

① ADDITION TO ALKENES

QUIZ IN

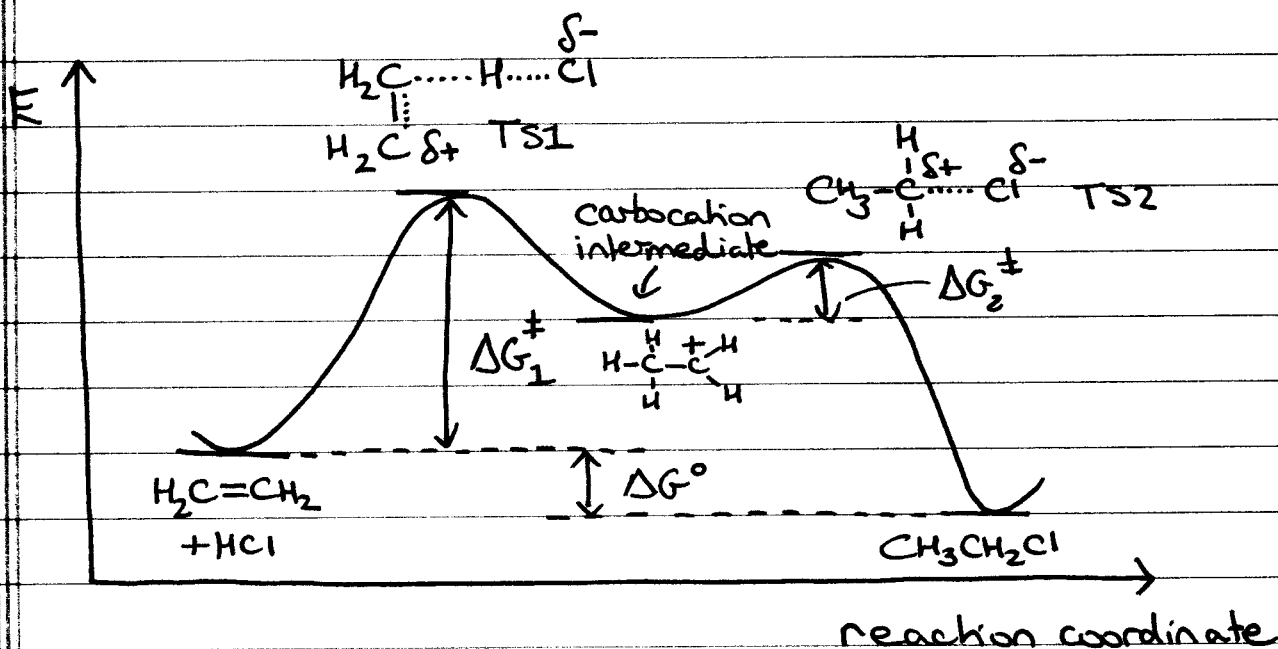
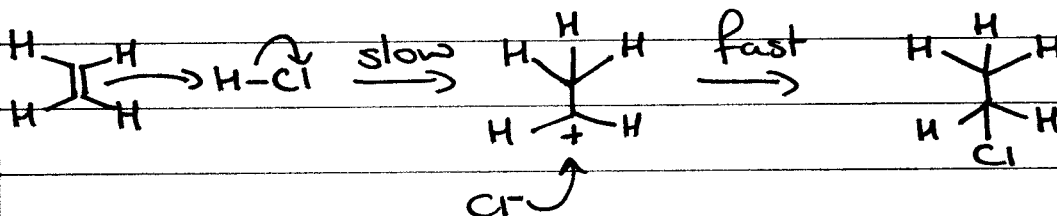
② CARBOCATIONS

CLASS WEDS

③ REARRANGEMENT

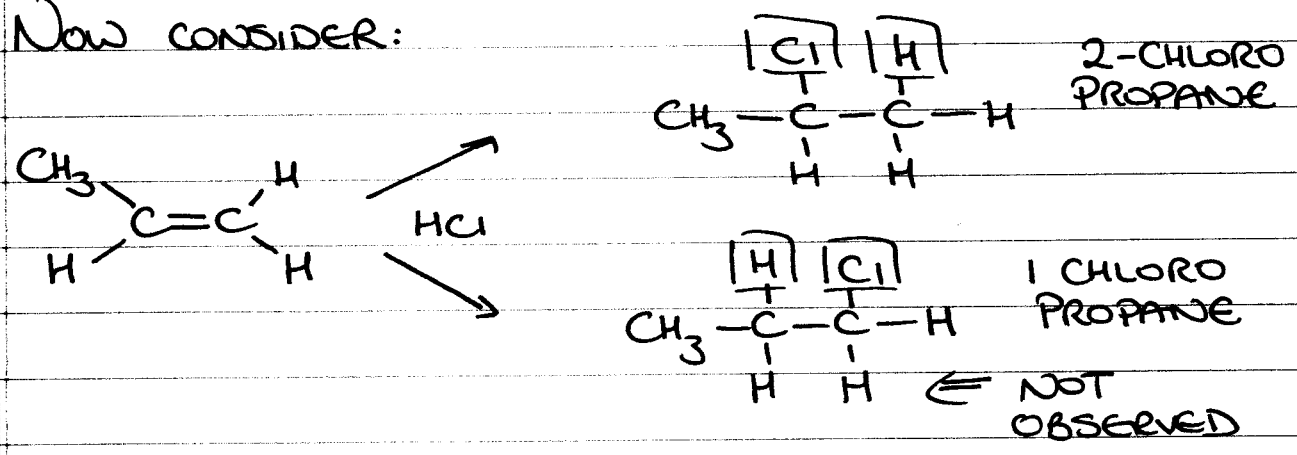
④ ADDITION of  $H_2O$ ⑤ ADDITION of  $Br_2/Cl_2$ 

(3/4)

Read 6.3-6.5 Prob: 6.3-6.8, 6.14-6.16 (3rd)  
6.1-6.6, 6.13-6.15 (4th)① ADDITION TO ALKENES ( $HCl, HBr, HI$ )

2

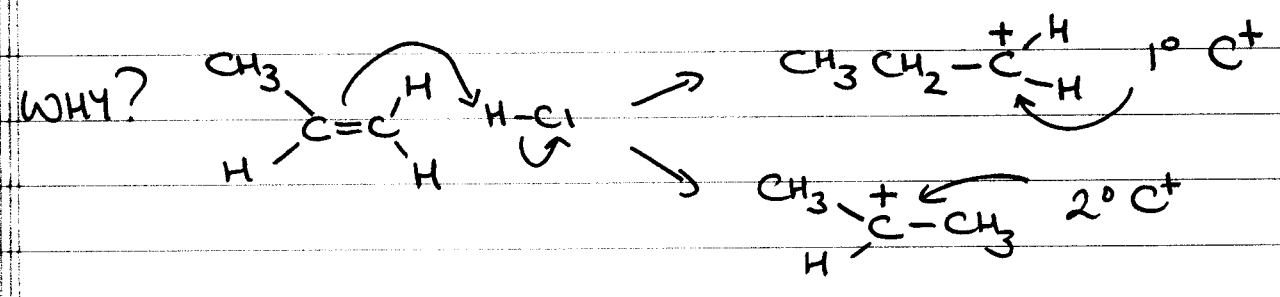
Now CONSIDER:



### REGIOSELECTIVE REACTION

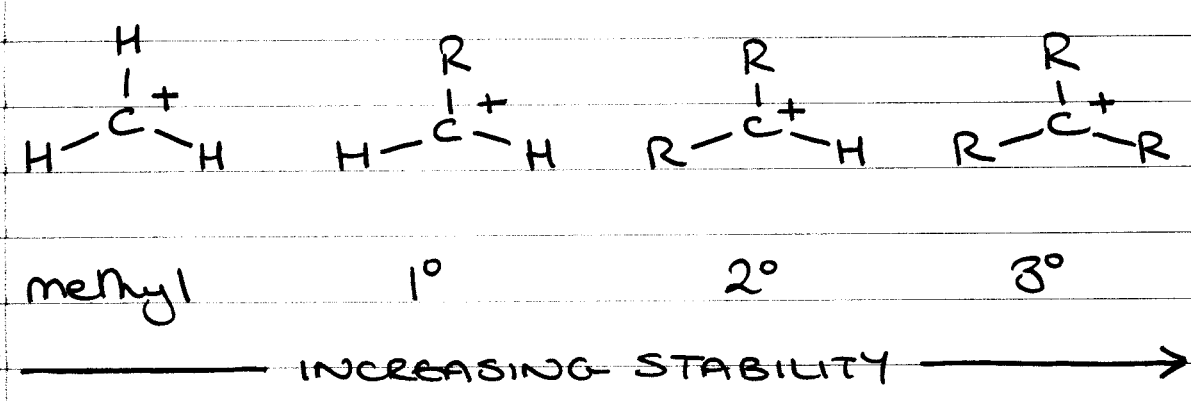
⇒ MARKOVNIKOV'S RULE

H ADDS TO DOUBLE BONDED C WITH MOST HS ALREADY ATTACHED



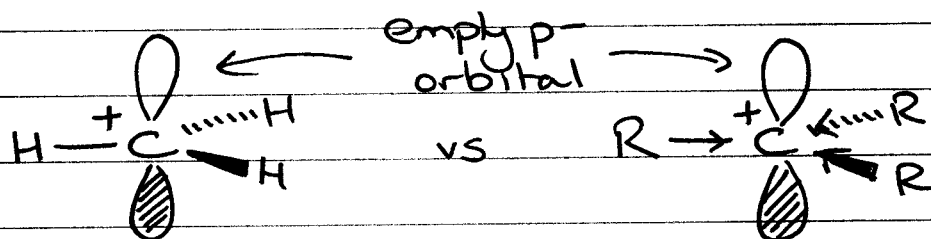
### ② CARBOCATIONS

(Stability R = ALKYL)



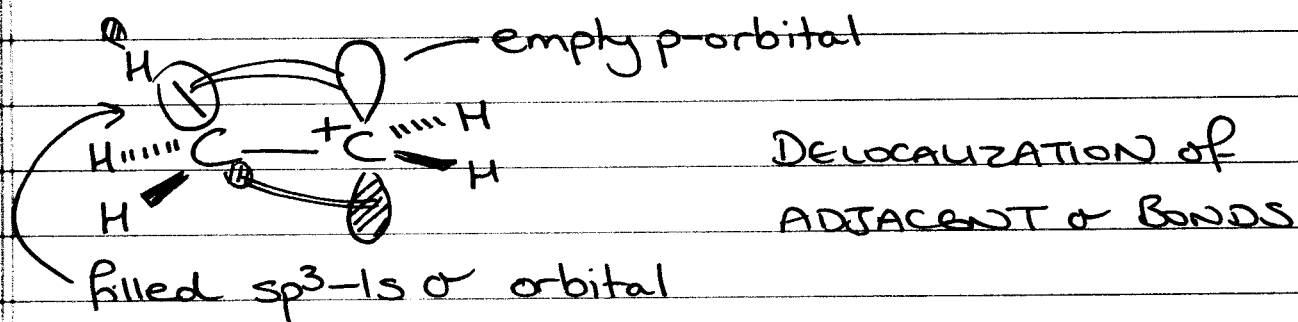
Two Factors

(i) Inductive Effect



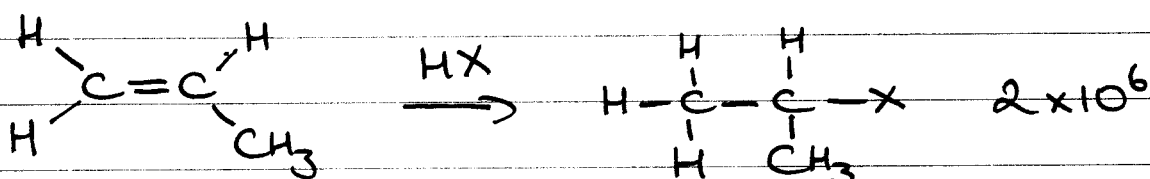
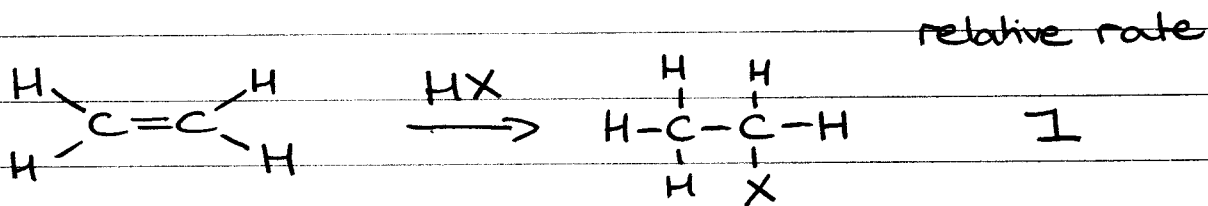
ALKYL GROUPS ARE INDUCTIVELY DONATING

(ii) Hyperconjugation

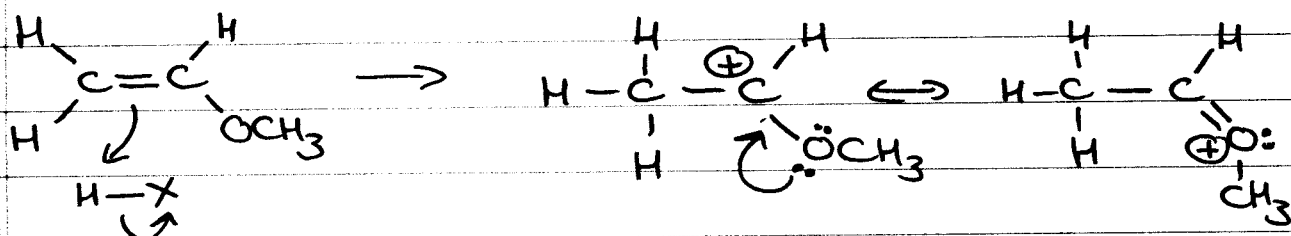
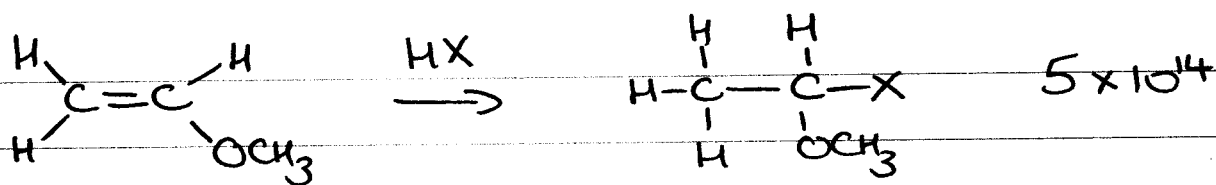


The more C-H or C-C bonds, the more significant the stabilization, so  $\text{Me}^+ < 1^\circ < 2^\circ < 3^\circ$

... and other factors (RESONANCE)

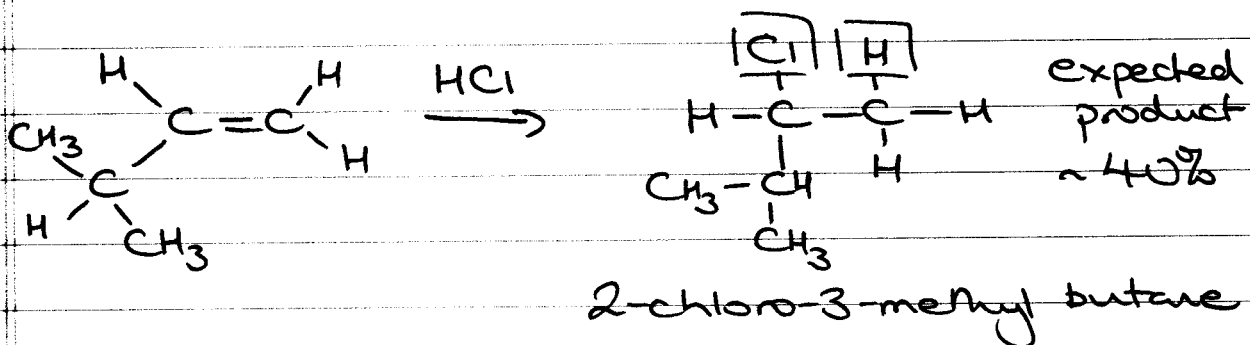


4

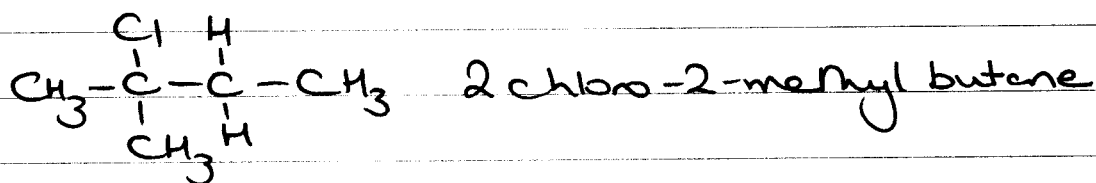


RESONANCE STABILIZED

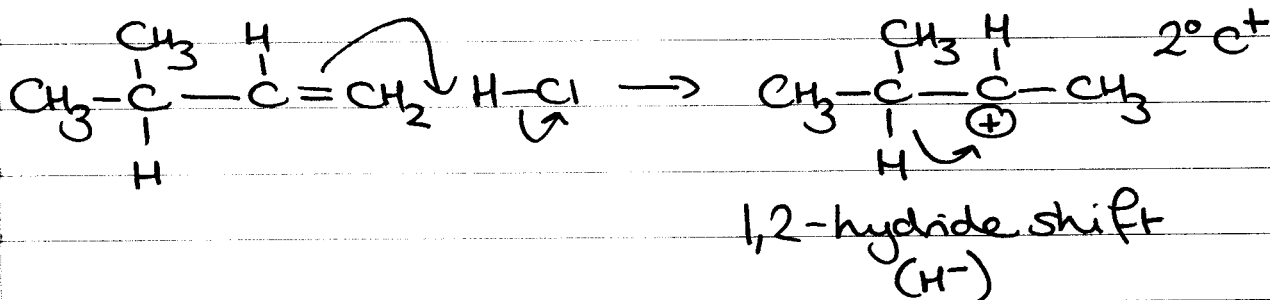
### ③ REARRANGEMENT

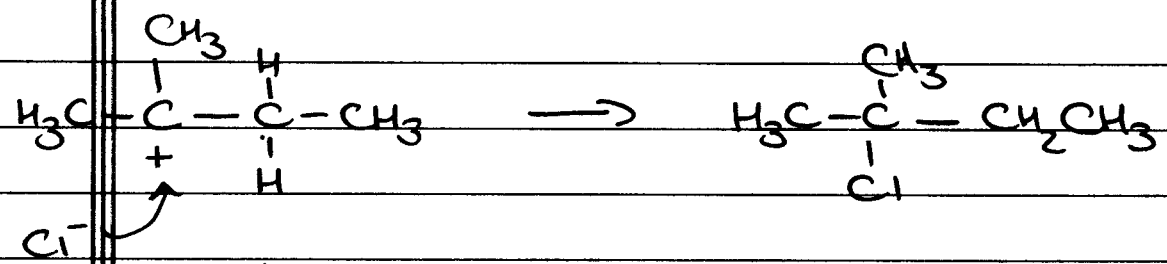


- other 60%



WHY?

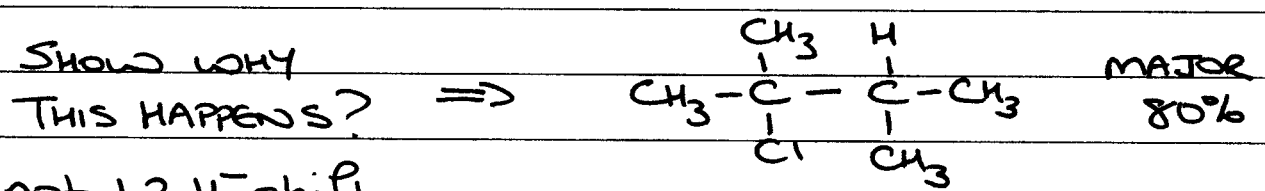
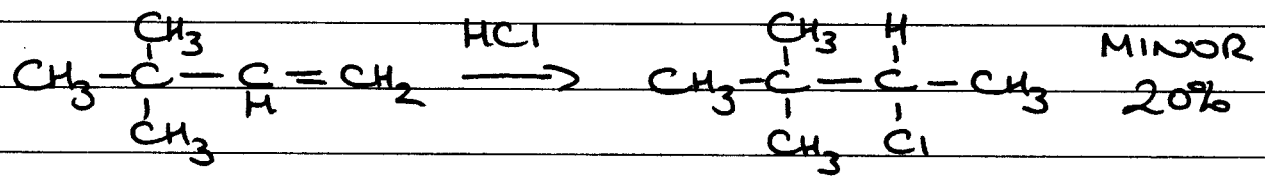




3° C<sup>+</sup>  
(more stable)

Rearrangement possible whenever a carbocation is formed.

Consider:



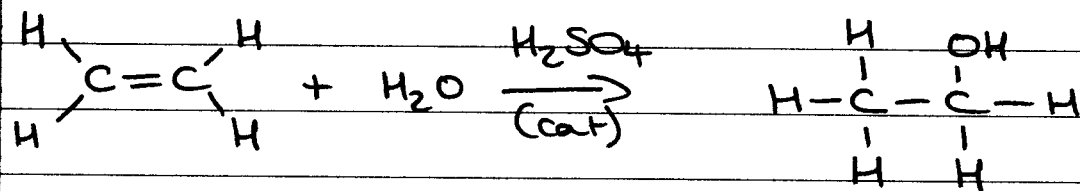
not 1,2 H<sup>-</sup> shift,  
but 1,2 METHYL shift

2° CARBOCATIONS ⇌ 3° CARBOCATIONS  
(rarely rearrange in reverse direction, but is possible ~ ring strain)

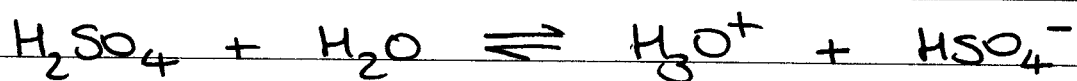
In reality, 1° C<sup>+</sup> do not form during reactions in solution, as they are so unstable.

(6)

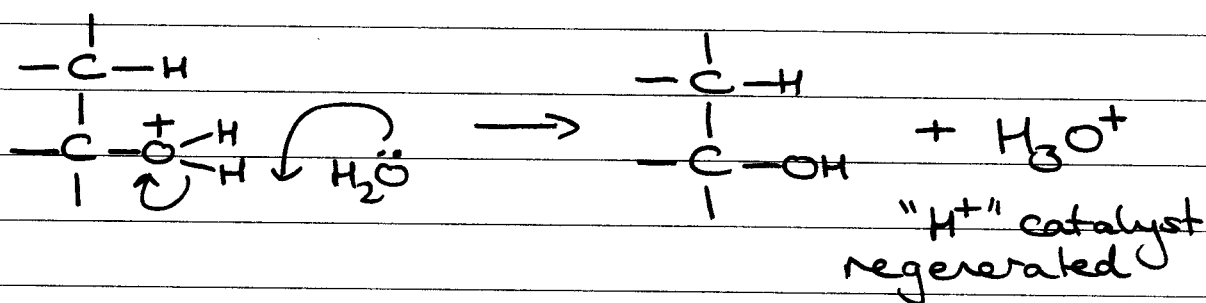
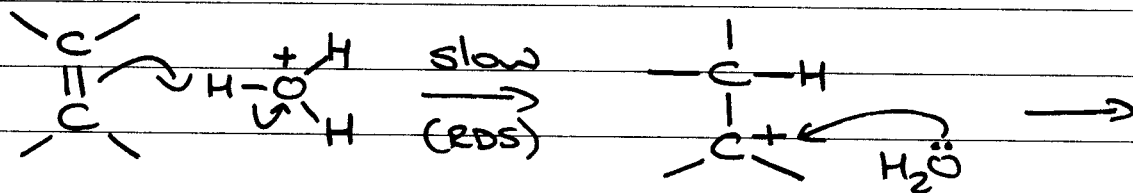
#### ④ ADDITION of H<sub>2</sub>O (acid catalysed hydration)



H<sub>2</sub>O alone is not acidic enough to protonate C=C, so need an acid catalyst



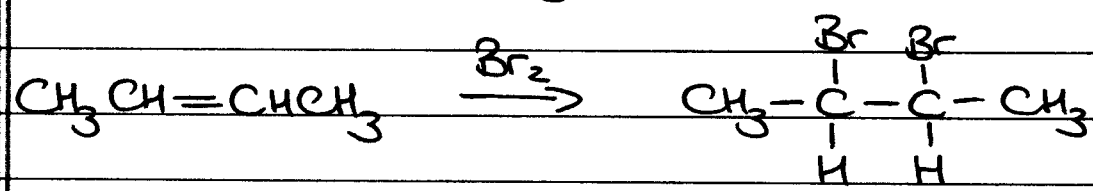
mechanism:



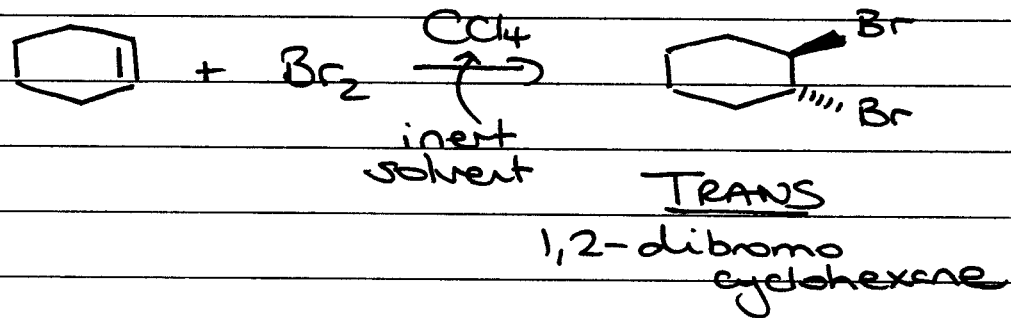
mechanism involves a CARBOCATION, so:

- (i) Rearrangement is possible in ACID cat hydration
- (ii) MARKOVNIKOV selectivity is observed

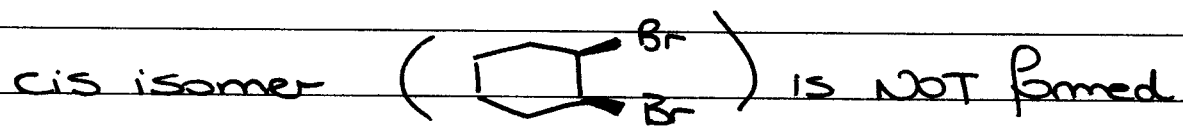
⑤ ADDITION of Br<sub>2</sub>/Cl<sub>2</sub>



note:



STEREOSPECIFIC reaction



note:

STEREOSPECIFIC (exclusion)      Some goes for (REGIO)

STERESELECTIVE (preference)