Me_3SiI

(Trimethyl silyl iodide)

Preparation:

$$SiCl_4 + CH_3MgBr \longrightarrow CH_3SiCl_3 + Mg(Cl)(Br)$$

$$H_3CSiCl_3 + 2\,CH_3MgBr \longrightarrow (H_3C)_3SiCl + 2\,Mg(Cl)(Br)$$

(excess)

$$(H_3C)_3SiCl \xrightarrow{CH_3CN} Me_3SiI + NaCl.$$

$+ NaI$

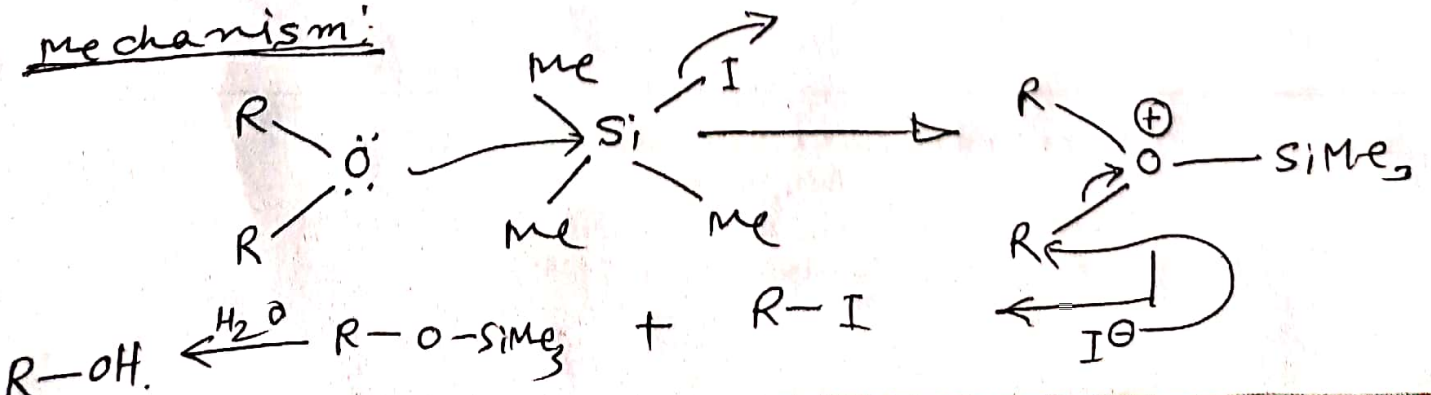
* cleavage of ether using conc. HI is not always suitable for molecules having several functional group. Me_3SiI is a milder and more effective reagent in this purpose.

Synthetic application of Me_3SiI:

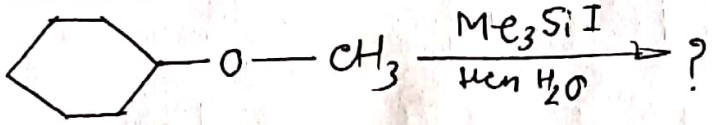
1) **Cleavage of ether:**

$$R-\ddot{O}-R + Me_3SiI \xrightarrow{then\ H_2O} R-I + R-OH.$$

Mechanism:



(Problem)

H.W 1. 

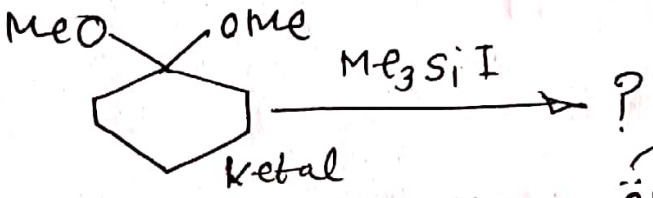
2. $Ar-O-CH_3 \xrightarrow{\text{"}} ?$

3. $R_2C=C(R)(OMe) \xrightarrow[H_3O^+]{Me_3SiI} ?$

Predict the Product with mechanism.

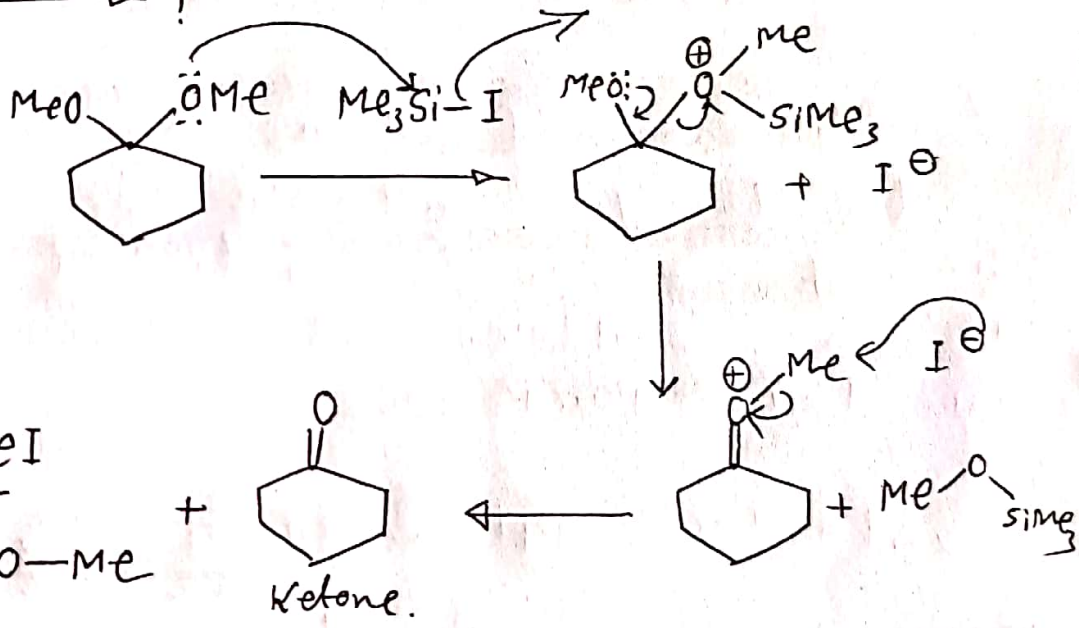
Note:- Me_3SiI is expensive and very much sensitive to light and moisture.

① Problem/answer



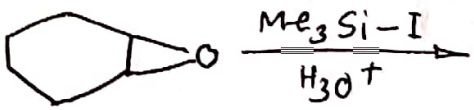
Ketal

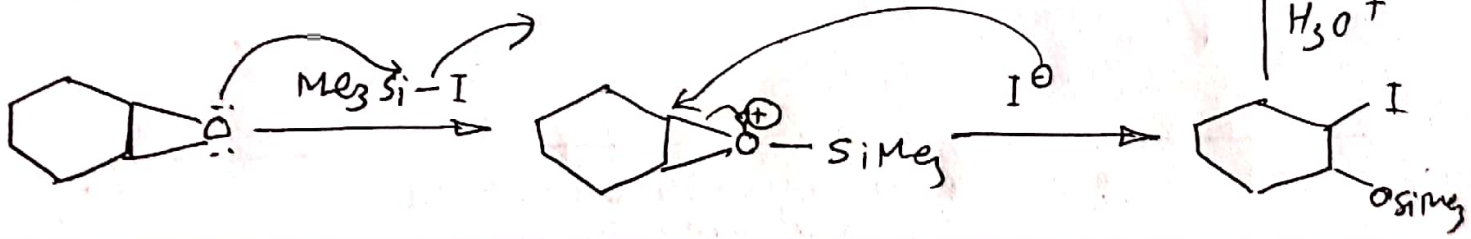
Mechanism:-



MeI + $Me_3Si-O-Me$ + Ketone.

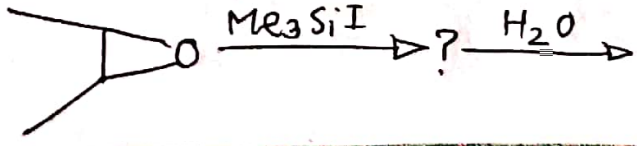
Problem/Answer

② 

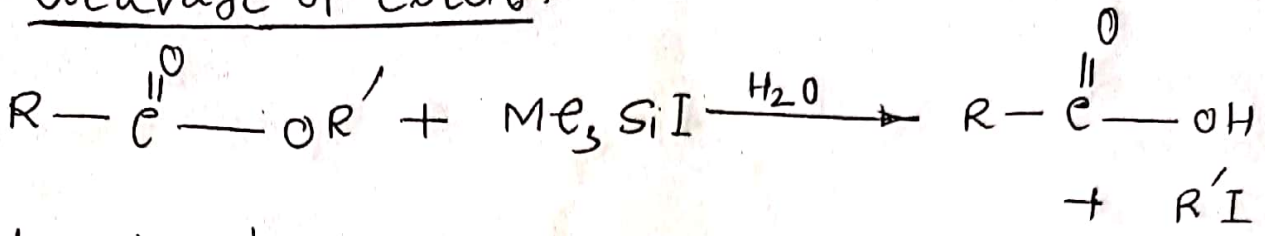


(Iodohydrin).

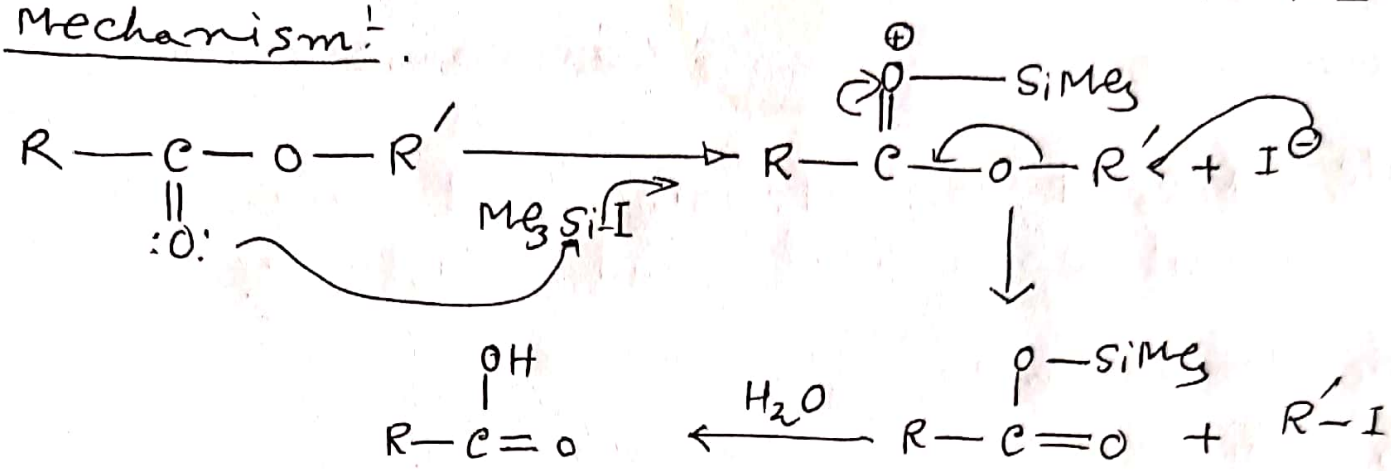
Problem:- (HW).



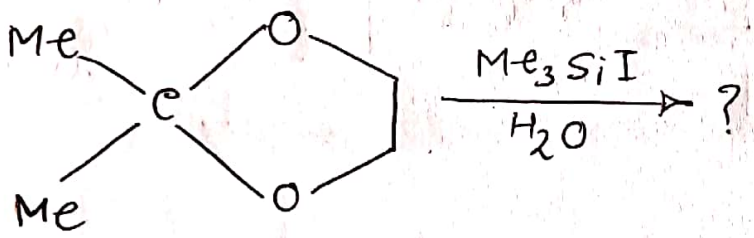
2) Cleavage of ester:



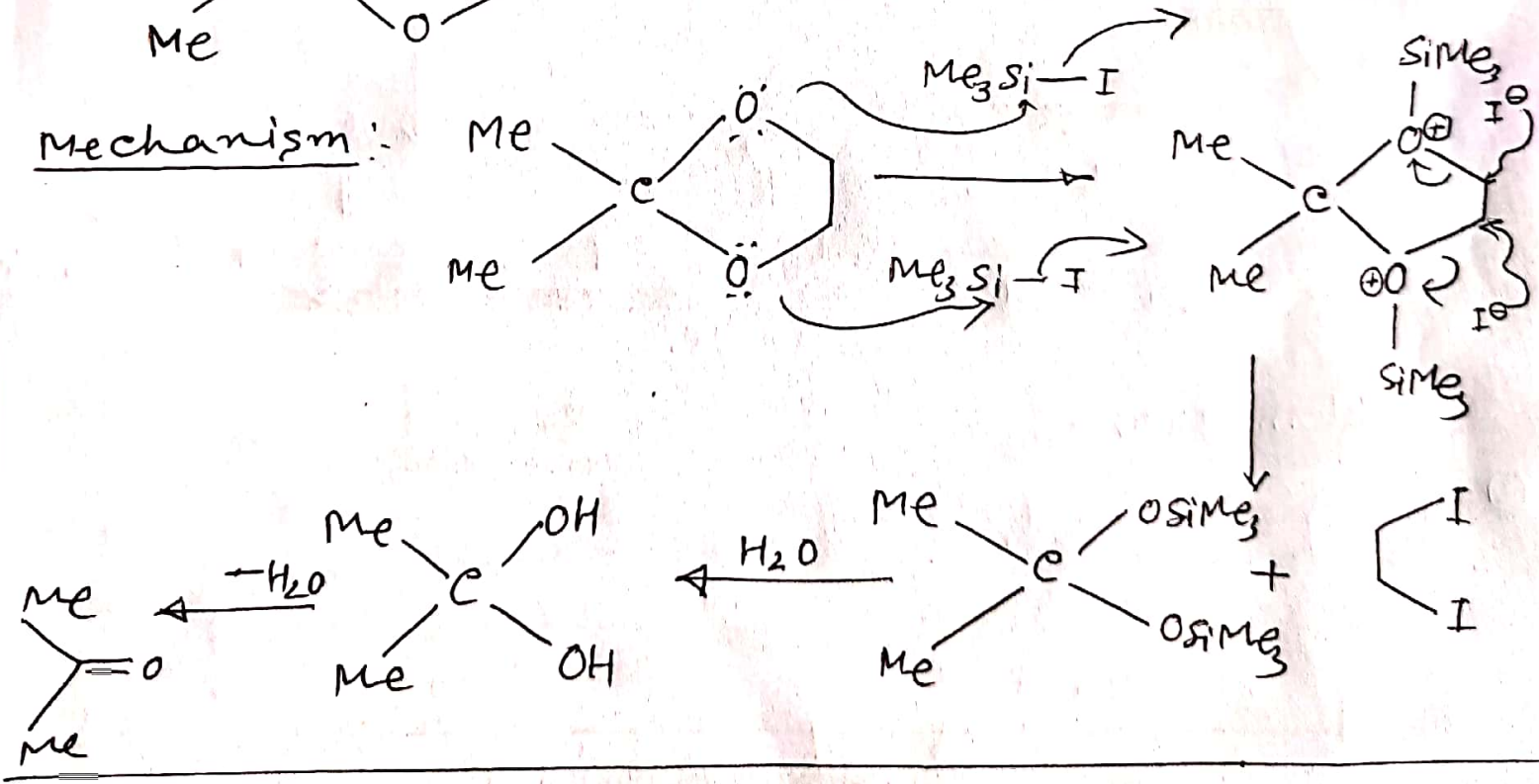
Mechanism:



3) Cleavage of 1,3-dioxalane



Mechanism:

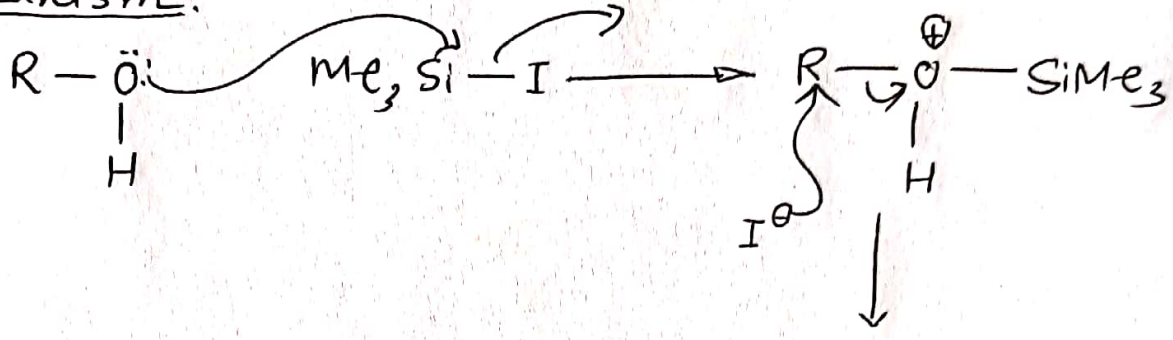


(4) Conversion of alcohol to alkyl iodide

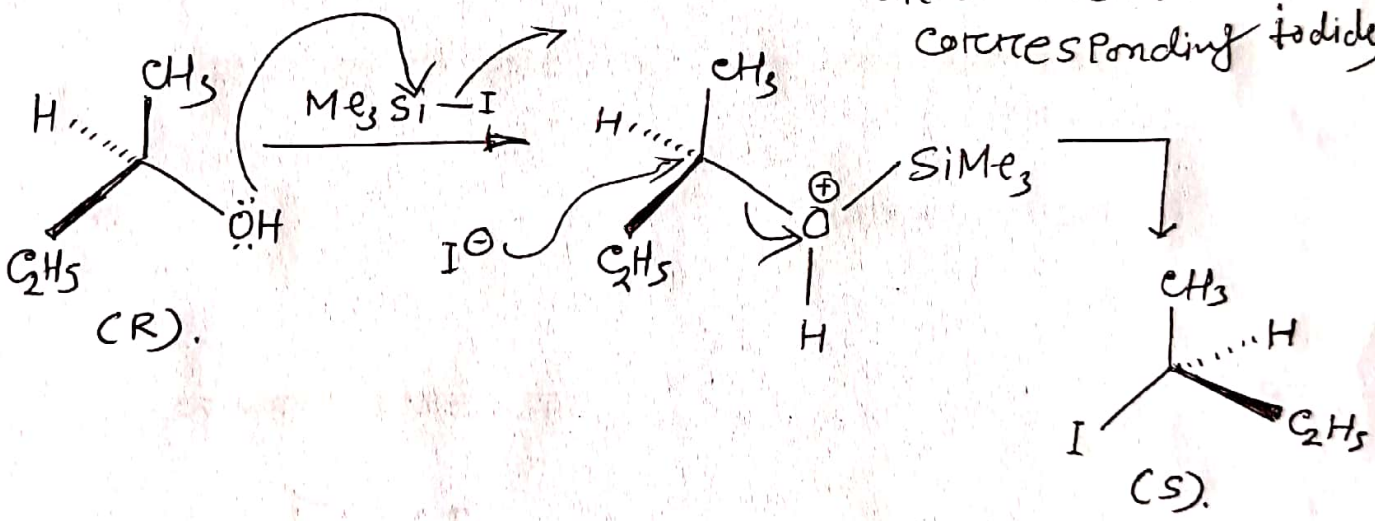
Rexn occurs through SN2 rexn.

$$R-OH + Me_3SiI \longrightarrow ?$$

Mechanism.



Mechanism: (Inversion of configuration of chiral alcohol to corresponding iodide)



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(5) Transesterification: (Rexn under neutral condition)

$$R-C(=O)-OMe + EtOH \xrightarrow{Me_3SiI} R-C(=O)-OEt$$

Mechanism