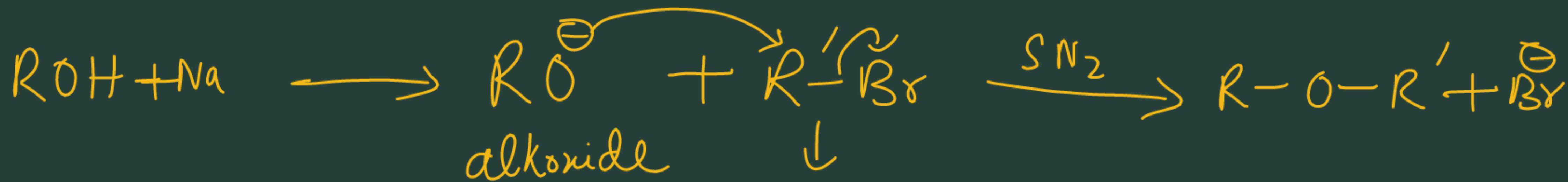

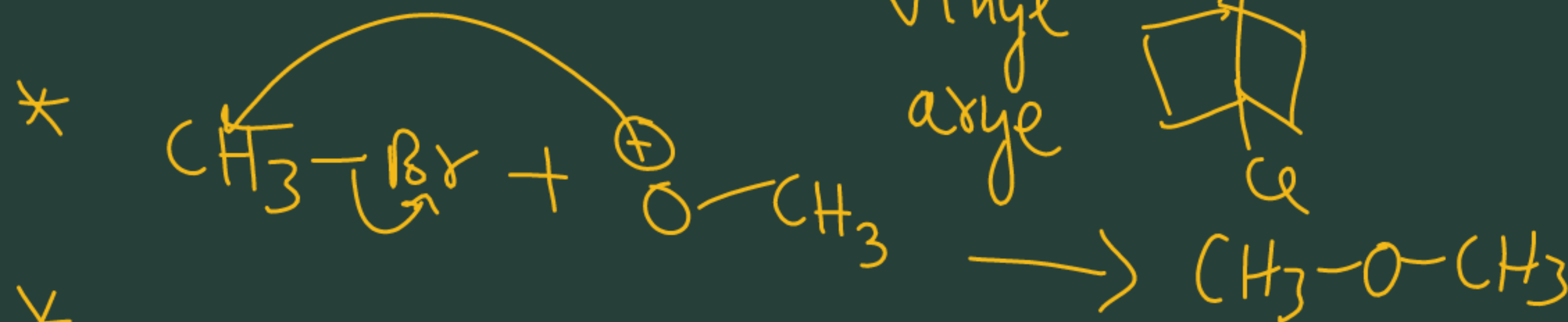
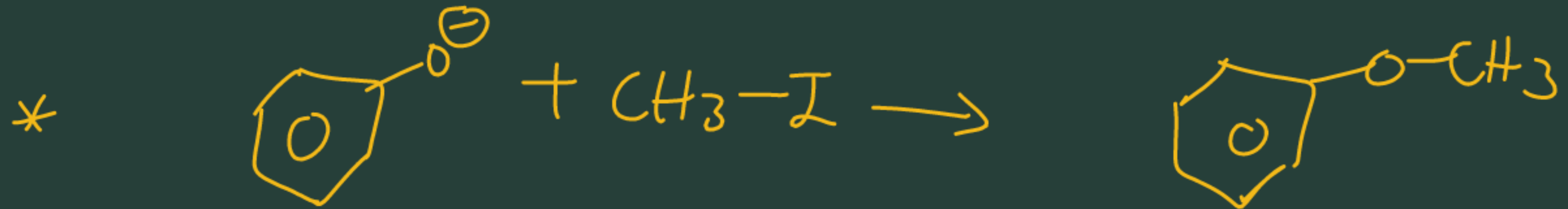
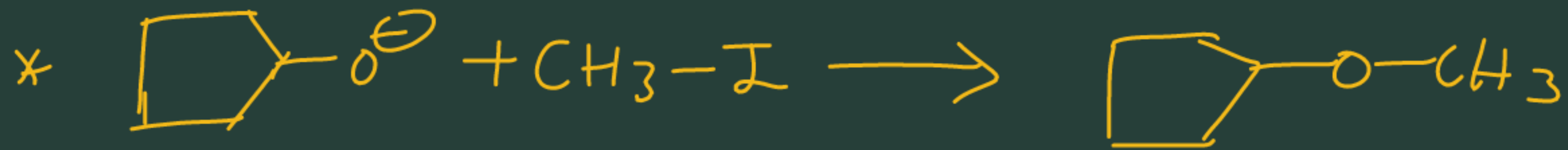


# Williamson Ether Synthesis

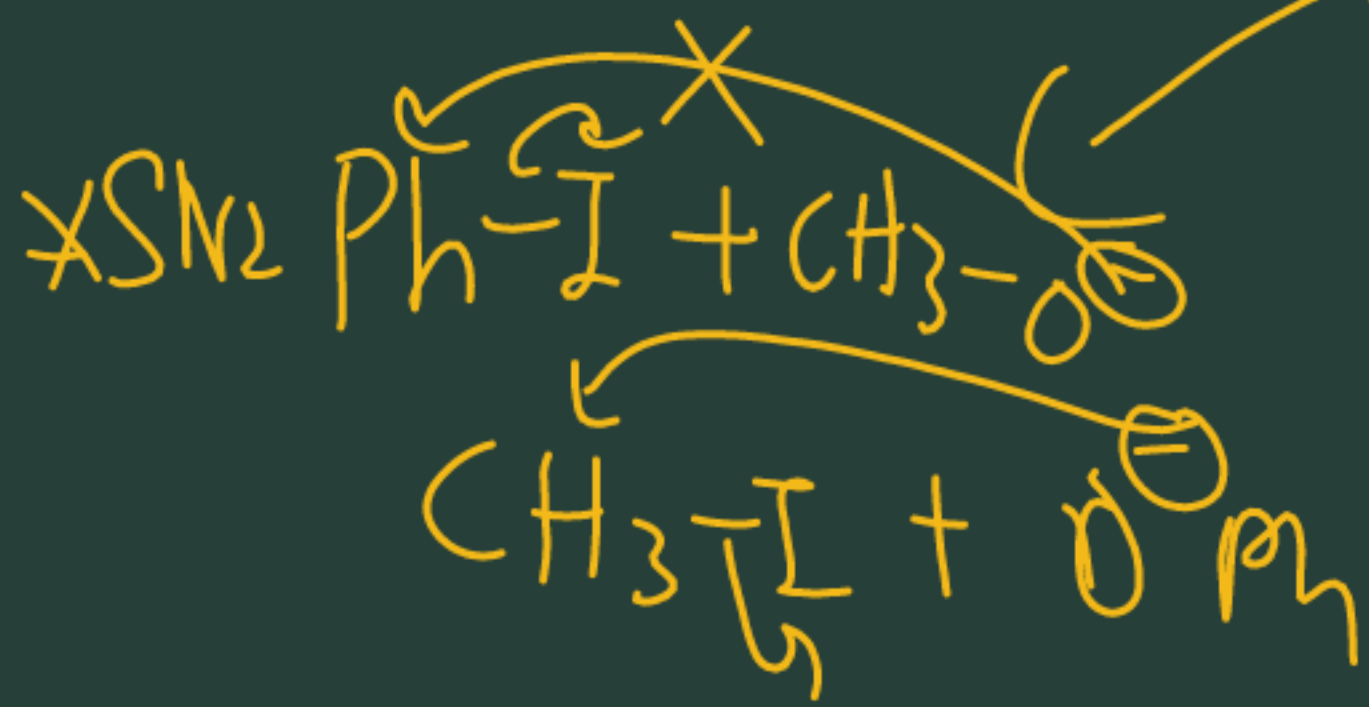
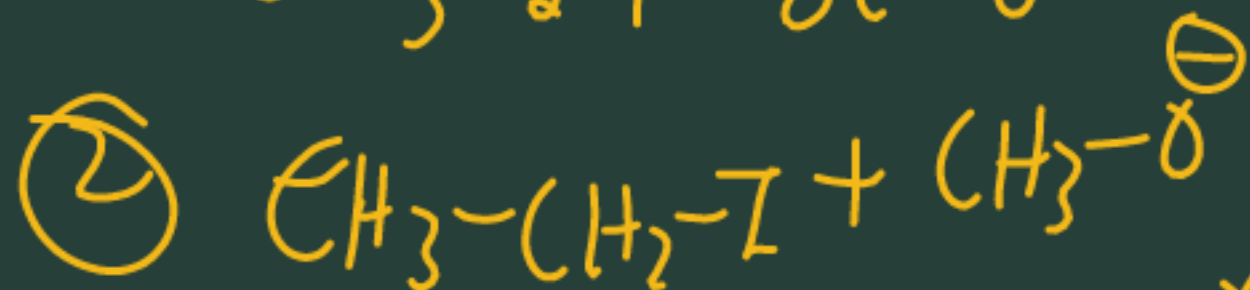


≠ Tertiary vinyl allyl  (≠ OH)

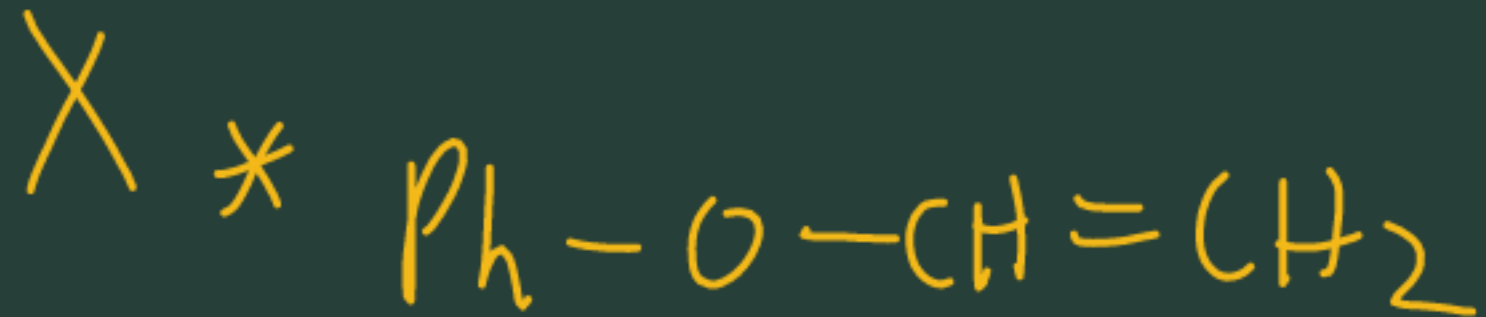
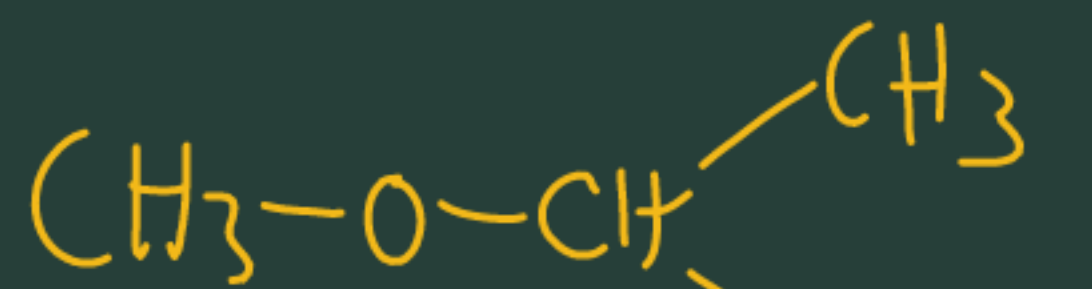


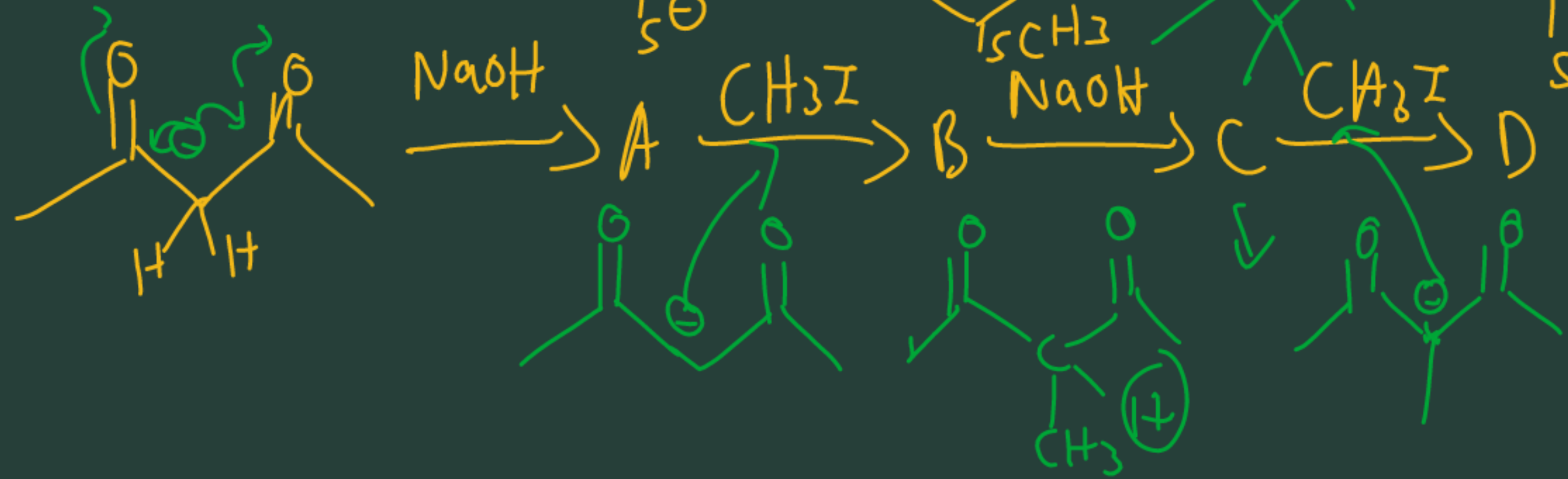
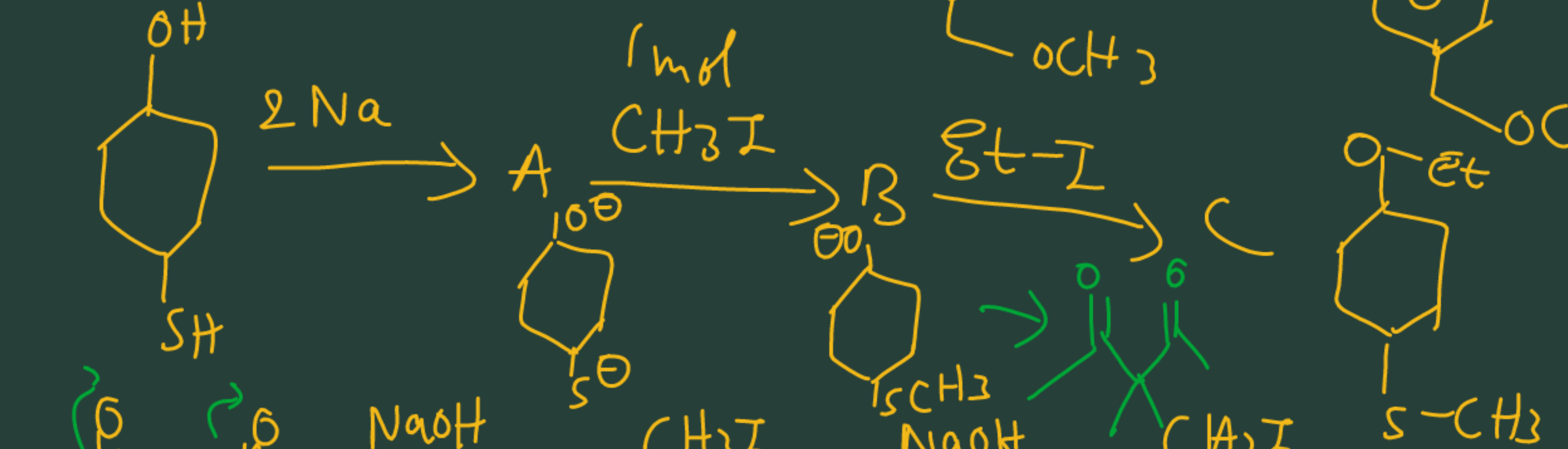
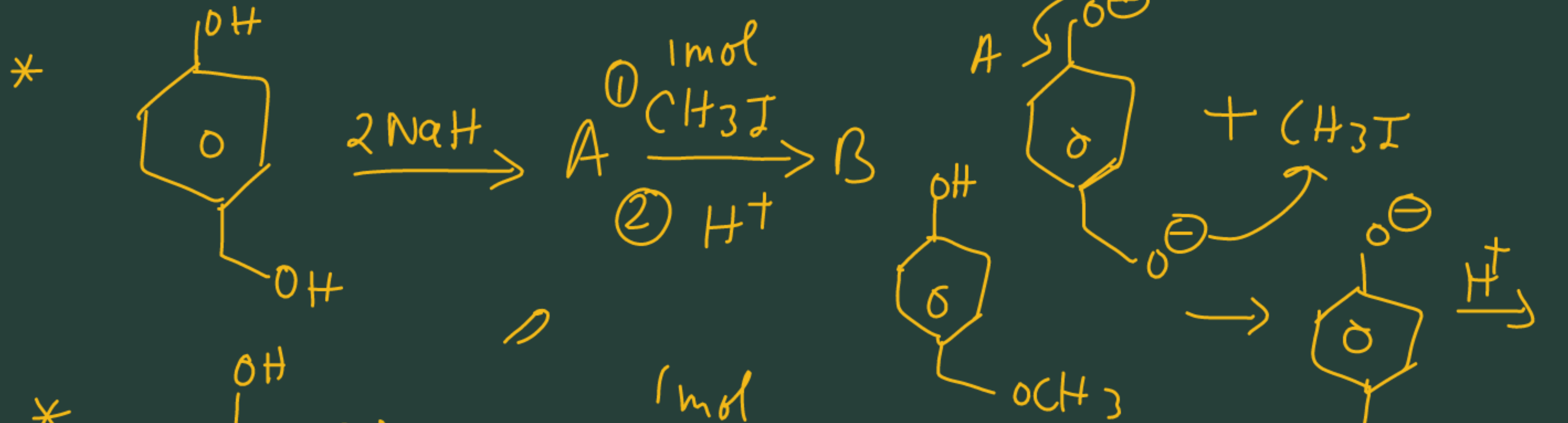
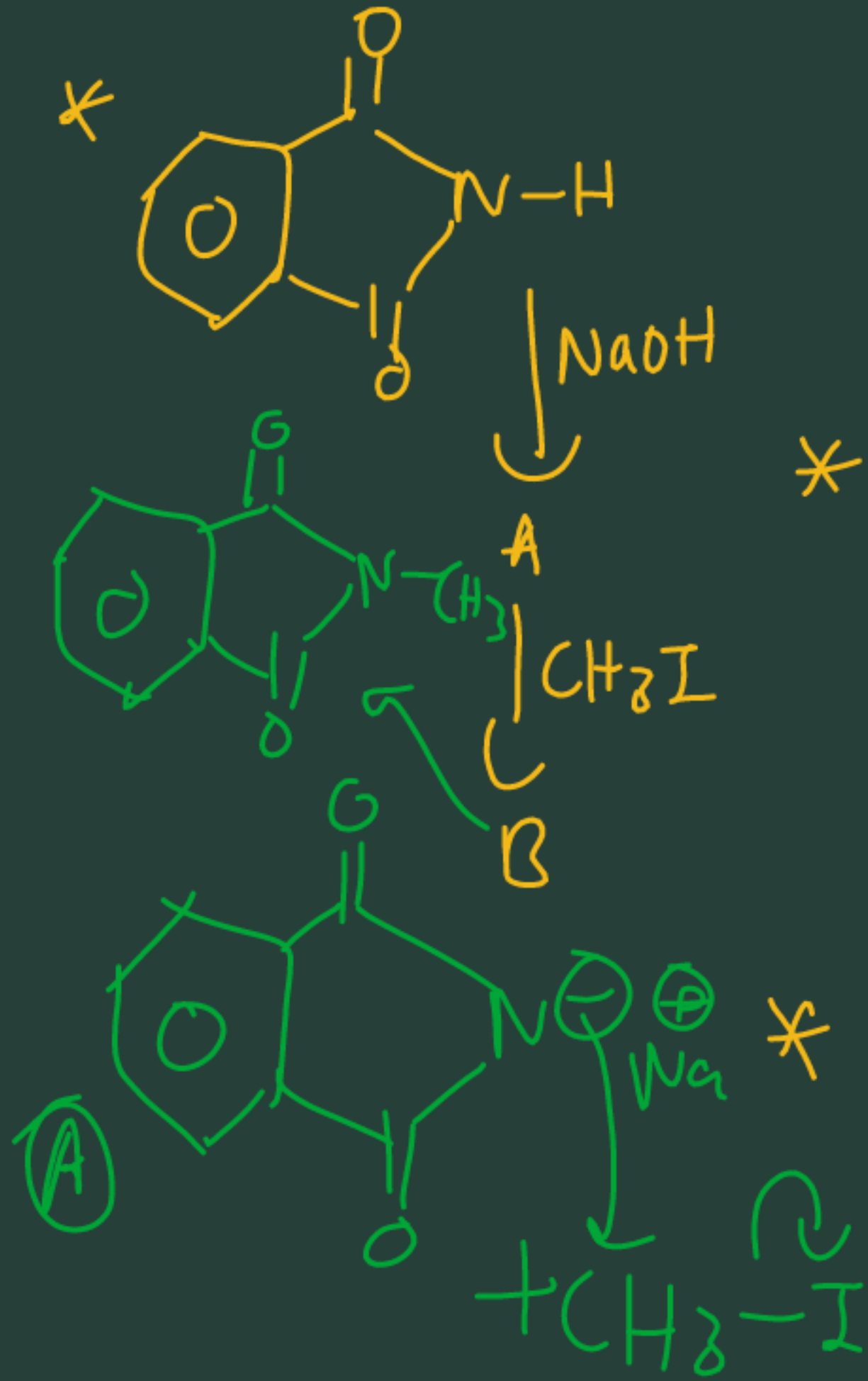


Best method to prepare this ether?



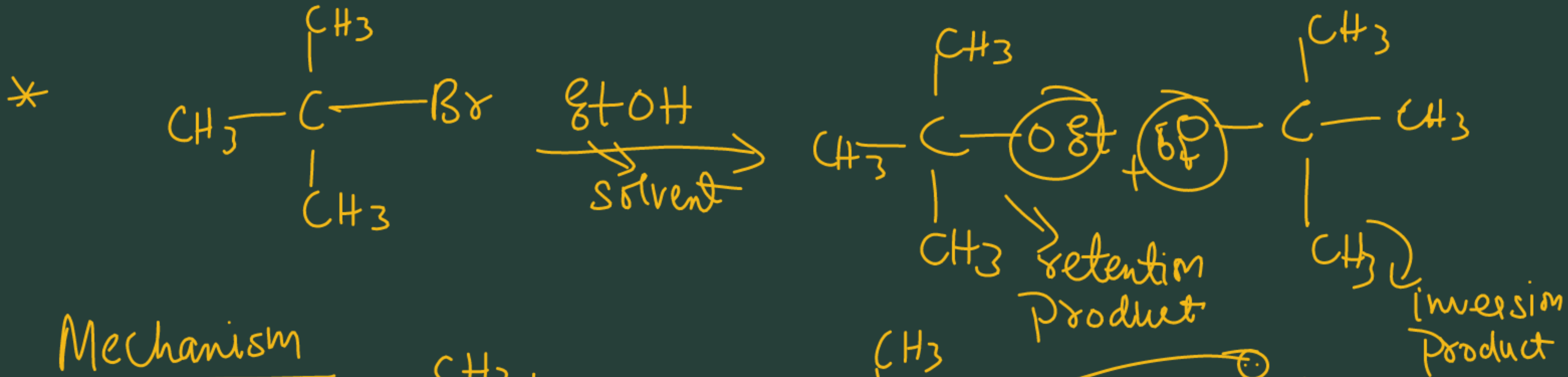
\*



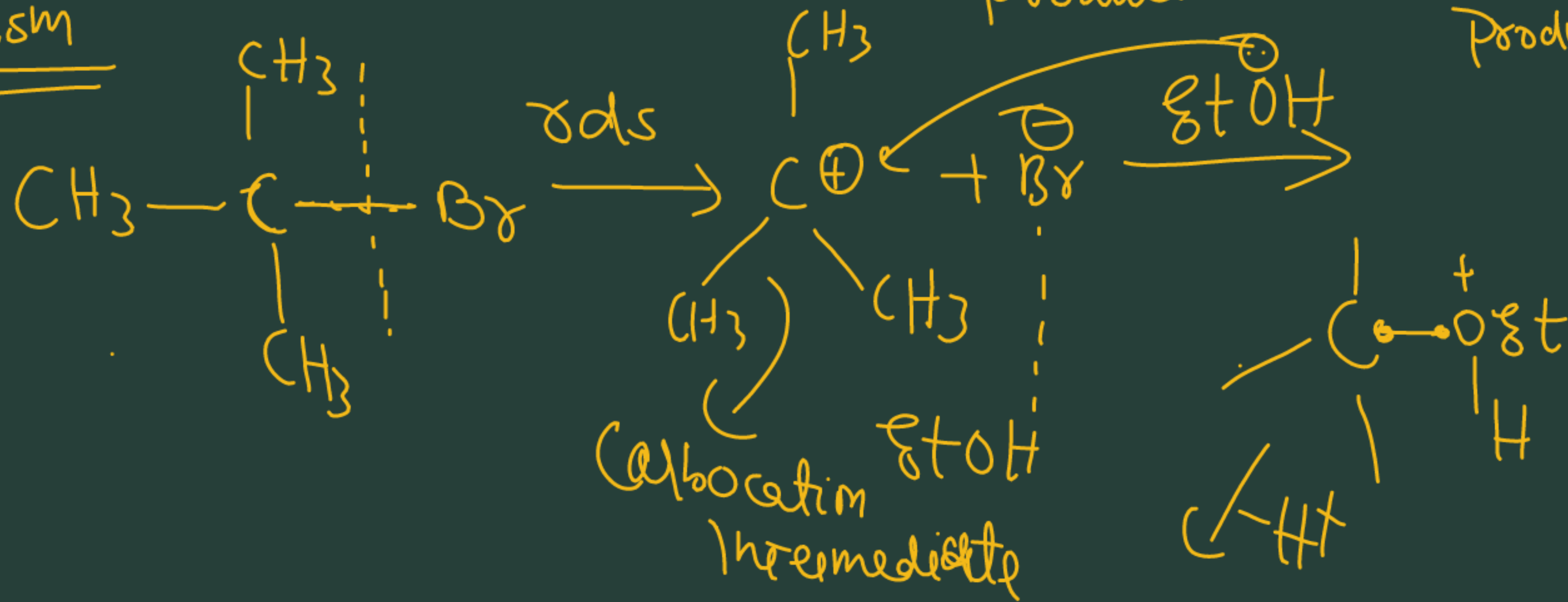




# SN<sub>1</sub> (Substitution Unimolecular)



## Mechanism



## Characteristics of $S_N1$

1)  $r = k[R-X]$  Order = 1 molecularity = 1

2) Formation of carbocation is the rds. more stable carbocation more will be the rate.

3) Rearrangement is possible.

4) Solvation of ions provides activation energy for this rxn.

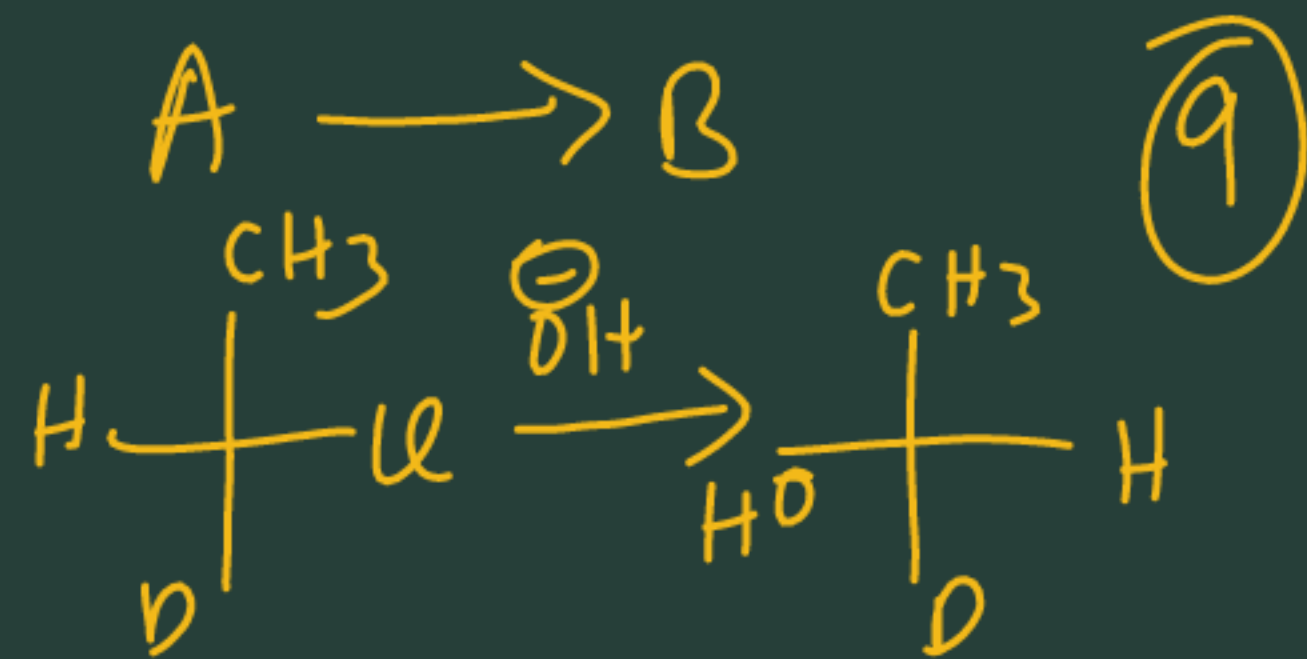
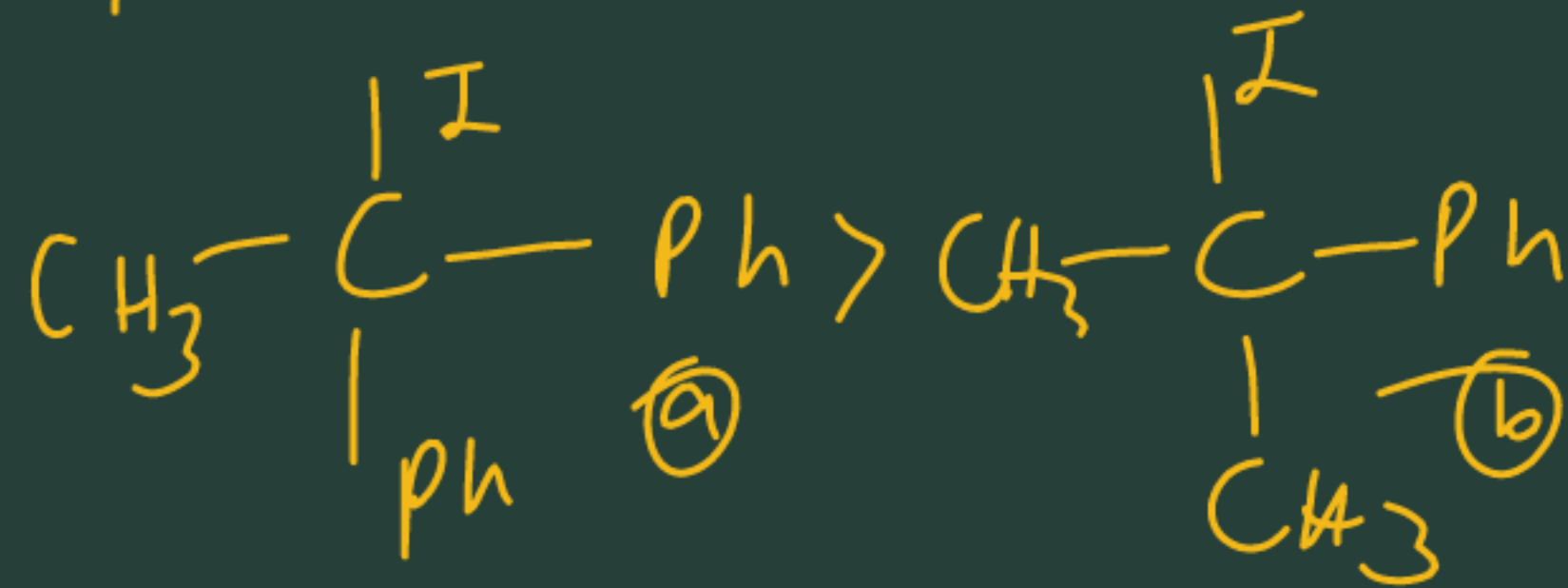
5) Polar Protic solvent ( $H_2O$ , EtOH,  $CH_3COOH$ ) favours  $S_N1$ .

6) <sup>Solvent acts as Nu</sup> Nu conc. & strength doesn't affect rate of rxn

7) Racemisation take place in  $S_N1$ , but generally inversion product is more.



⑧ More the stable carbocation formed more will be the racemisation.



⑨ SN<sub>2</sub> is stereospecific rxn but SN<sub>1</sub> is stereoselective

Reactant stereochemistry determined product stereochemistry  $\rightarrow$  Stereospecific  
(There is no choice)



There is a choice

one isomer form in greater amount

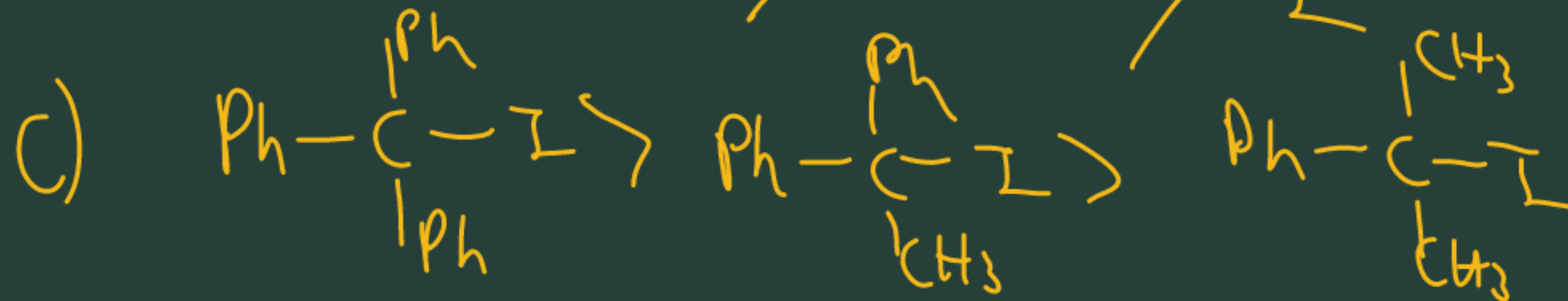
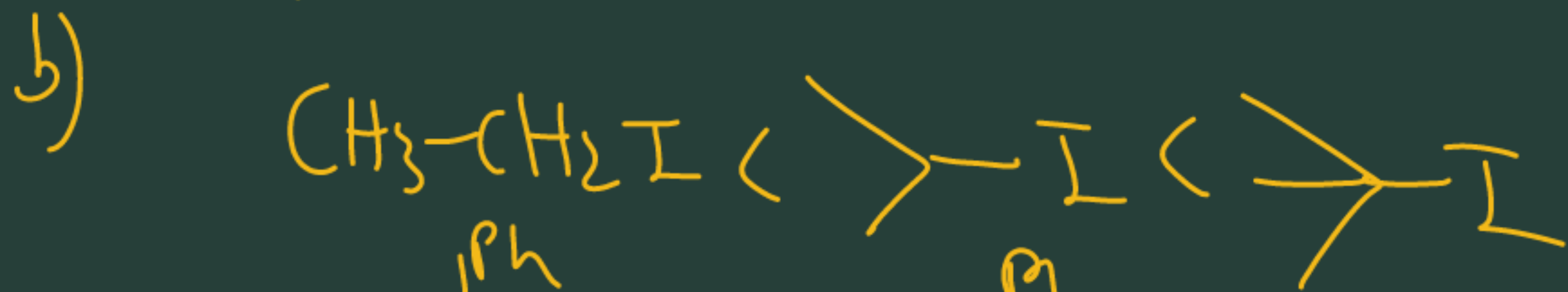
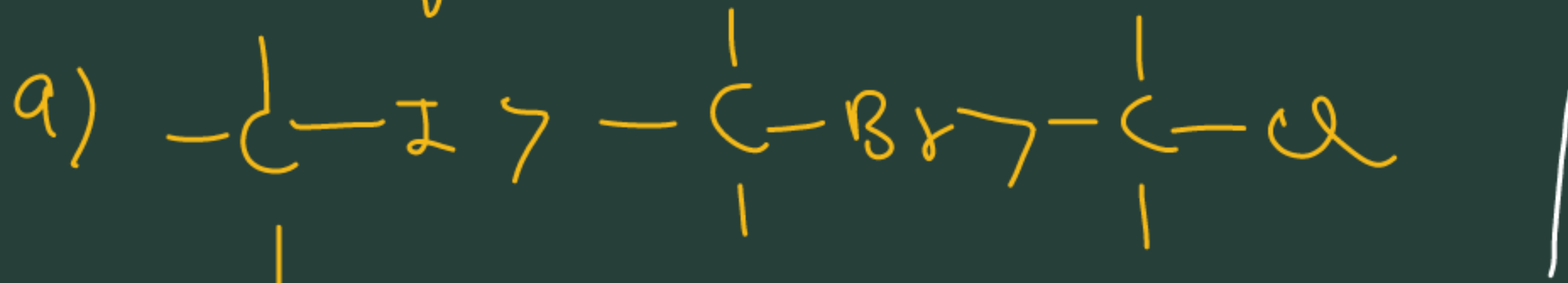
# Factor affecting rate of SN<sub>1</sub>

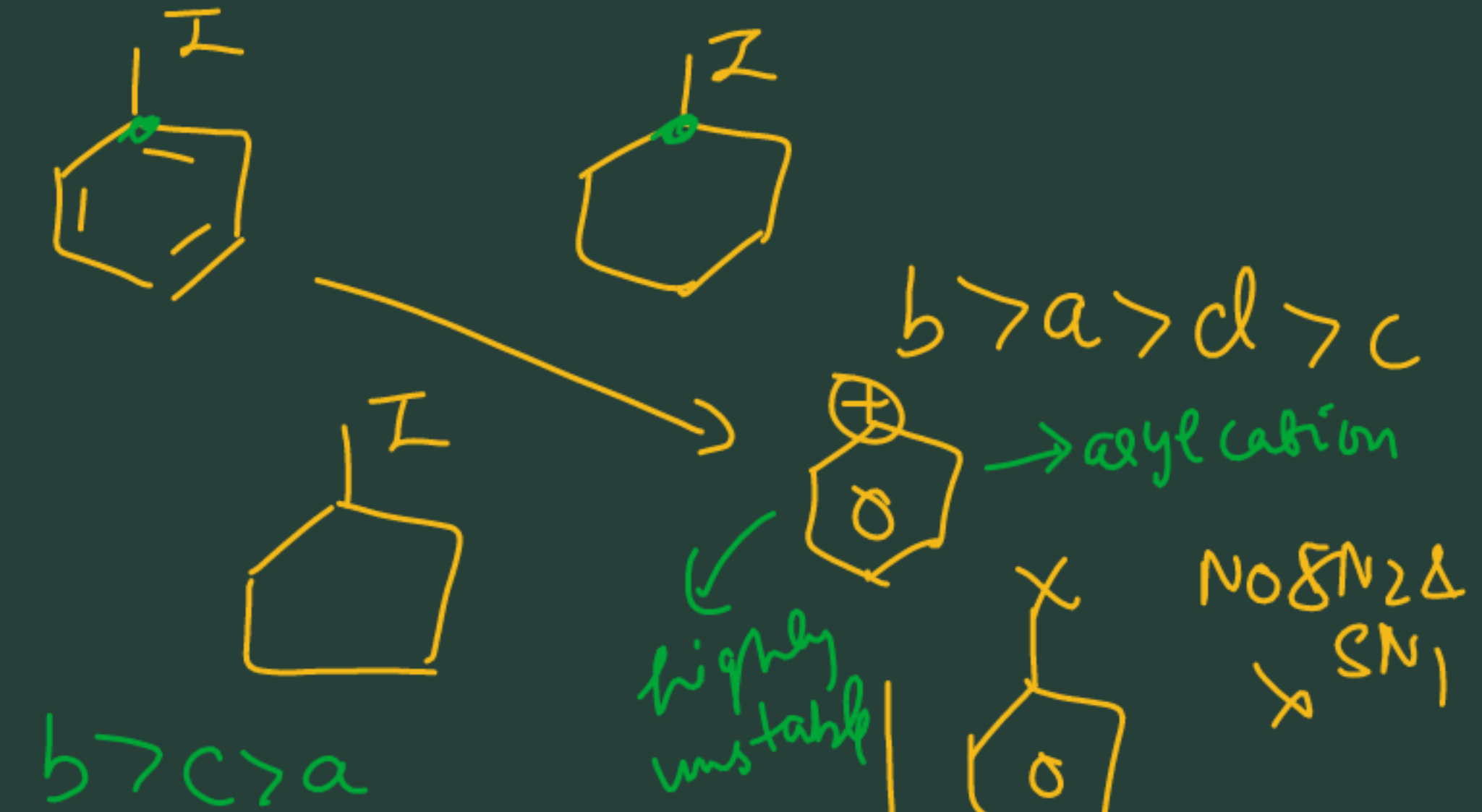
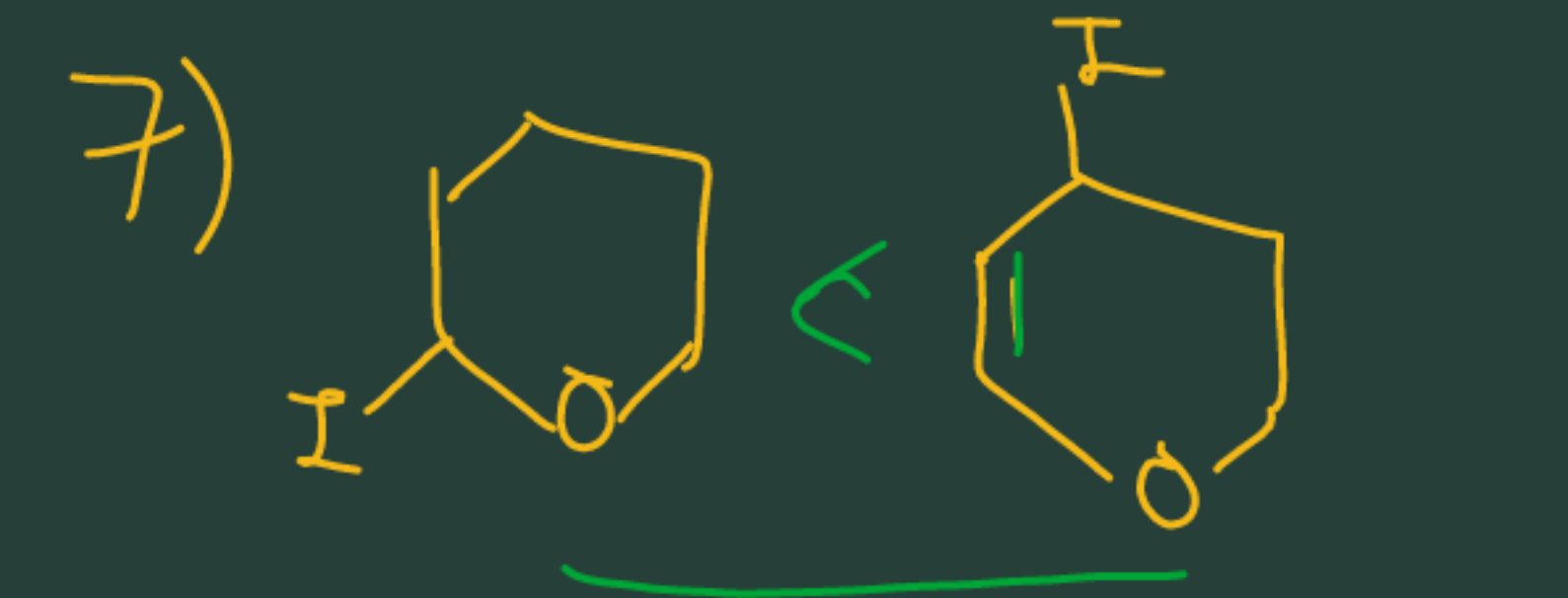
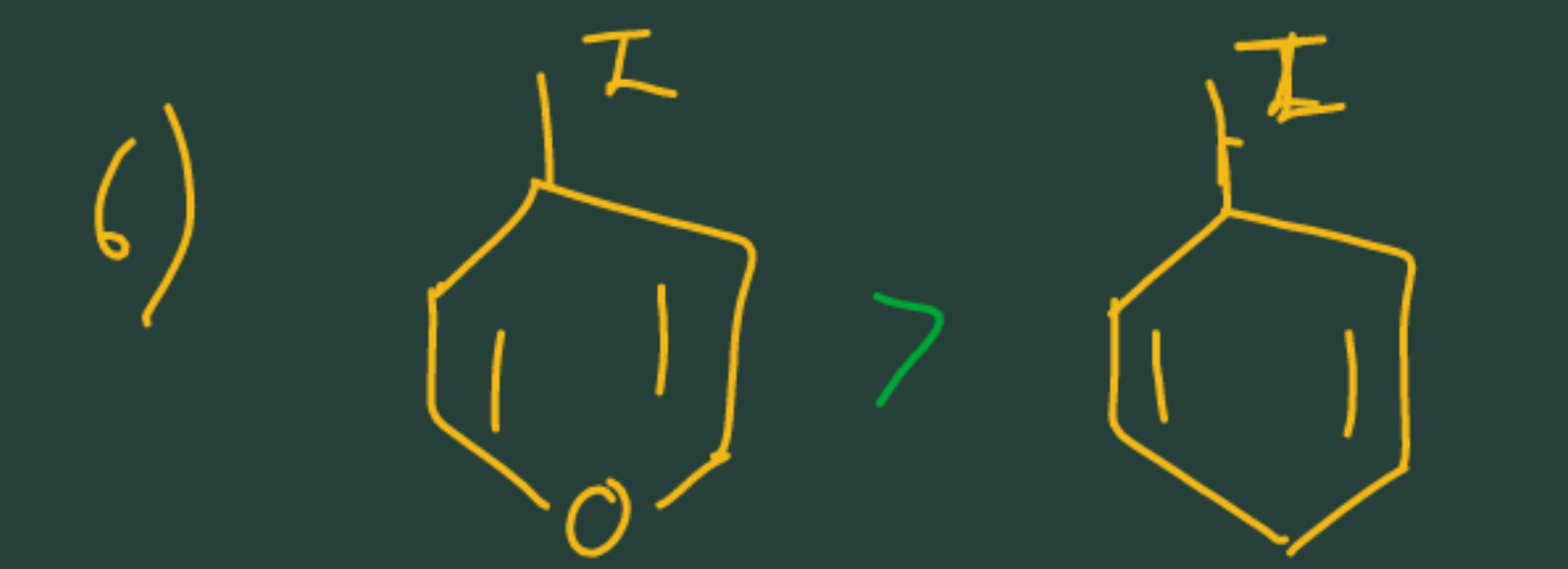
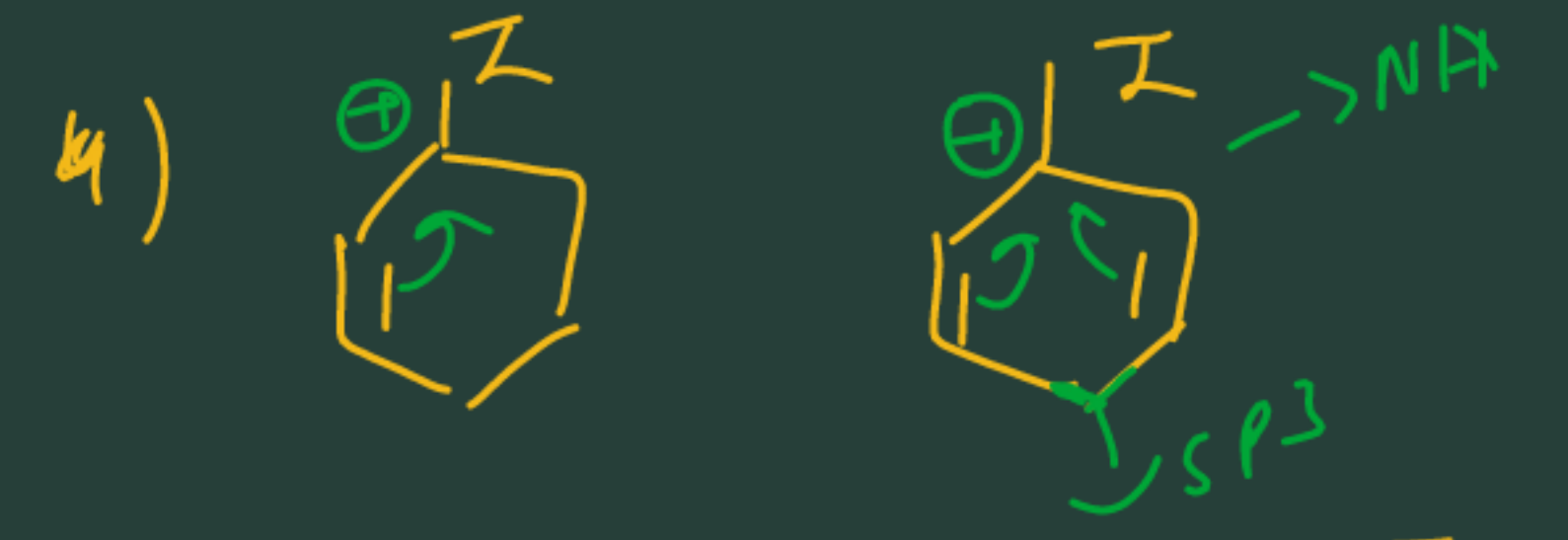
1) Leaving group

2) Structure of Alkyl halide & conc.

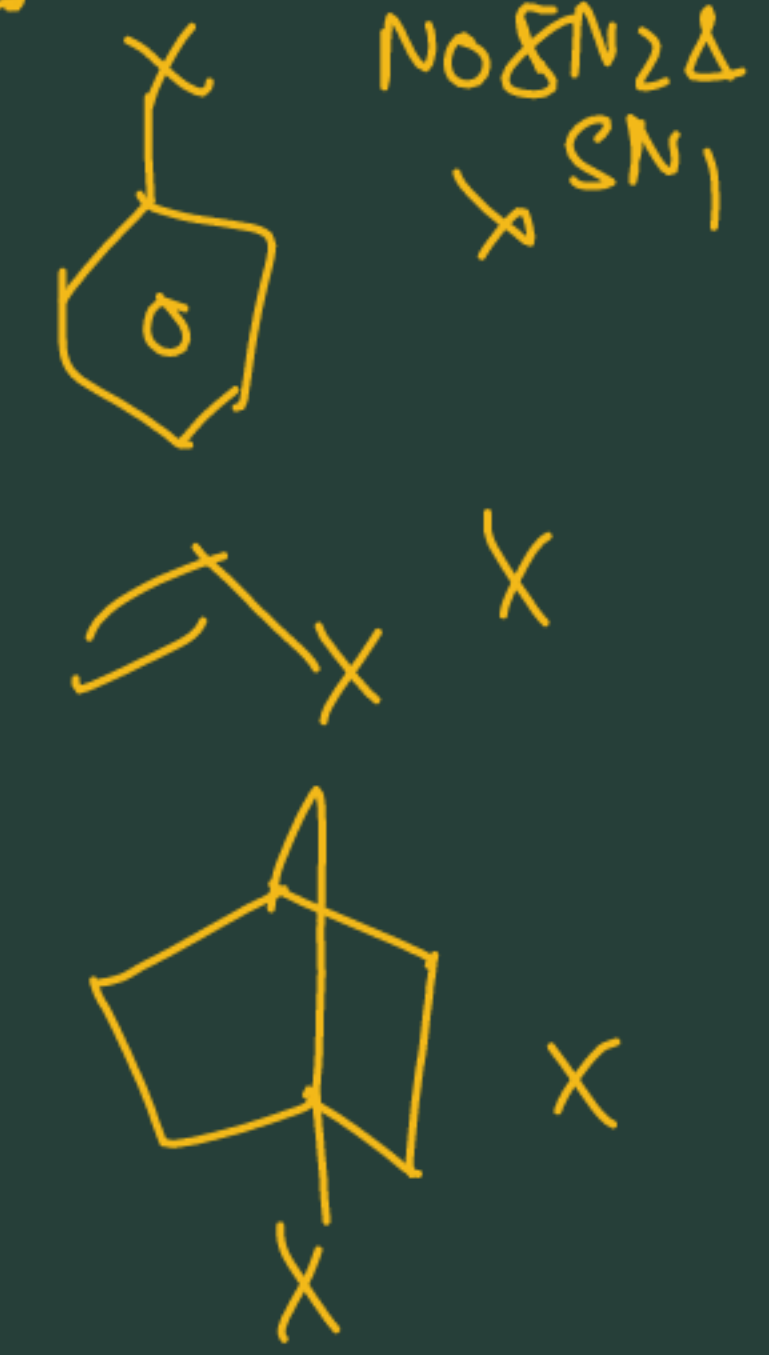
3) Solvent.

Q. Compare rate of SN<sub>1</sub>



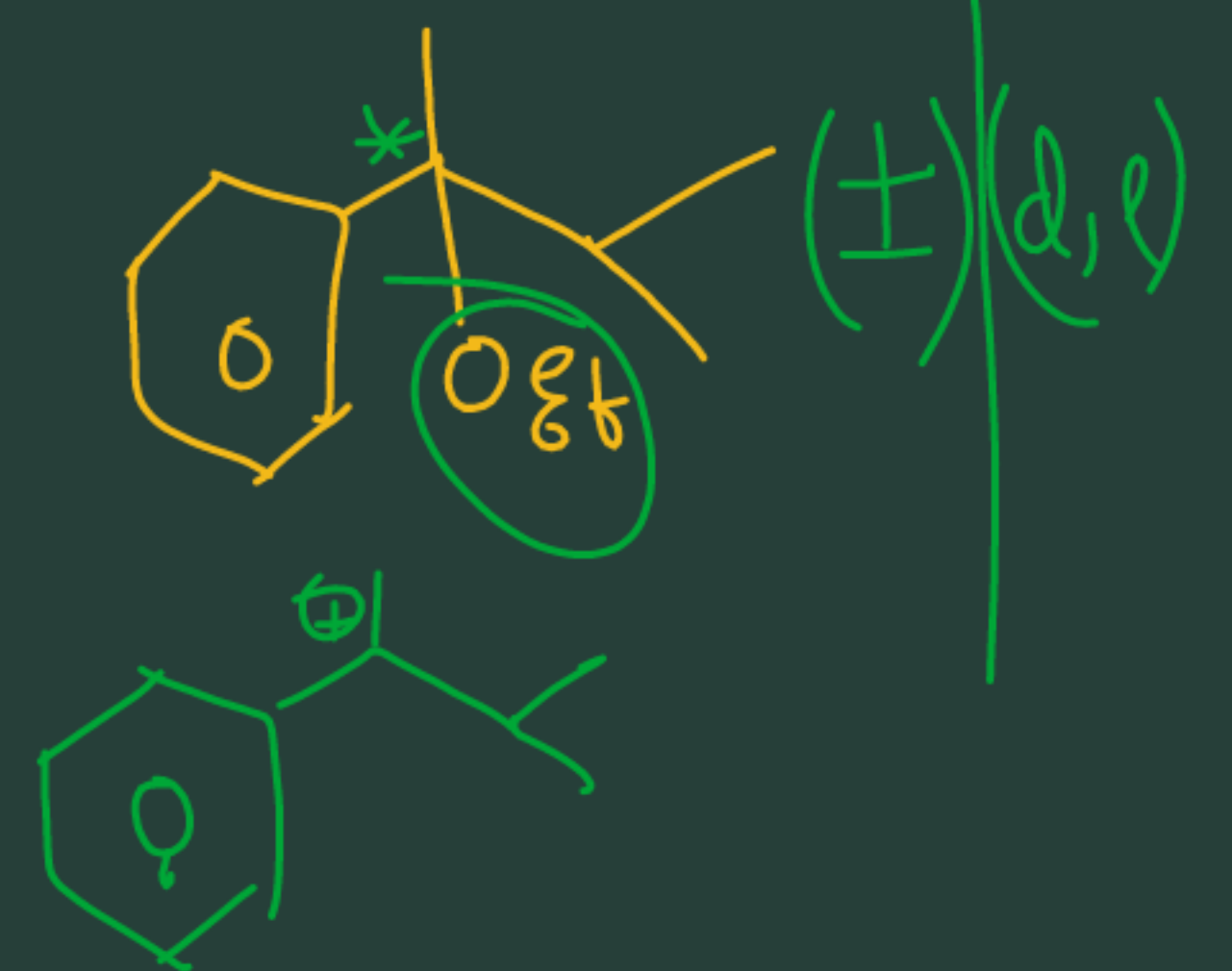
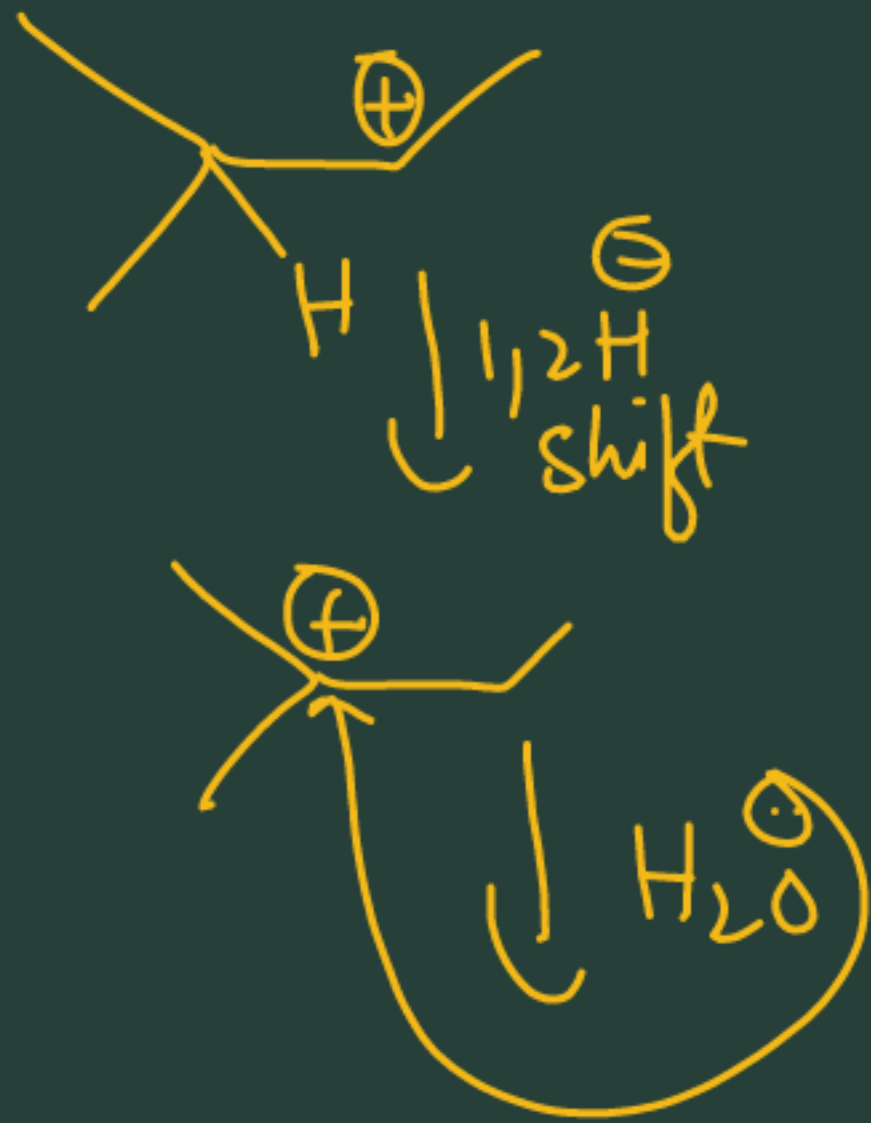
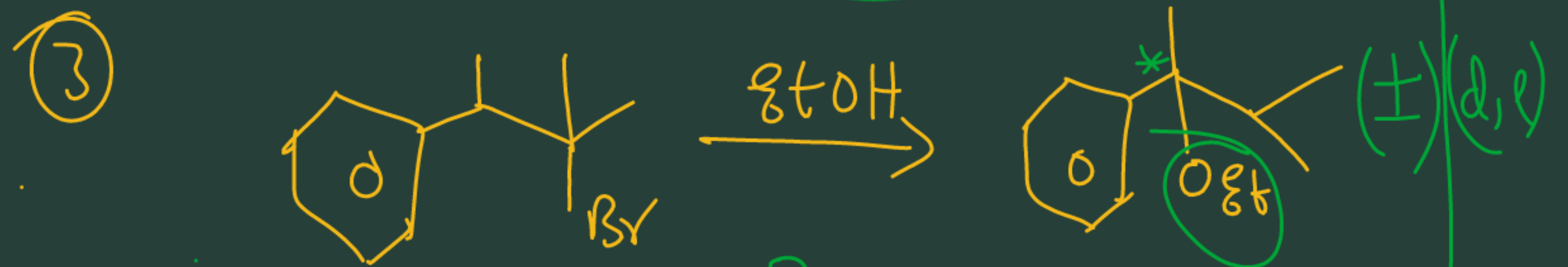
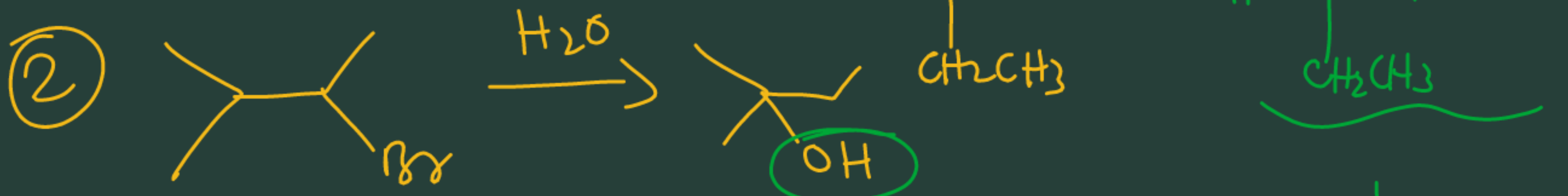
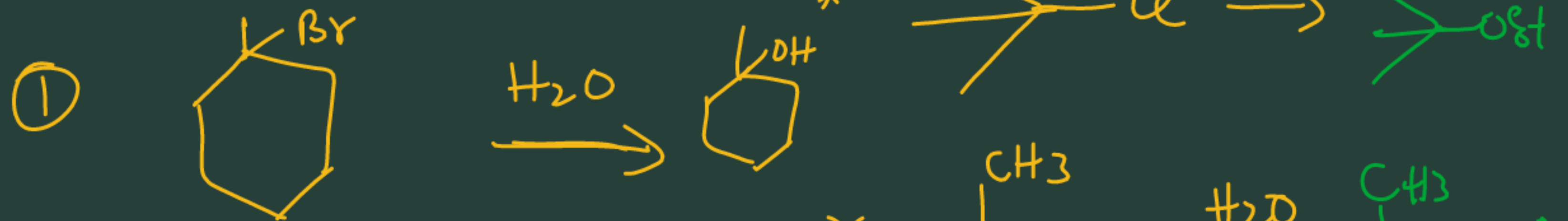


$b > c > a$



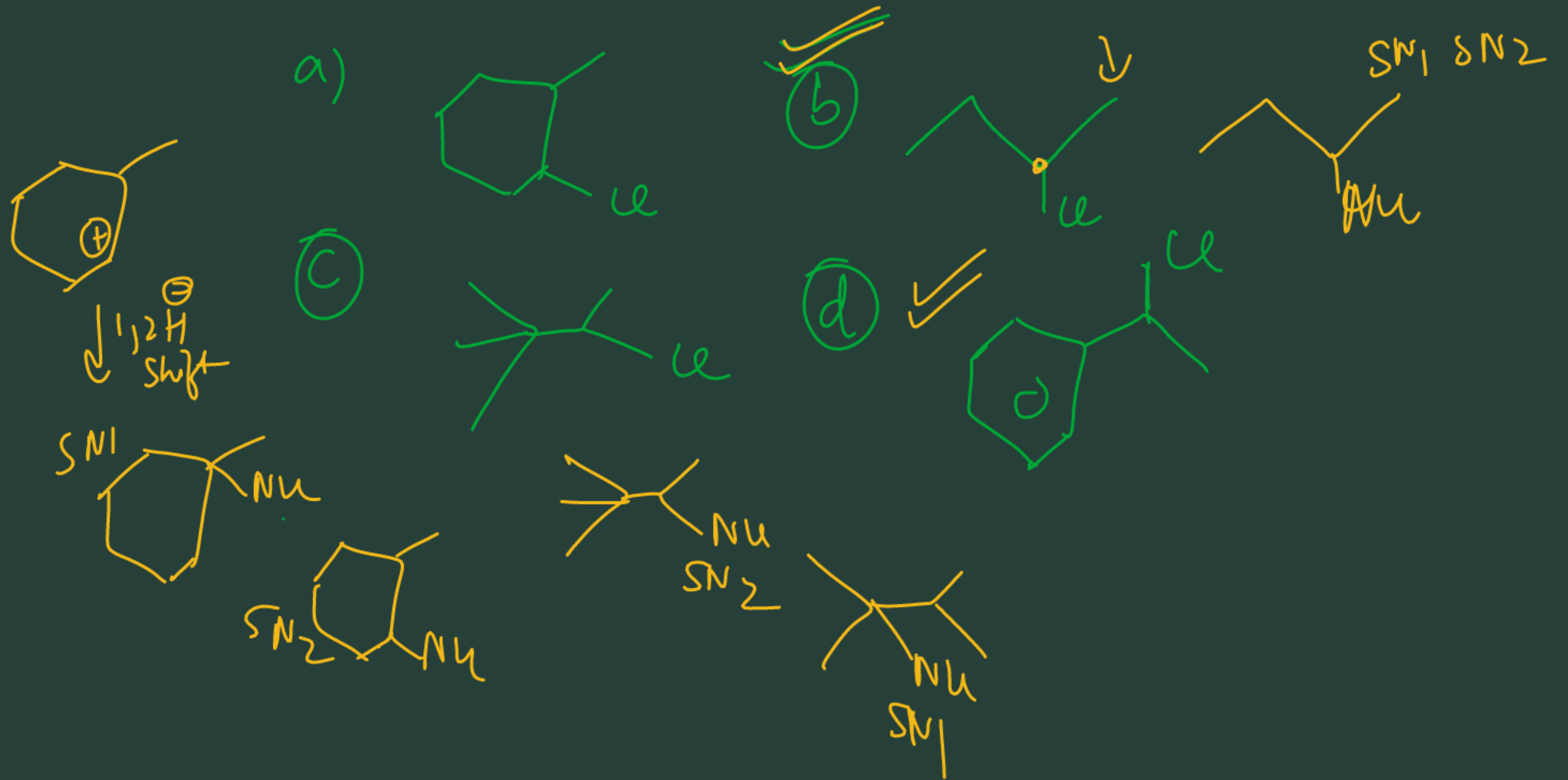


# Q Identify Product



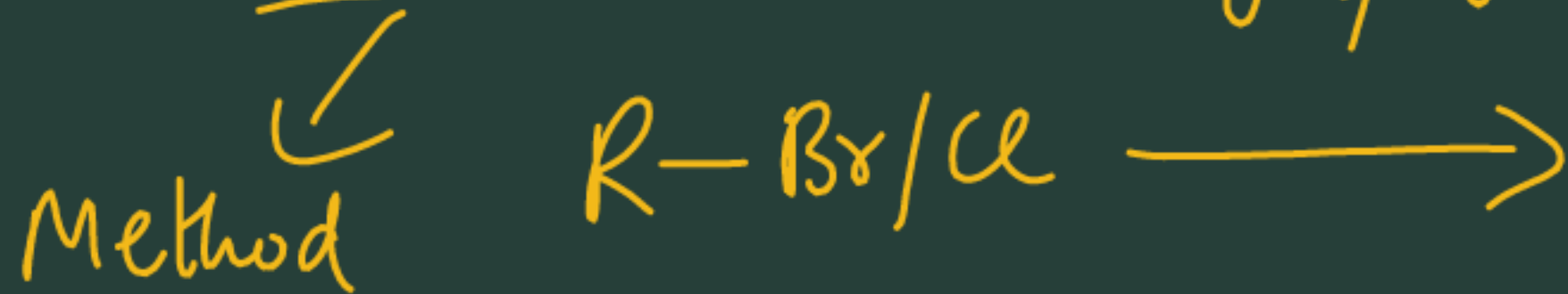
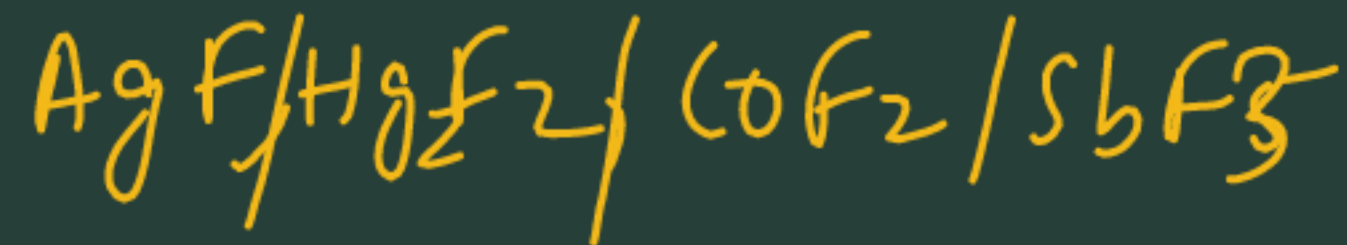


Q. Which of the following will give same  $S_N1$  &  $S_N2$  product





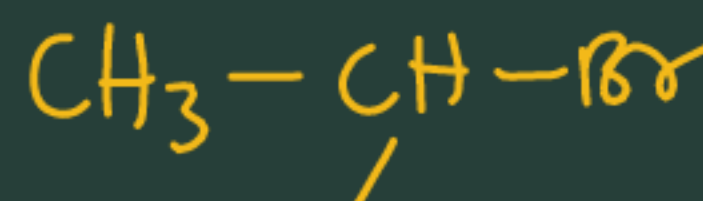
Swarts Rxn



to prepare Alkyl Fluoride

moderate S<sub>N</sub>1 & S<sub>N</sub>2

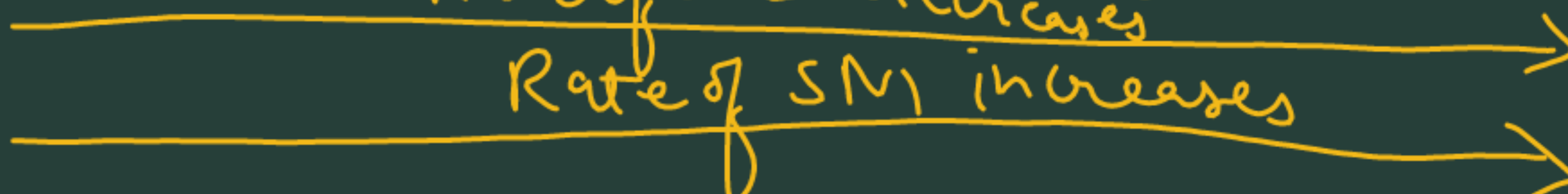
Excellent S<sub>N</sub>1  
Poor or no S<sub>N</sub>2

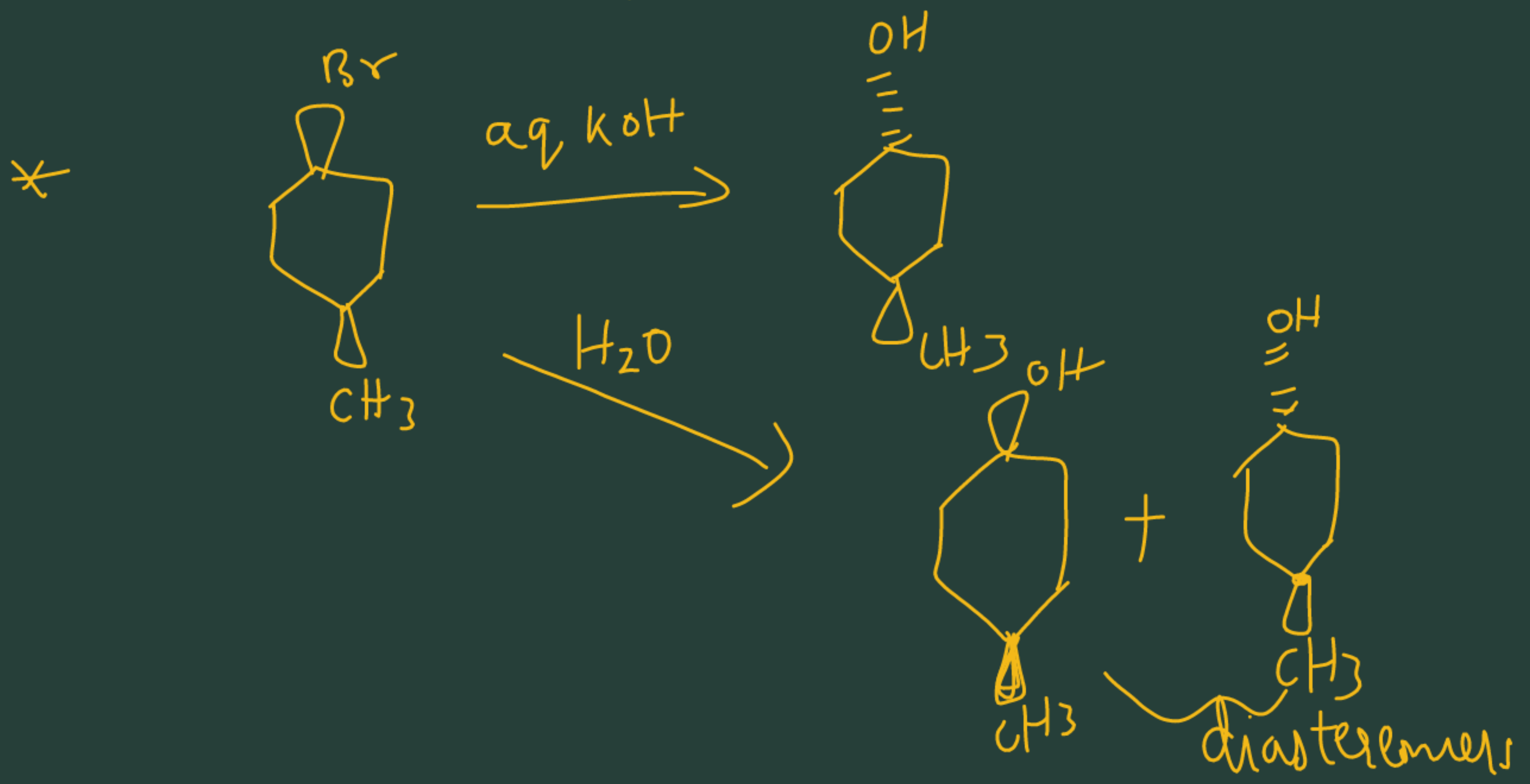
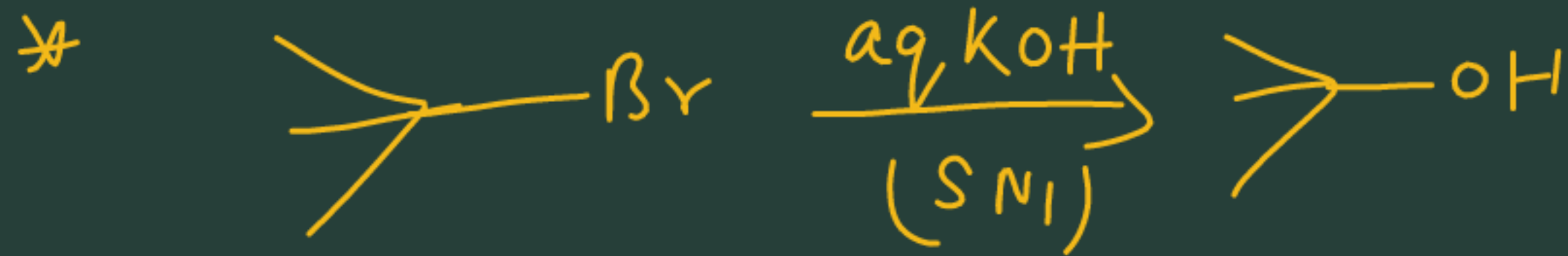







Excellent S<sub>N</sub>2  
Poor or no S<sub>N</sub>1

Rate of S<sub>N</sub>2 decreases

Rate of S<sub>N</sub>1 increases

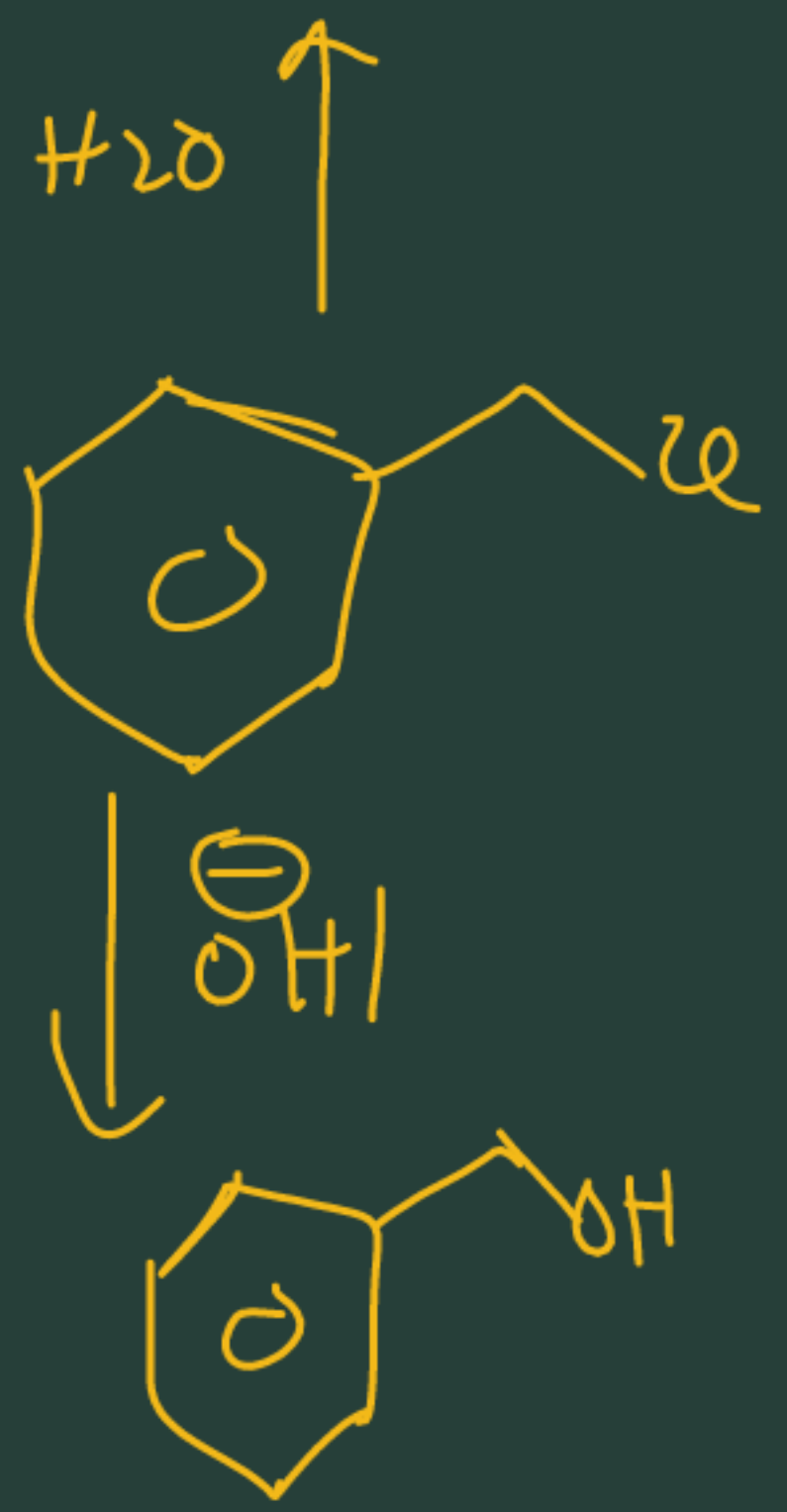
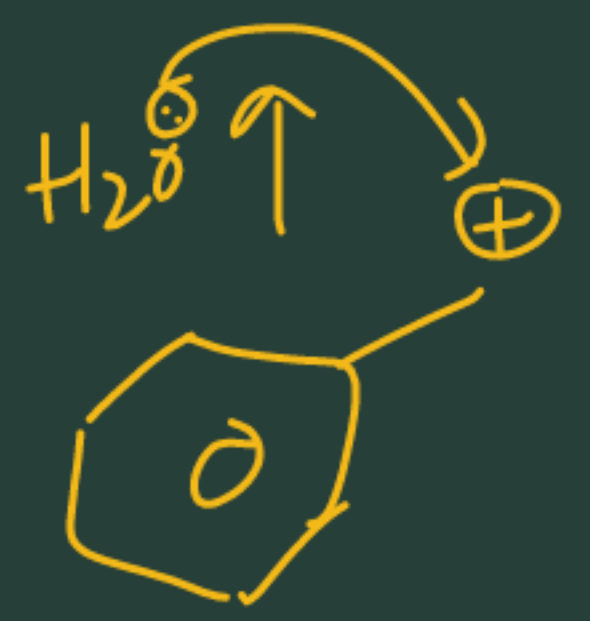




Org. Compound	$S_N2$	$S_N1$	Reason
1) 	X	X	(aryl carbocation)
2) 	X	X	(vinyl carbocation)
3) 	X (T.S. cis $sp^2$ hybrid)	X	(Bredt's Rule)
4) $R-F$	X	X	(F is poor L.G.)
5) 	X (steric hindrance)	X	( $1^\circ$ carbocation)
6) 	X (A.A. $\pi$ )	X	(A.A) Intermediate

is notorious towards both  $S_N1$  &  $S_N2$   
 neopentyl halide





	SN <sub>2</sub>	SN <sub>1</sub>	
7) <chem>CC(C)(C)Cl</chem>	X	✓	Solublysis cond <sup>n</sup> solvent is Nu
8) <chem>CH3-I</chem>	✓	X	
9) <chem>Ph-C(=O)-CH2-Cl</chem>	✓ (fastest SN <sub>2</sub> )	X	<chem>Ph-C(=O)-CH2+</chem>
10) <chem>Ph-CH2-Cl</chem>	✓ (I <sup>-</sup> , RS <sup>-</sup> , OH <sup>-</sup> )	✓	(stable carbocation (H <sub>2</sub> O, & OH <sup>-</sup> ))
11) <chem>CH2=CH-CH2-Cl</chem>			
12) <chem>CC(C)Cl</chem>	✓	✓	(very stable carbocation)
13) <chem>CH3-O-CH2-Cl</chem>	✓ (-I of O more s on carbon)	✓	