C) The elctronic effect of the phenolic group

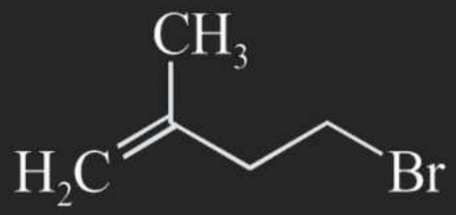
(D) The electronic effect of the turt-butyl group

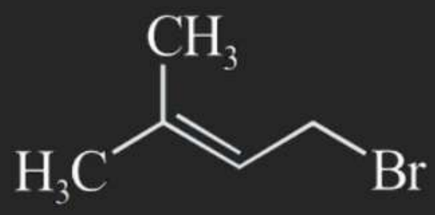
21. In the following reaction, the major product is [IIT 2015]



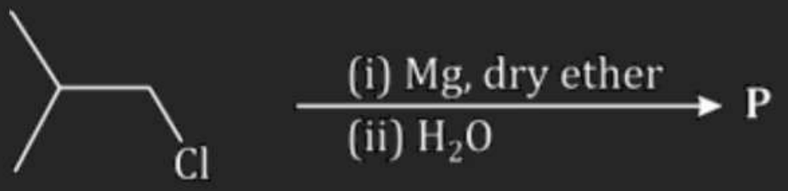
(A)

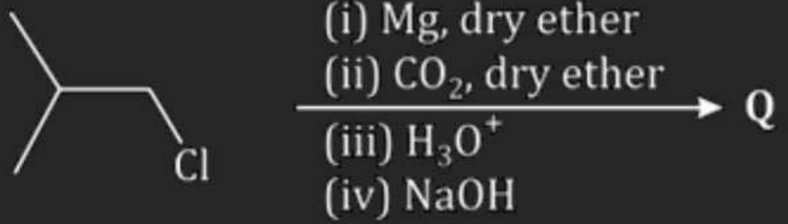
(B)

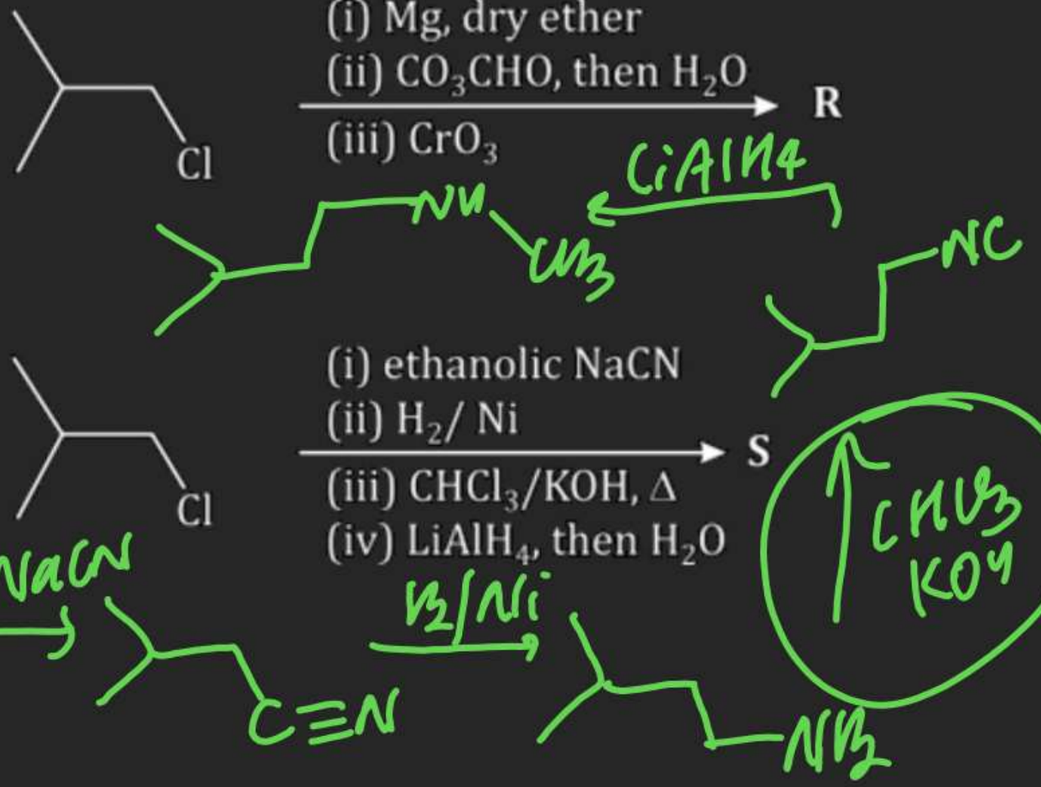
(C) 

(D) 

25. In the following reactions, P, Q, R, and S are the major products. [IIT 2023]







The correct statement about P, Q, R, and S is:

(A) P is a primary alcohol with four carbons.

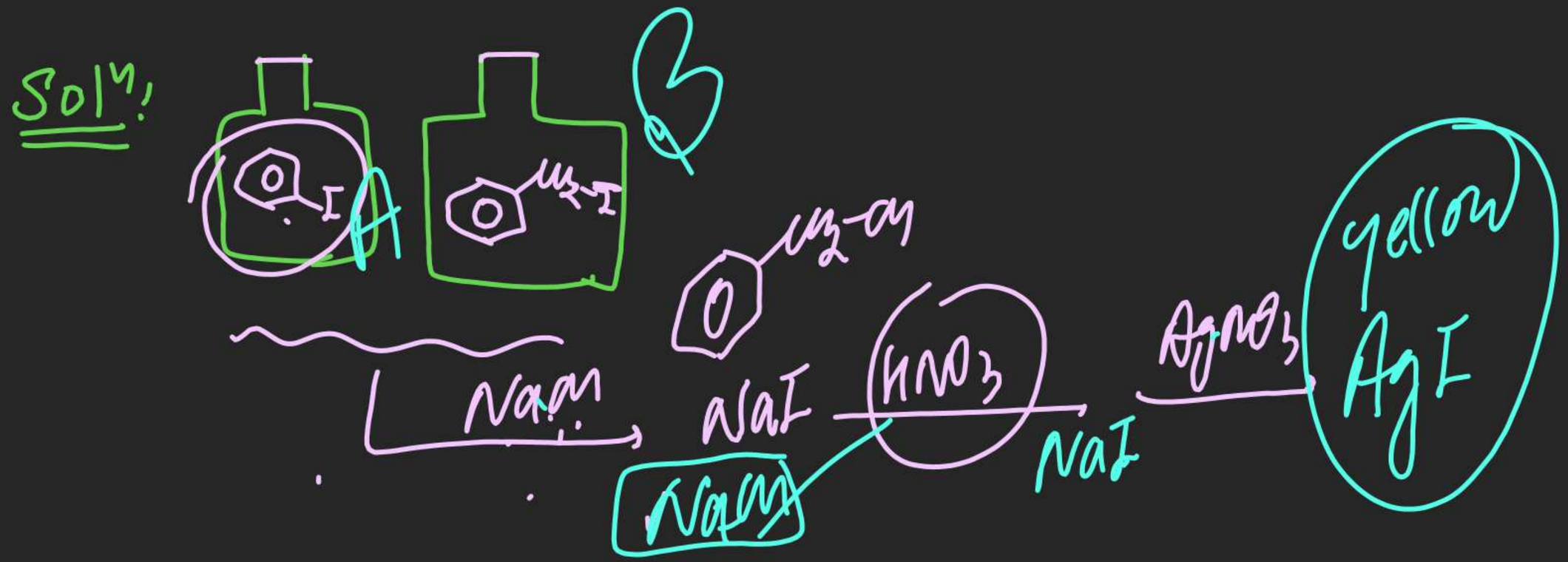
(B) Q undergoes Kolbe's electrolysis to give an eight-carbon product.

(C) R has six carbons and it undergoes Cannizzaro reaction.

(D) S is a primary amine with six carbons.

3. Bottles containing C_6H_5I and $C_6H_5-CH_2I$ lost their original labels. They were labelled A and B for testing. A and B were separately taken in a test tube and boiled with $NaOH$ solution. The end solution in each tube was made acidic with dilute HNO_3 and then some $AgNO_3$ solution was added. Substance B gave a yellow precipitate. Which one of the following statements is true for this experiment. [AIEEE 2003]

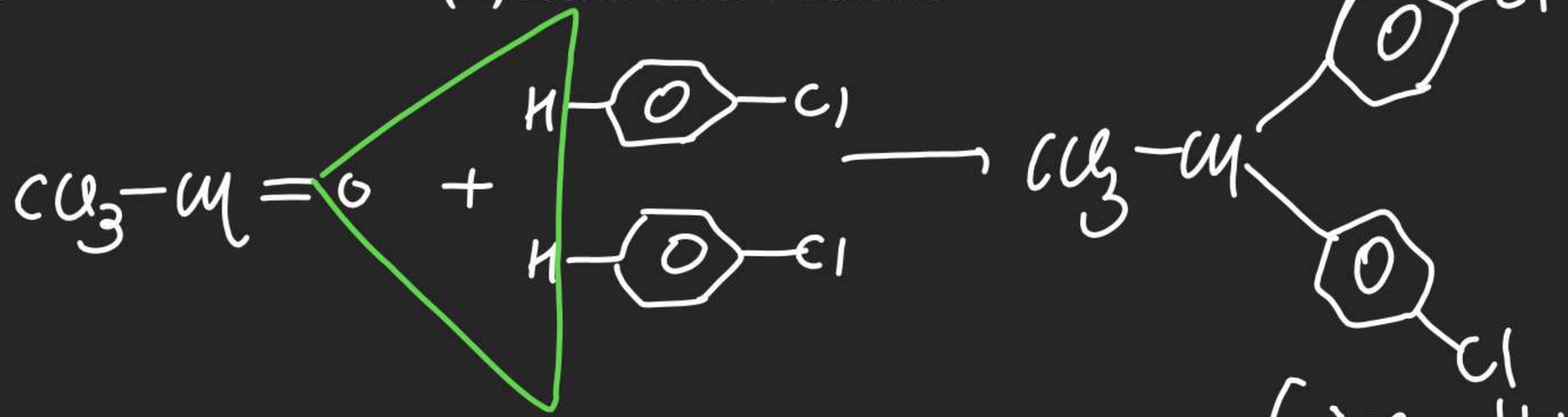
(A) A was C_6H_5I
(B) A was $C_6H_5CH_2I$
(C) B was C_6H_5I
(D) Addition of HNO_3 was unnecessary



4. The compound formed on heating chlorobenzene with chloral in the presence of concentrated sulphuric acid is [AIEEE 2003]

(A) Gammaxe (B) DDT

(C) Freon (D) Hexa chloro ethane



(x) DDT (insecticide)

(x) Dichloro-Diphenyl Trichloro Ethane

8. 2-chloro-2-methylpentane on reaction with sodium methoxide in methanol yields:

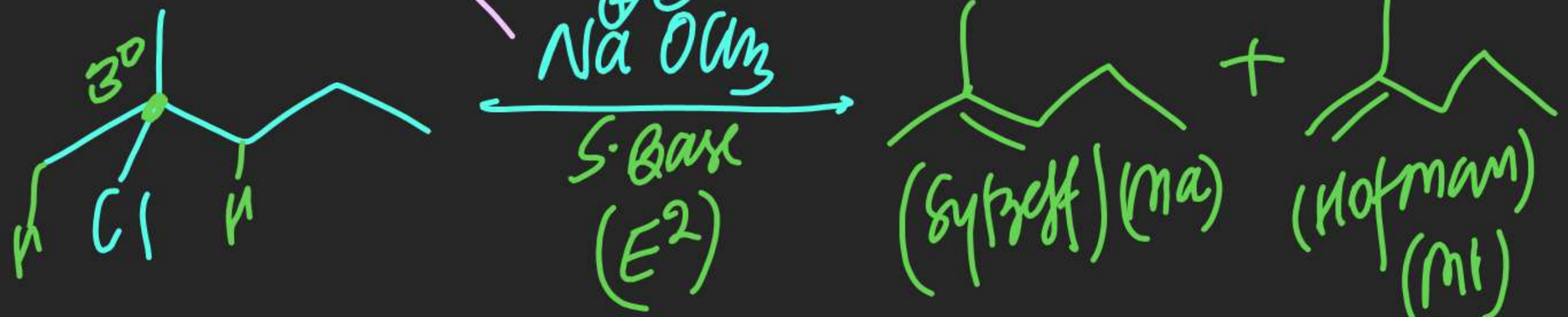
[JEE MAIN 2016]

(a) $C_2H_5CH_2C(CH_3)_2OCH_3$ (b) $C_2H_5CH_2C(=CH_2)CH_3$ (c) $C_2H_5CH_2=C(CH_3)-CH_3$

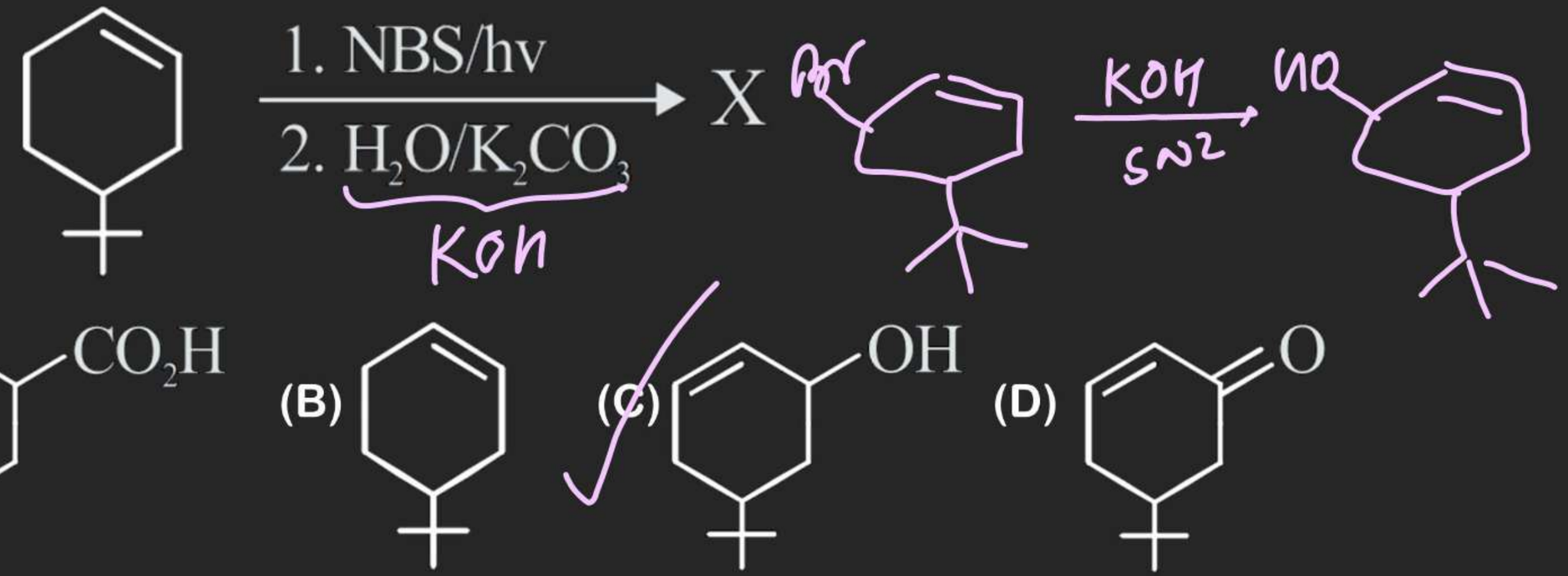
Major Product

(A) (a) and (b)
(B) All of these
(C) (a) and (c)
(D) (c) only

Soln (8)



9. The product of the reaction given below is: [JEE MAIN 2016]



(A)

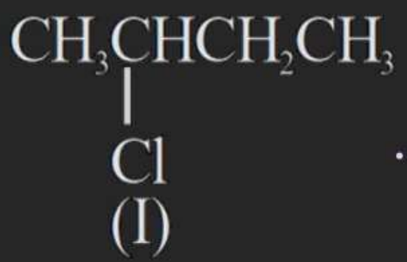
(B)

(C)

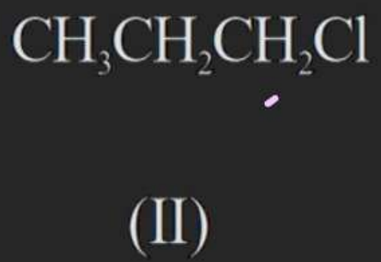
(D)

11. The increasing order of the reactivity of the following halides for the S_N1 reaction is:

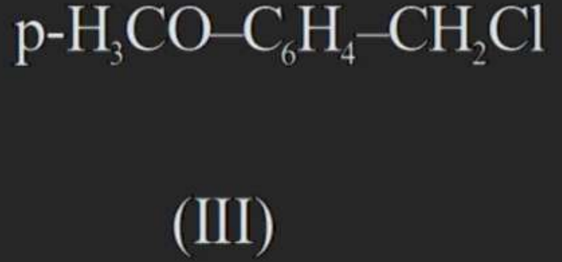
[JEE MAIN 2017]



(I)



(II)



(III)

(A) (III) < (II) < (I)

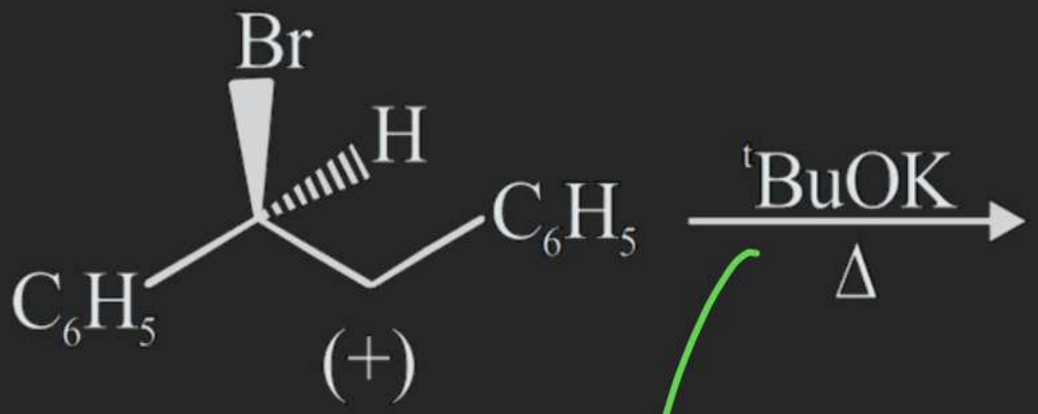
(B) (II) < (I) < (III)

(C) (I) < (III) < (II)

(D) (II) < (III) < (I)

14. The major product obtained in the following reaction is :-

[JEE MAIN 2017]

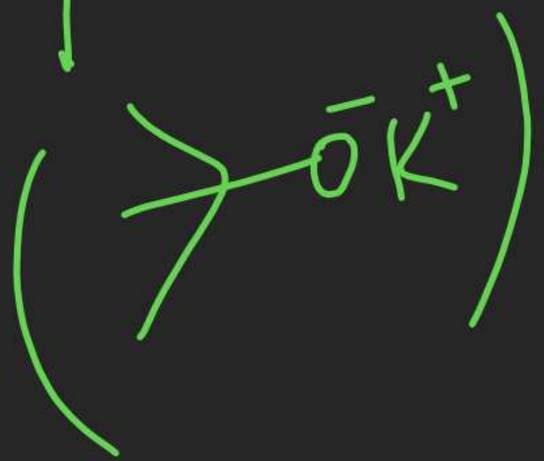


(A) $(\pm)C_6H_5CH(O^tBu)CH_2C_6H_5$

(B) $C_6H_5CH = CHC_6H_5$

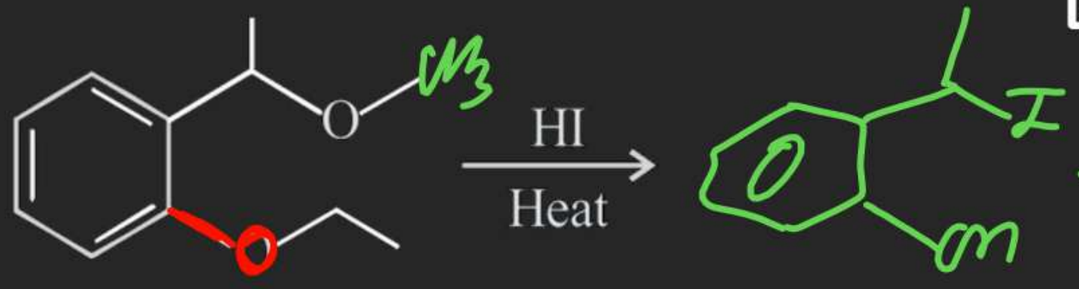
(C) $(+)C_6H_5CH(O^tBu)CH_2C_6H_5$

(D) $(-)C_6H_5CH(O^tBu)CH_2C_6H_5$



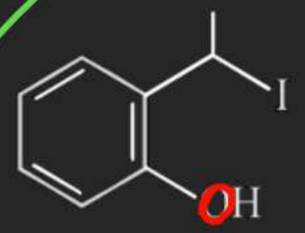
15. The major product formed in the following reaction is

[JEE MAIN 2018]

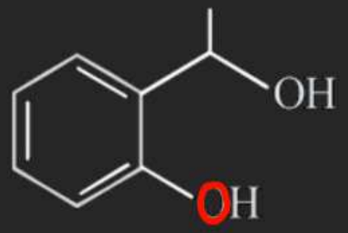


$+ CH_3-I + CH_3-\underset{I}{CH_2}$

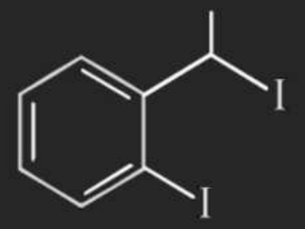
(A)



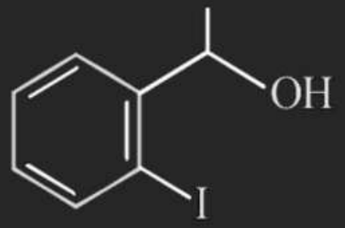
(B)



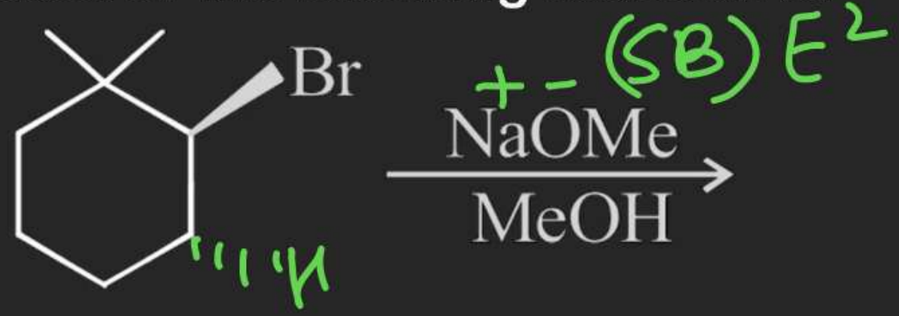
(C)

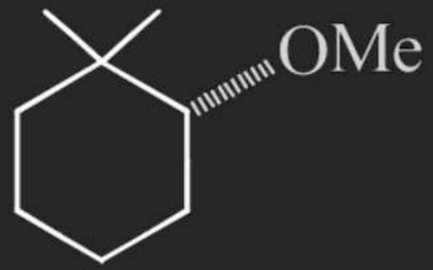


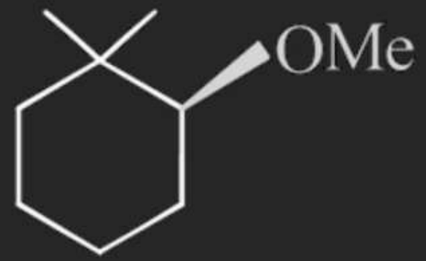
(D)



16. The major product of the following reaction is: [JEE MAINS 2018]



(A) 

(B) 

(C) 

(D) 

18. The increasing order of nucleophilicity of the following nucleophiles is :

[JEE MAIN-2019]

2RS — most stable — 3RS — 0RS

(a) $CH_3CO_2^{\ominus}$ (b) H_2O (c) $CH_3SO_3^{\ominus}$ (d) $\overset{\ominus}{O}H$

(A) (b) < (c) < (d) < (a)

(B) (b) < (c) < (a) < (d) → Ans

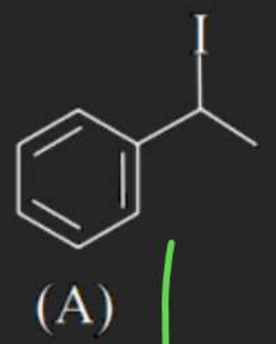
(C) (a) < (d) < (c) < (b)

(D) (d) < (a) < (c) < (b)

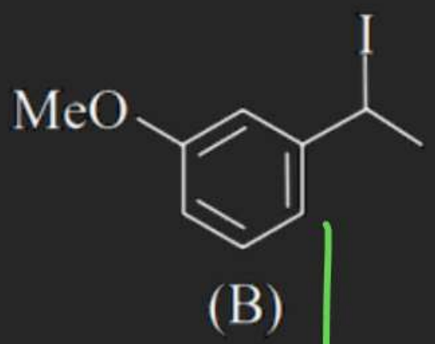
d > a > c

19. Increasing rate of S_N1 reaction in the following compounds is:

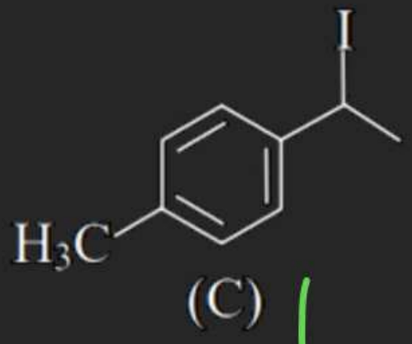
[JEE MAIN-2019]



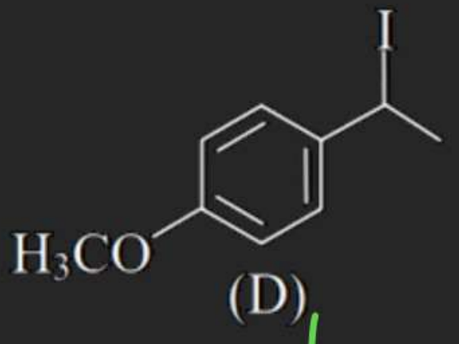
(A)



(B)



(C)



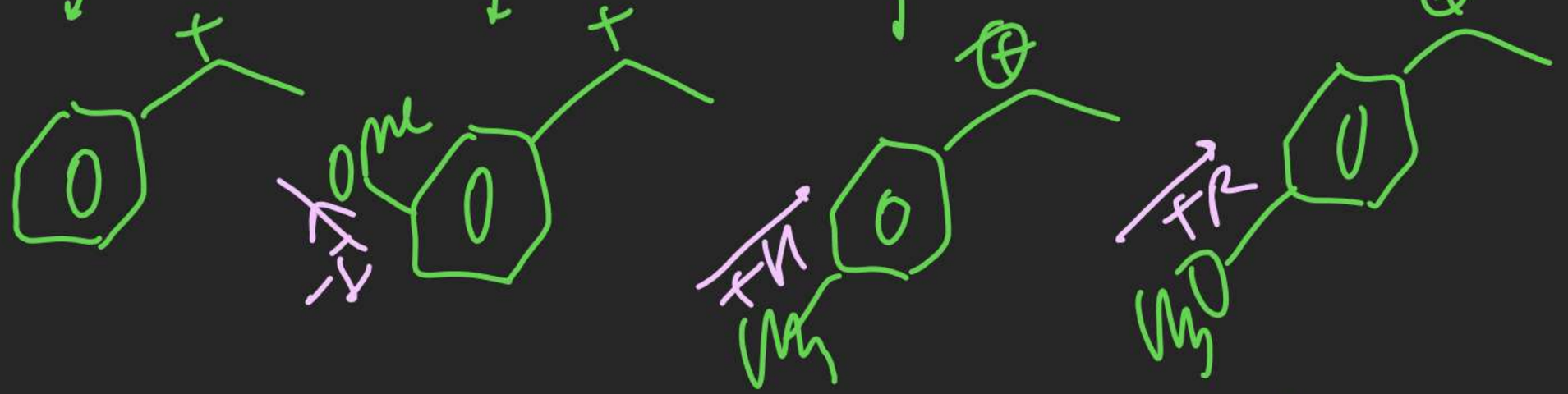
(D)

(A) (B) < (A) < (C) < (D)

(C) (B) < (A) < (D) < (C)

(B) (A) < (B) < (C) < (D)

(D) (A) < (B) < (D) < (C)



22. An 'Assertion' and a 'Reason' are given below. Choose the correct answer form the following options: [JEE MAIN-2019]

Assertion (A): Vinyl halides do not undergo nucleophilic substitution easily.

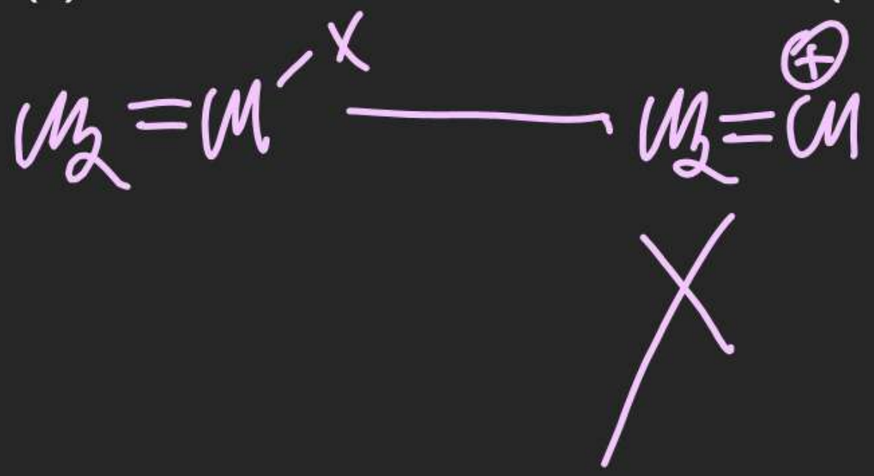
Reason (R): Even though the intermediate carbocation is stabilized by loosely held π-electrons, the cleavage is difficult because of strong bonding.

(A) (A) is a correct statement but (R) is a wrong statement.

(B) Both (A) and (R) are correct statements but (R) is not the correct explanations of (A).

(C) Both (A) and (R) are wrong statements

(D) Both (A) and (r) are correct statements and (R) is the correct explanation of (A).

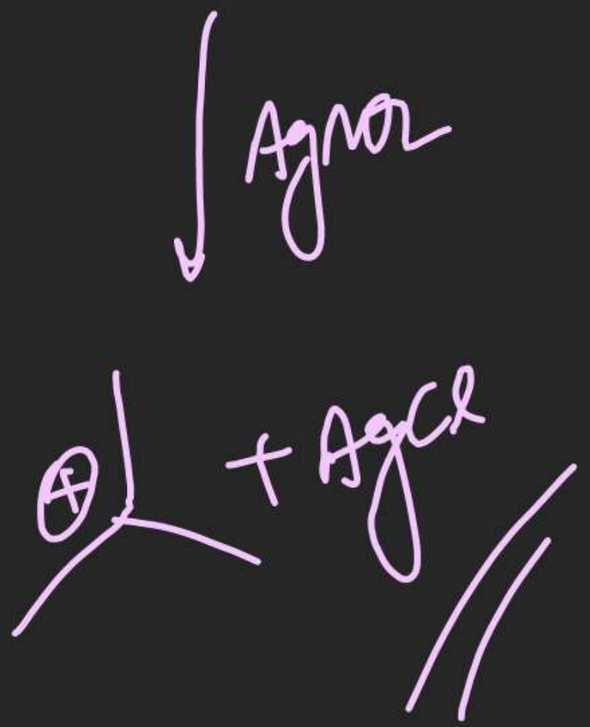


23. Which one of the following is likely to give a precipitate with $AgNO_3$ solution?

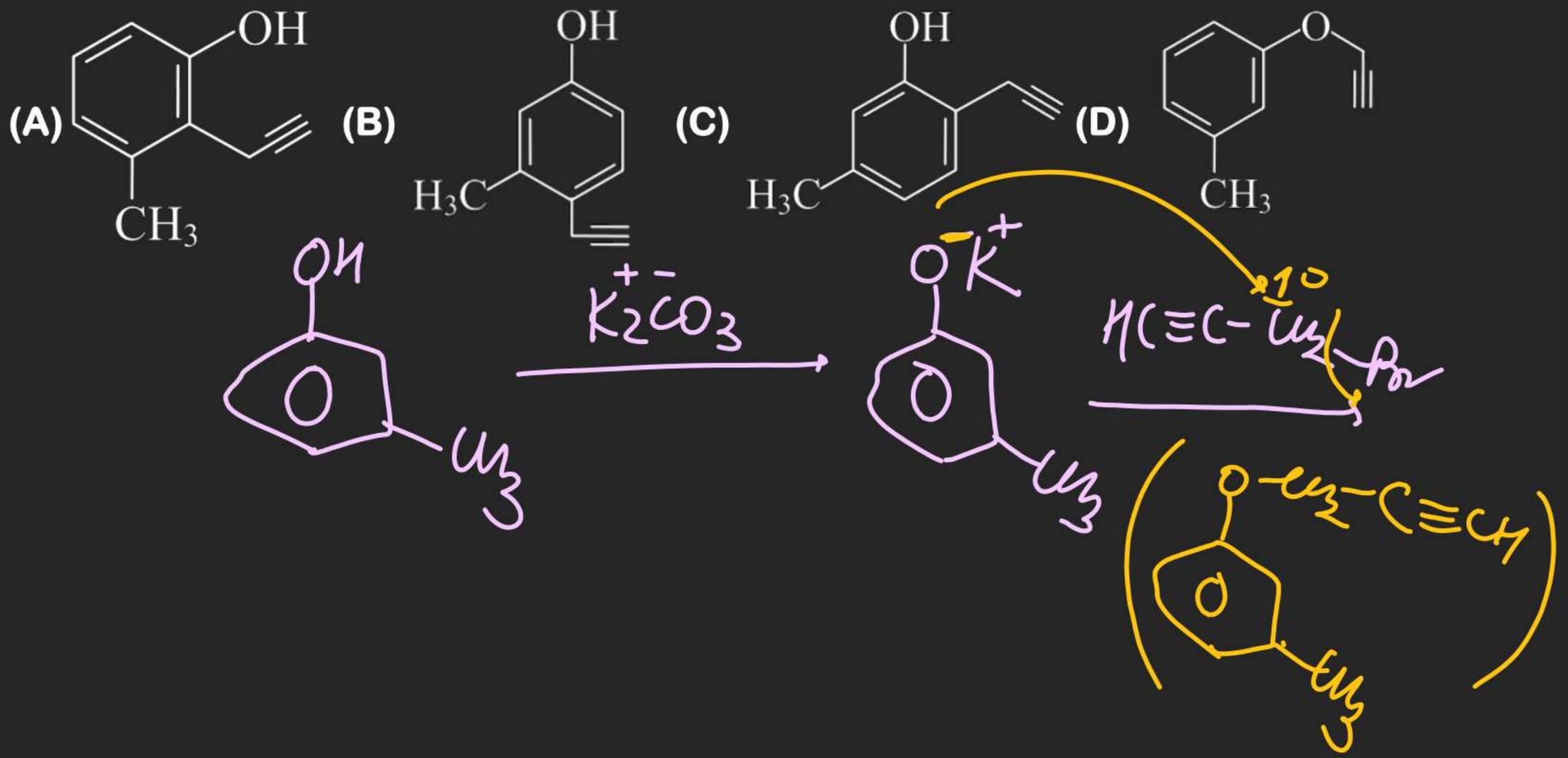
[JEE MAIN-2019]

(A) $(CH_3)_3CCl$ (B) CCl_4 (C) $CHCl_3$ (D) $CH_2 = CH - Cl$

NO RXN

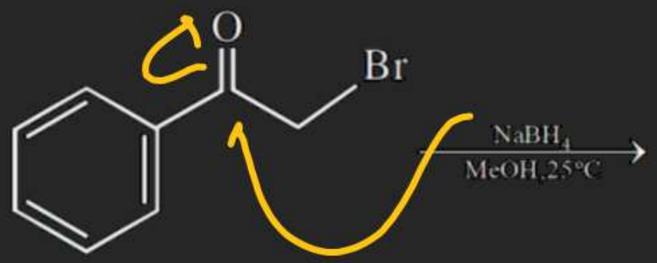


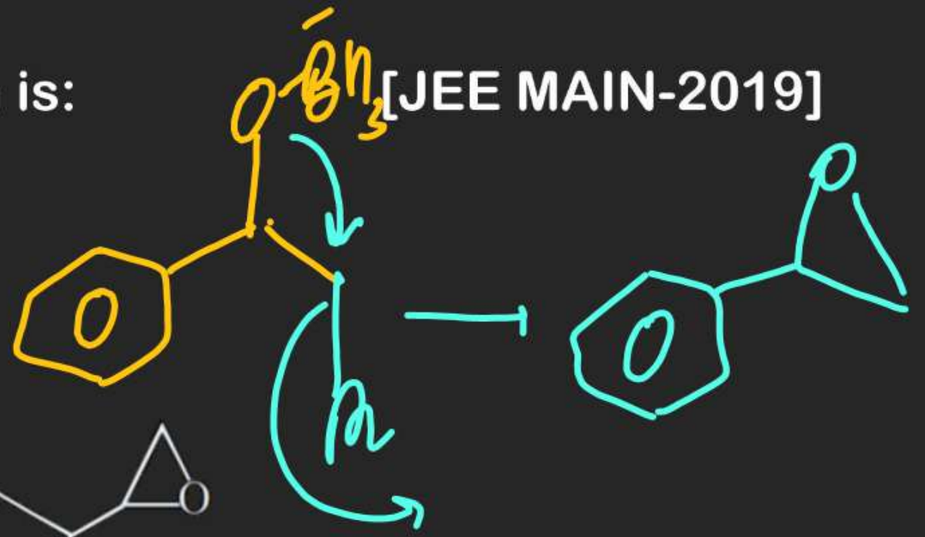
24. What will be the major product when m-cresol is reacted with propargyl bromide $(HC \equiv C - CH_2Br)$ in presence of K_2CO_3 in acetone? [JEE MAIN-2019]



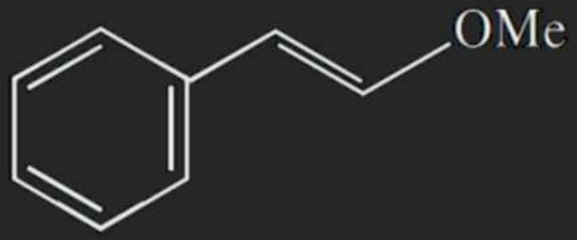
Nishant Jindal

26. The major product of the following reaction is: [JEE MAIN-2019]

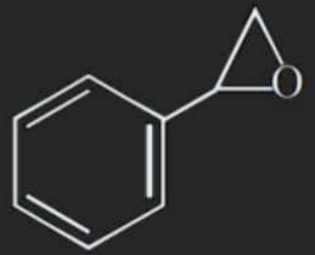




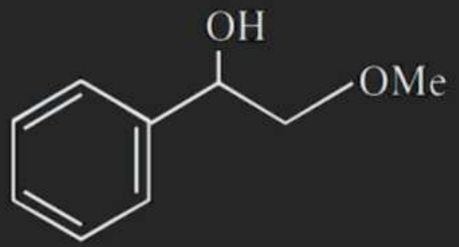
(A)



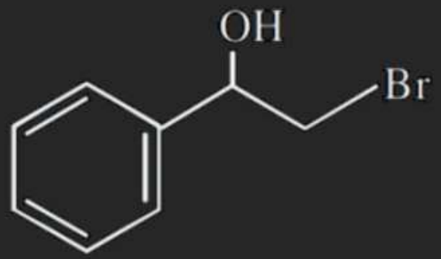
(B)



(C)

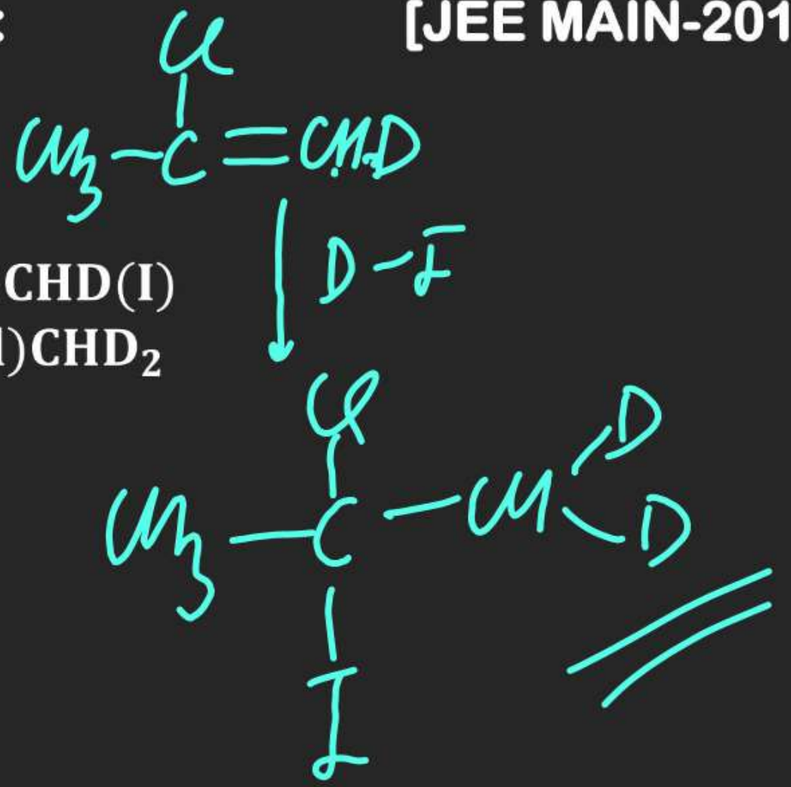


(D)



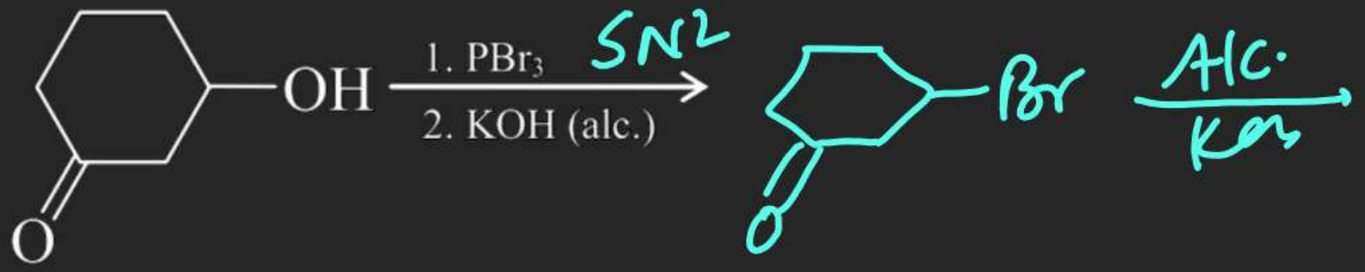
28. The major product of the following reaction is: [JEE MAIN-2019]

$$CH_3C{\equiv}CH \xrightarrow[(ii)\,DI]{(i)\,DCl(1\,equic.)}$$

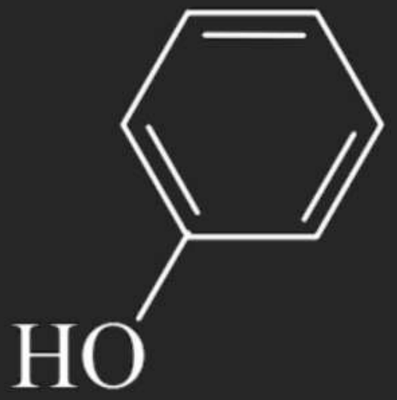


(A) $CH_3CD(I)CHD(Cl)$
(B) $CH_3CD(Cl)CHD(I)$
(C) $CH_3CD_2CH(Cl)(I)$
(D) $CH_3C(I)(Cl)CHD_2$

29. The major product of the following reaction is: [JEE MAIN-2019]

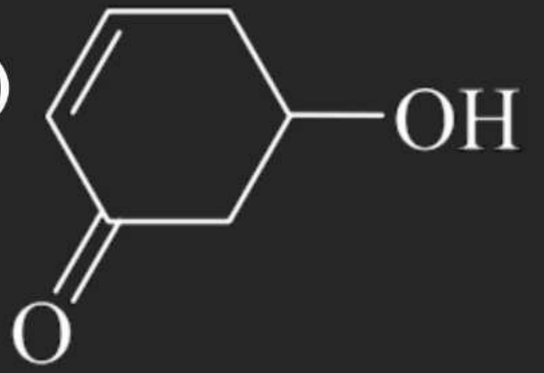


(A)

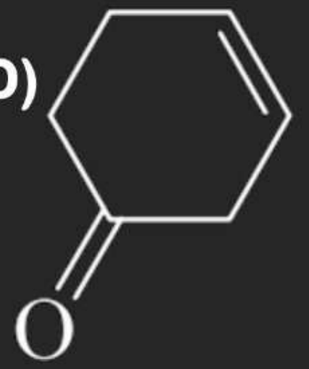


(B)

(C)



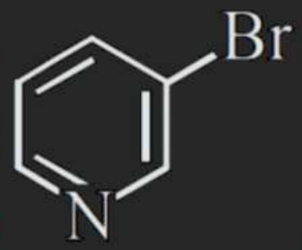
(D)

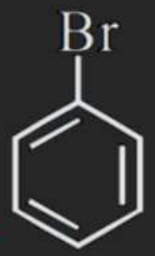


36. Which of the following compounds will produce a precipitate with $AgNO_3$?

[JEE MAIN-2019]

(A) 

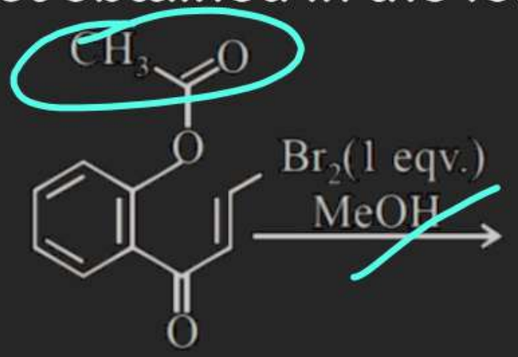
(B) 

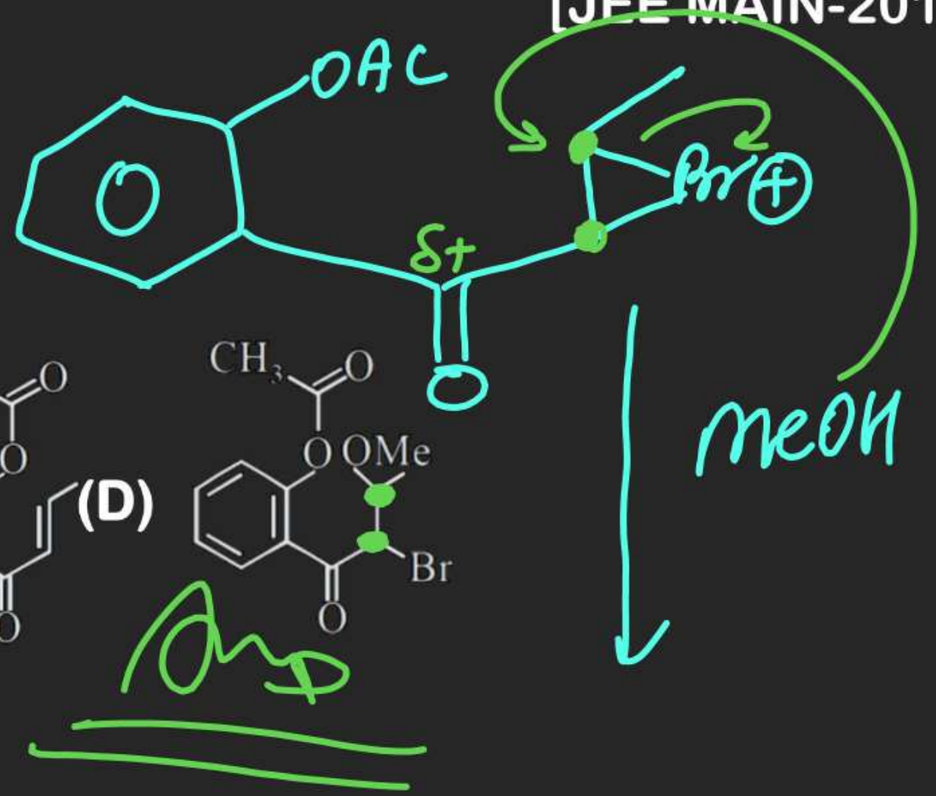
(C) 

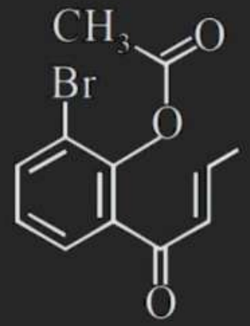
(D) 

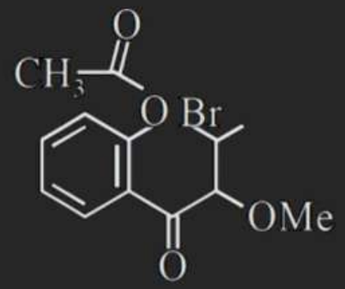
$AgNO_3$ → 

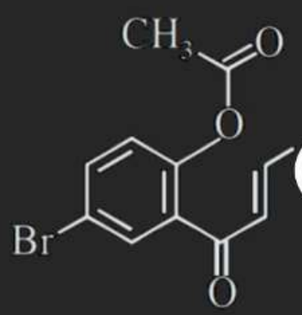
37. The major product obtained in the following conversion is:- [JEE MAIN-2019]





(A) 

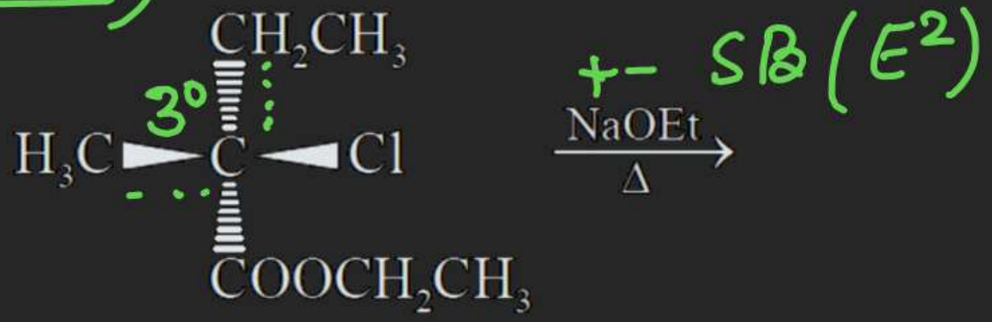
(B) 

(C) 

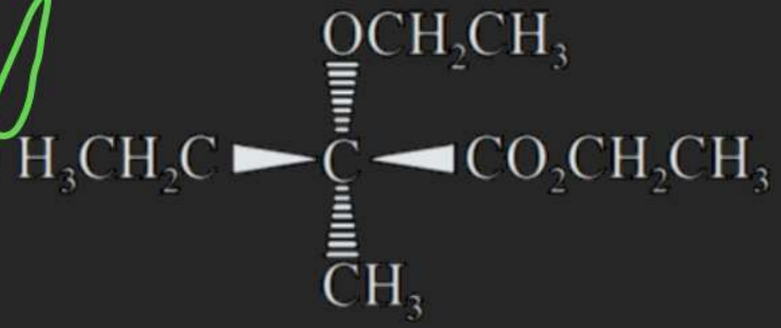
(D)

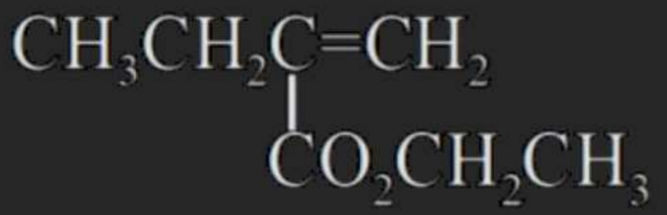
Ans

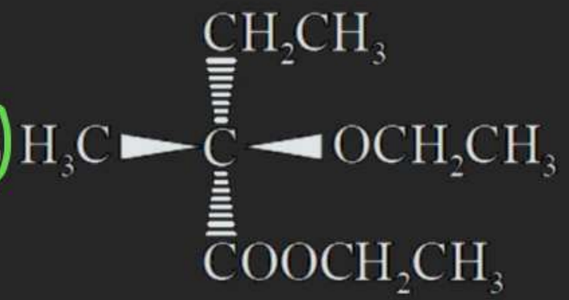
40. The major product the following reaction is: **[JEE MAIN-2019]**

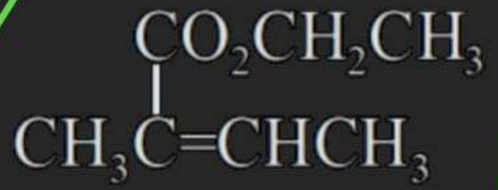


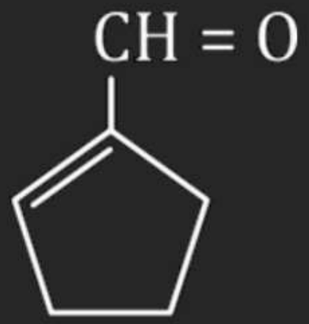
+- SB (E^2)

(A) 

(B) 

(C) 

(D) 

42. Compound X $\xrightarrow[(2)\ \text{alc. KOH}]{(1)\ Br_2,\ hv}$ 

[JEE MAIN-2020]

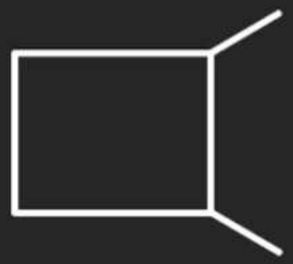
(3) O_3

(4) Me_2S

(5) dil. NaOH, Δ

Compound X will be:

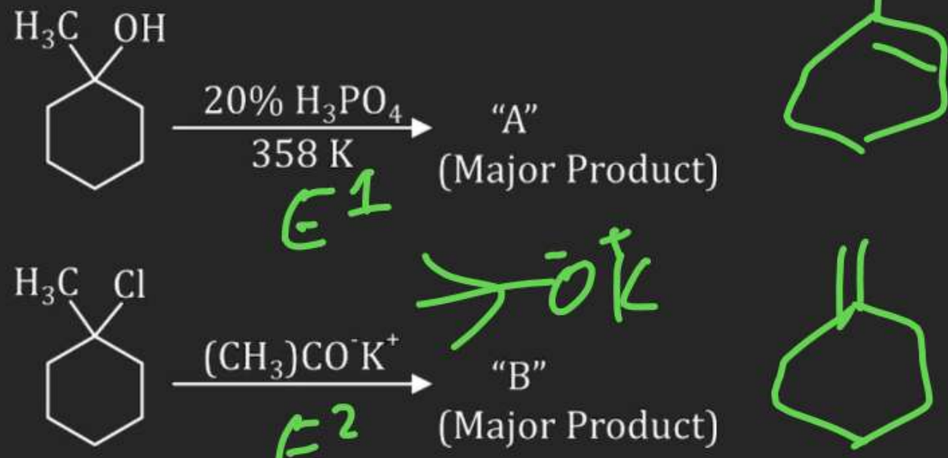
(A) 

(B) 

(C) 

(D) 

44. [JEE MAIN-2021]



The product " A " and "B" formed in above reactions are

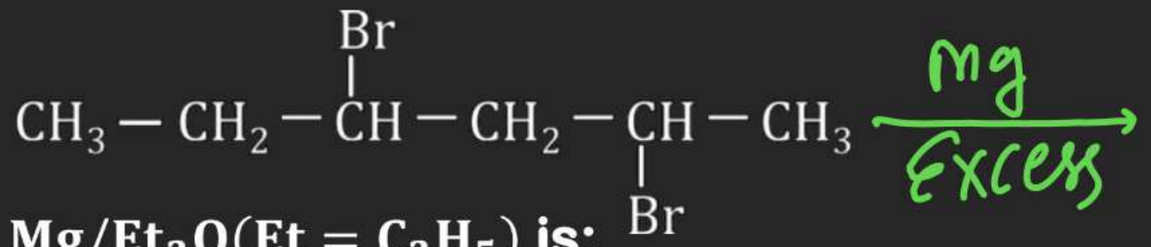
(A) A-  B- 

(B) A-  B- 

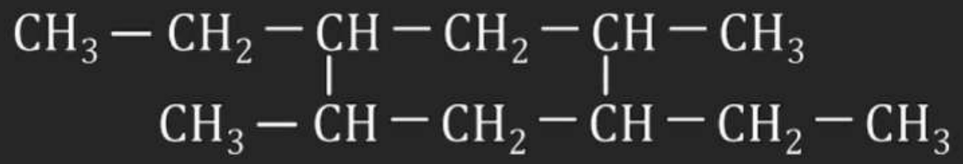
(C) A-  B- 

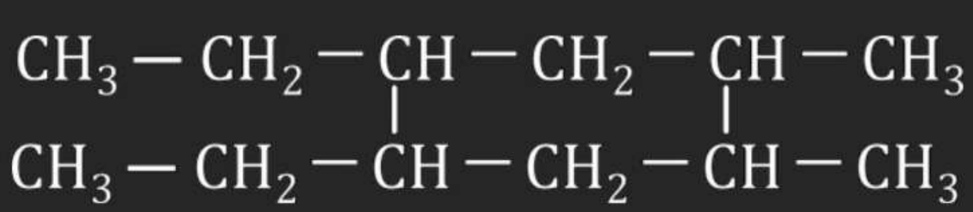
(D) A-  B- 

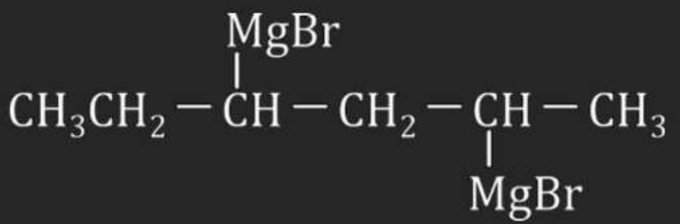
45. The product formed in the first step of the reaction of [JEE MAIN-2021]

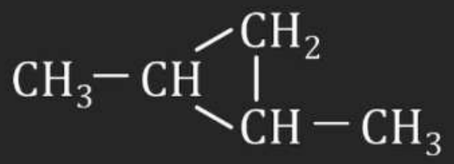


with excess $Mg/Et_2O(Et = C_2H_5)$ is:

(A) 

(B) 

(C) 

(D) 

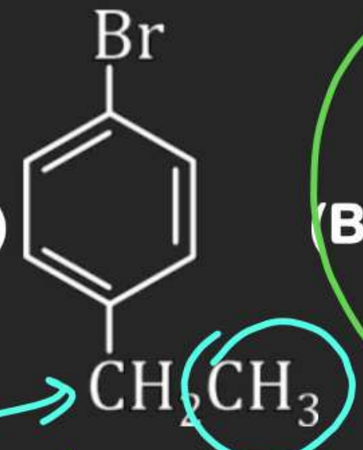
$$R\text{-}X \xrightarrow[\text{Ether}]{Mg} R\text{-}MgX$$

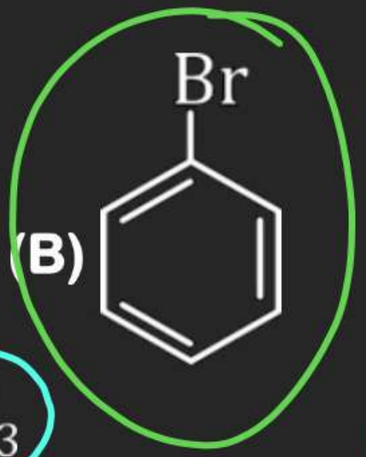
47. [JEE MAIN-2022]

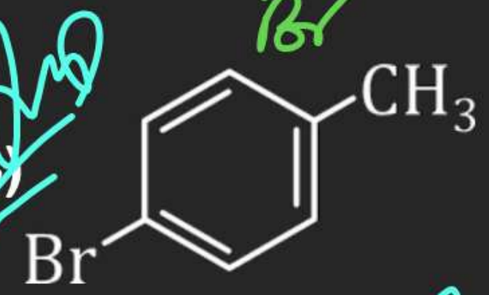
$$A \xrightarrow[\text{(ii) } CN^-]{\text{(i) } Cl_2,\ \Delta} \text{4-Bromophenyl acetic acid.}$$

Free Radical Substitution

In the above reaction 'A' is

(A) 

(B) 

(C) 

(D)