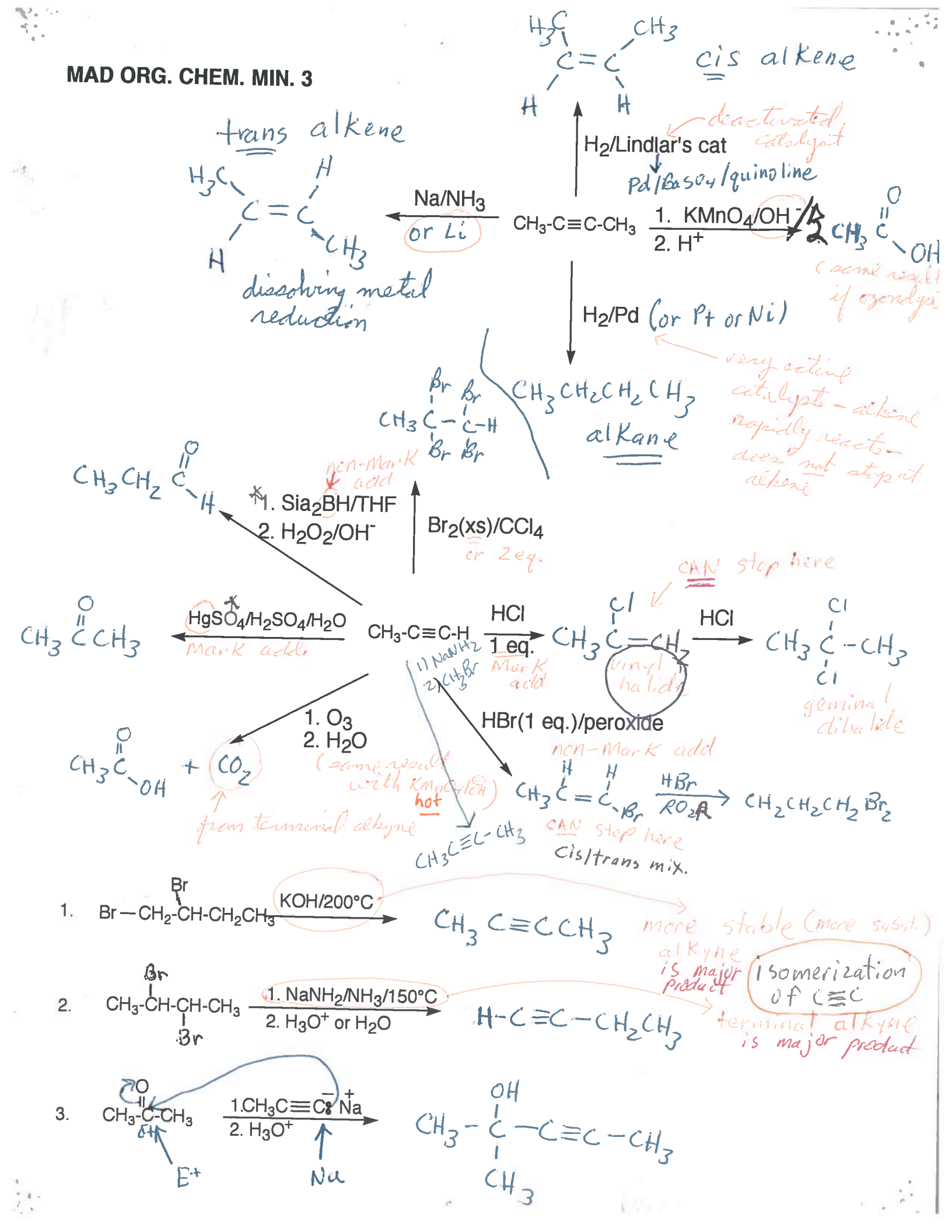
MAD ORG. CHEM. MIN. 3



MAD ORG. CHEM "MIN." #3

LAST NAME : _____ FIRST NAME : _____

SS# : _____ CLASS TIME : _____

* Look at Nu first. Determine if strong or weak base.

1. Give major products only. When stereochemistry is indicated in the starting material, indicate the stereochemistry in the product also. State the mechanism that formed the product (S_N1, S_N2, E1, E2).

a. $(CH_3)_3C\text{-}Cl$ + CH_3OH $\xrightarrow{\text{heat}}$ $(CH_3)_3C\text{-}OCH_3$ S_N1

3° ; weak Nu protic solvent ; weak base ; "solvolysis"

b. $CH_3CH_2CH_2Cl$ + $CH_3O^-Na^+$ $\xrightarrow{CH_3OH}$ $CH_3CH_2CH_2\text{-}O\text{-}CH_3$ S_N2

1° ; strong base – unhindered ; exception to strong base = E2

c. $CH_3CH_2CH_2Cl$ + $(CH_3)_3C\text{-}O^-K^+$ $\xrightarrow{(CH_3)_3C\text{-}OH}$ $CH_3CH{=}CH_2$ E2

1° ; strong hindered base

d. $CH_3CH_2C(CH_3)(H)Cl$ $\xrightarrow[DMSO]{CH_3S^-Na^+}$ $CH_3S\text{-}C(CH_3)(H)CH_2CH_3$ S_N2

2° ; strong Nu / weak base ; weak base / strong Nu ; aprotic solvent ; inversion

e. $CH_3\text{-}CH(Cl)\text{-}CH_2CH_3$ $\xrightarrow[CH_3OH]{CH_3O^-Na^+}$ $CH_3\text{-}CH{=}CH\text{-}CH_3$ E2

2° ; strong base (unhindered) ; more stable alkene is major ; * Z rule

$CH_2{=}CH\text{-}CH_2CH_3$ minor – less subst.

2. Give all possible products of the following reaction (ignore stereoisomers):

$CH_3\text{-}CH(CH_3)\text{-}CH{=}CH_2$ $\xrightarrow{HCl}$ $CH_3\text{-}CH(CH_3)\text{-}CH(Cl)CH_3$ + $CH_3\text{-}C(CH_3)(Cl)\text{-}CH_2CH_3$

(A) ~50% ; (B) ~50%

$CH_3\text{-}C(CH_3)(H)\text{-}CH^+\text{-}CH_3$ $\xrightarrow{\text{hydride shift}}$ $H_3C\text{-}C(CH_3)^+\text{-}CH_2CH_3$

NOT formed:

$CH_3CH(CH_3)\text{-}CH_2\text{-}CH_2Cl$

violates Mark's