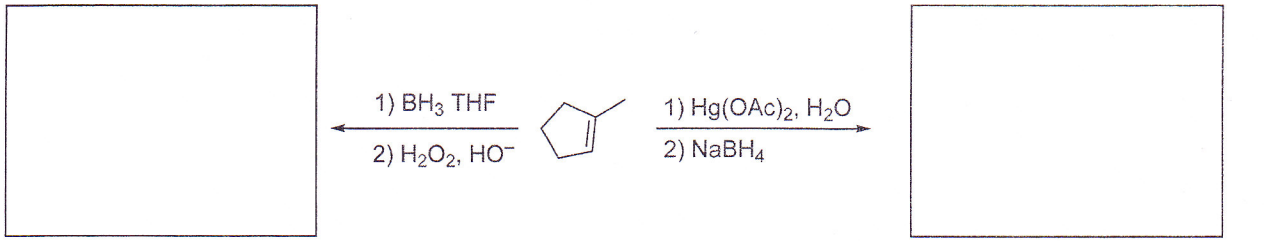
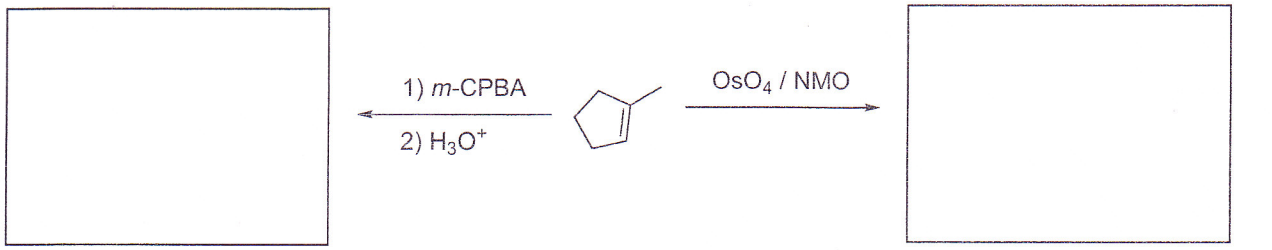
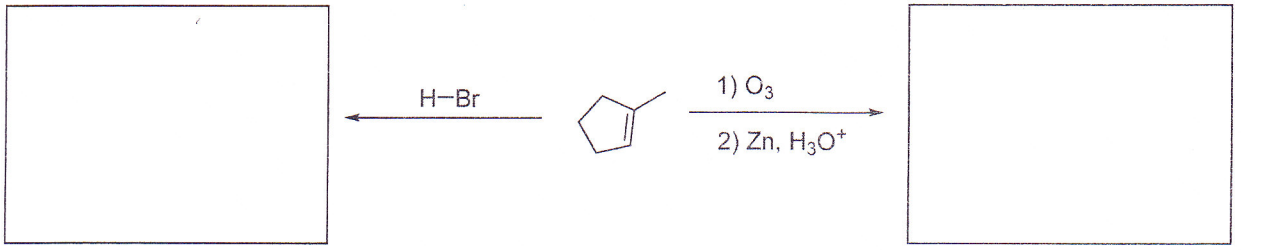
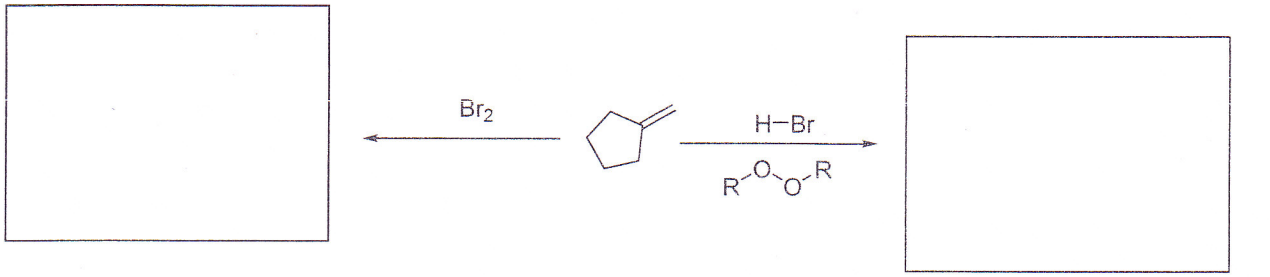
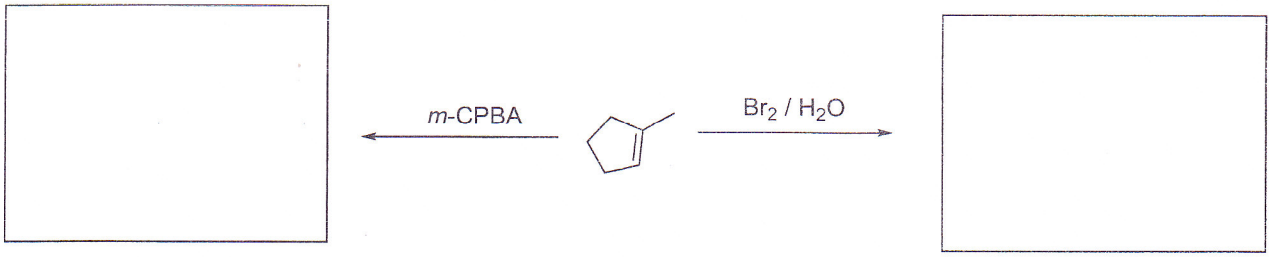
1) Draw the MAJOR (most abundant) product made in the reaction. IF NEW STEREOCENTER(S) IS/ARE MADE, DRAW ONLY ONE ENANTIOMER. (3 pts each, 30 points total)





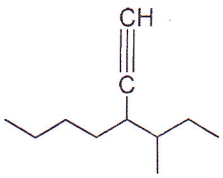






NAME_____

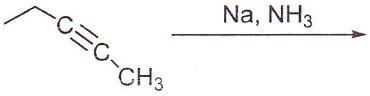
2) Name the following structure (IUPAC). USE sec-, tert, OR neo in naming, if necessary. (2 pts)



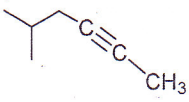
3) Draw the structure. (2 pts)

6-(1-methylethyl)-3,3-dimethyl-1-nonyne

4) Predict the products of the following reaction. (3 pts per box, 6 pts total)



Na, NH_3



H_2

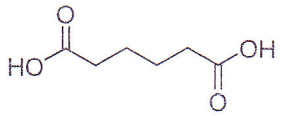
Lindlar Catalyst

show stereochemistry

5) Draw the alkyne reactant. (3 pts)

1) O_3

2) H_2O



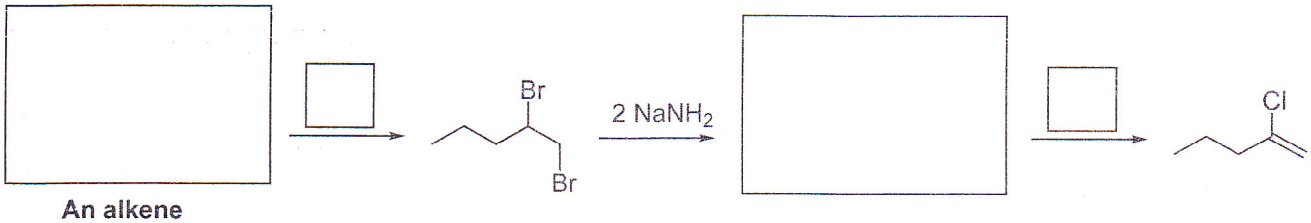
NAME_____

(A) HBr	**(B)** Na, NH_3 (liquid)	**(C)** 1 mol HCl	**(D)** 2 mol HCl
(E) 1) $Hg(OAc)_2$, H_2O 2) $NaBH_4$	**(F)** $KMnO_4$, NaOH (**cold**)	**(G)** H_2, Pd/C **or** H_2, Pt/C **or** H_2, Ni	**(H)** 2 mol Br_2 (in CH_2Cl_2 solvent)
(I) 1) OsO_4 2) $NaHSO_3$, H_2O	**(J)** 1) O_3 2) DMS (required!!) (DMS -= dimethylsufide) **(compare K)**	**(K)** 1) O_3 2) H_2O (no DMS required) dimethylsufide	**(L)** 1 mol Br_2 (in CH_2Cl_2 solvent)
(M) 1) BH_3, THF 2) $HO^{\ominus}$, H_2O_2, H_2O	**(N)** $CHCl_3$, KOH (base)	**(O)** Tosyl Cl (TsCl), pyridine	**(P)** 1 mol $NaNH_2$
(Q) HIO_4	**(R)** Br_2, excess H_2O	**(S)** 1) $HgSO_4$, H_2O, H_2SO_4,	**(T)** $H_3O^{\oplus}$ (23 °C) **(mild addition cond'ns)**
(U) *m*-chloroperoxybenzoic acid (*m*CPBA)	**(V)** H_2O, conc. H_2SO_4, Heat	**(W)** CH_3Br	**(X)** NBS, *hv* *N*-bromosuccinimide
(Y) 1) *m*-chloroperoxybenzoic acid (*m*CPBA) 2) $H_3O^{\oplus}$	**(Z)** HBr, ROOR (peroxides)	**(AA)** (*t*-BuOK) **OR** DBU **OR** DBN	**(BB)** 1 mol Cl_2 (in CH_2Cl_2 solvent)
(CC) 1) BH_3, THF 2) $HO^{\ominus}$, H_2O_2, H_2O	**(DD)** Na^+Br^- in DMSO	**(EE)** 1) disiamylborane **OR** 9-BBN 2) $HO^{\ominus}$, H_2O_2, H_2O	**(FF)** Cl_2 (in CH_2Cl_2 solvent)
(GG) ($NaOCH_3$) **OR** (NaOEt)	**(HH)** Br_2, excess CH_3OH	**(II)** H_2O	**(JJ)** H_2, Lindlar catalyst
(KK) 2 mol Cl_2 (in CH_2Cl_2 solvent)			

6) <u>Synthesis:</u> Complete the following synthetic schemes using the table above (**25 points**).
Fill in the **small boxes (1 point each; 7 points total)** with a letter corresponding to a reagent (Table above)
Fill in the **larger rectangles (2 points each; 18 points total)** with organic reactant

NEXT PAGE

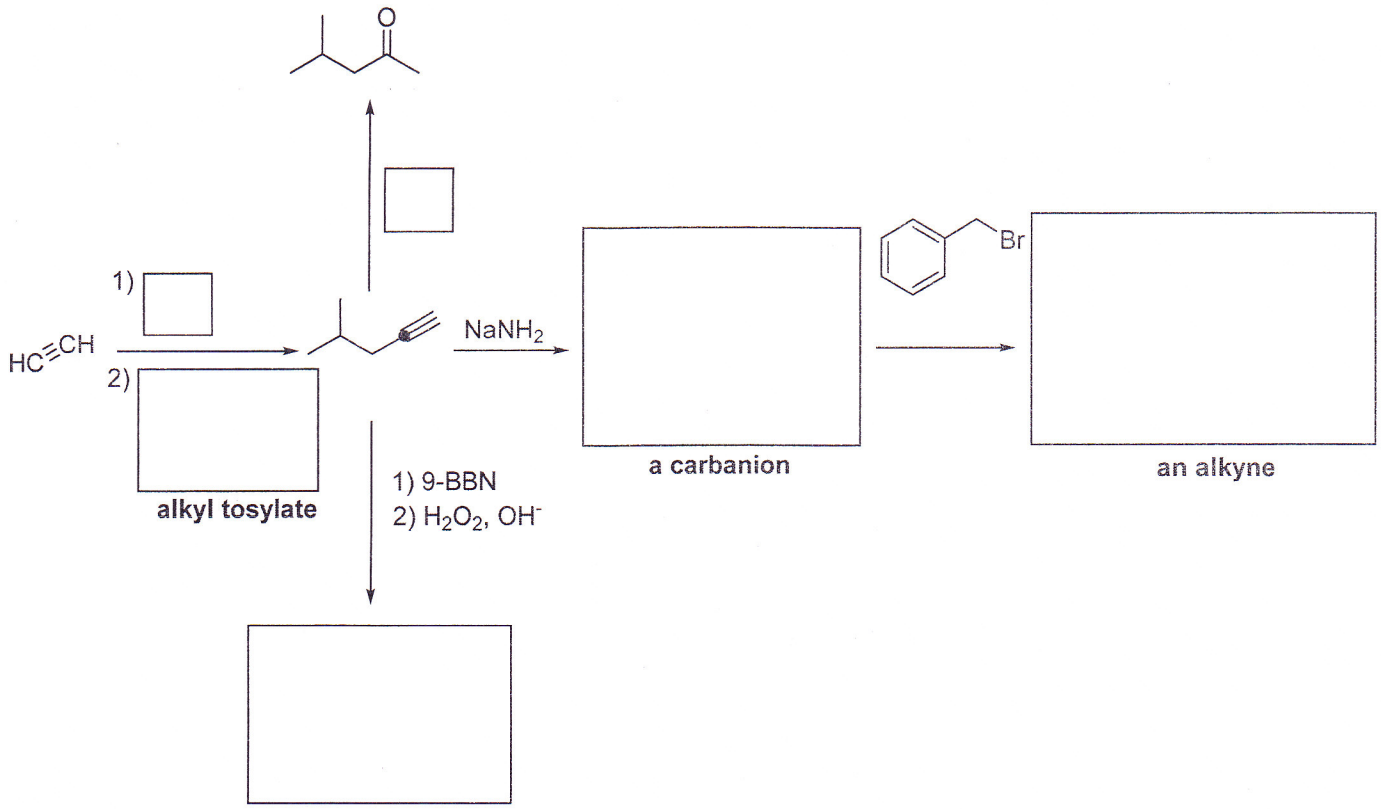
a)



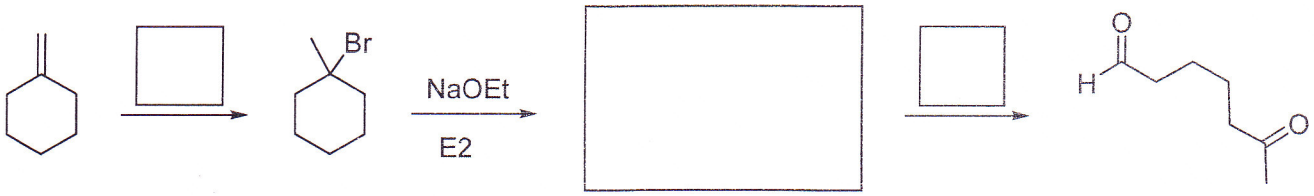
An alkene

NAME_____

b)



c)



Major Product

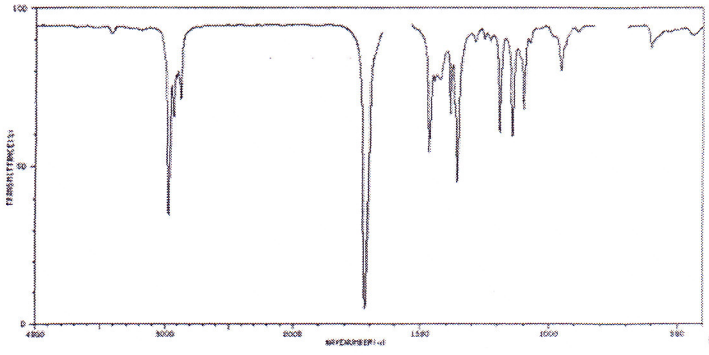
d)

C9 cis alkene

NAME_____

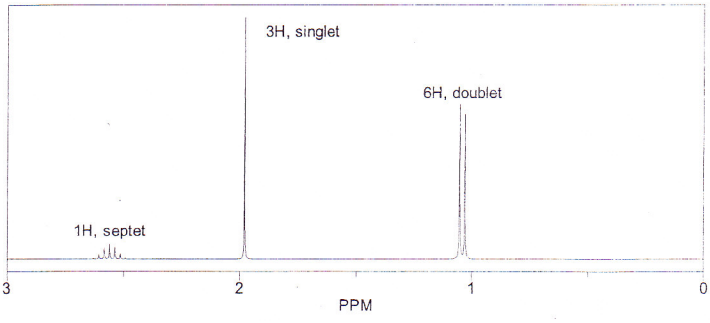
$C_5H_{10}O$ (Dous?)_____ (1 pt)

IR



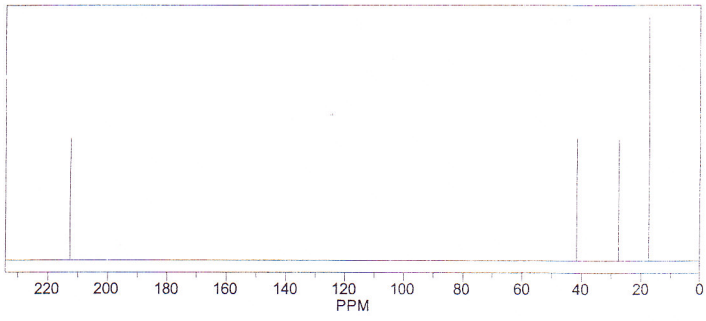
(2 pts)

1H NMR



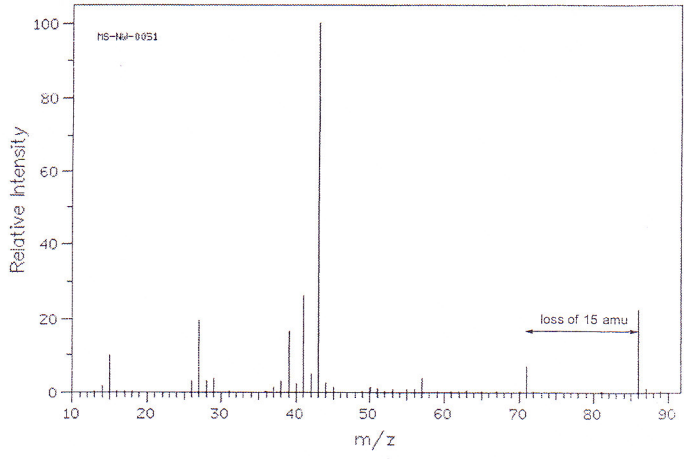
(2 pts)

13C NMR



(2 pts)

Mass Spect. Draw structure of fragment lost from M corresponding to 15 mass units_____ (2 pts)



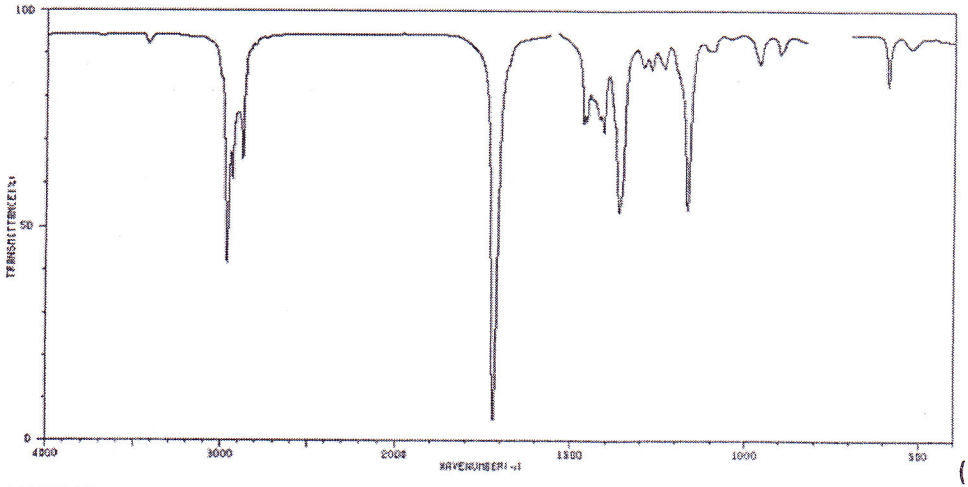
Structure Here

(3 pts)

NAME_____

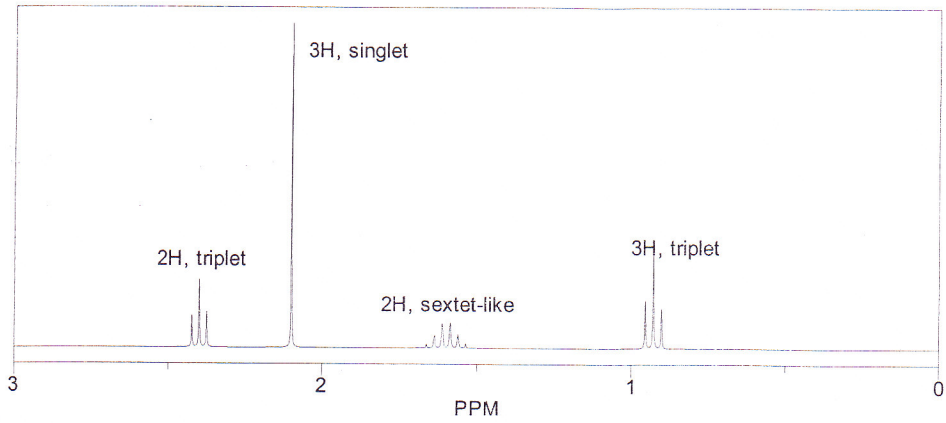
$C_5H_{10}O$ (Dous?)_____ (1 pt)

IR



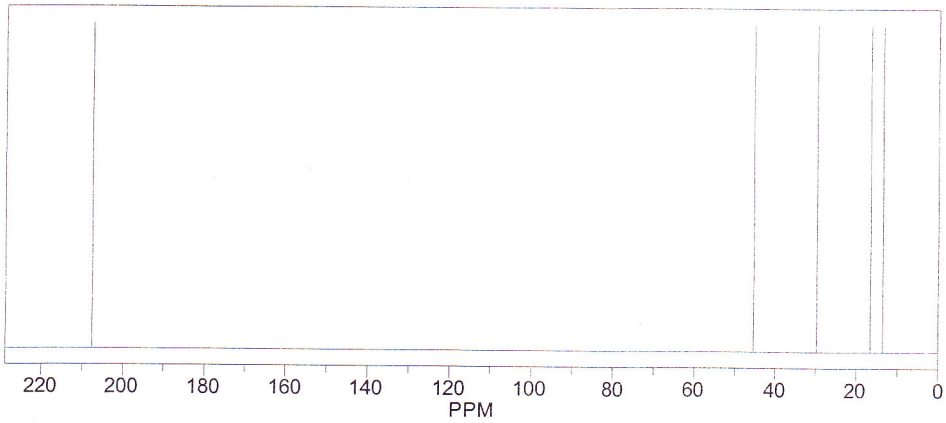
(2 pts)

1H NMR



(2 pts)

13C NMR



(2 pts)

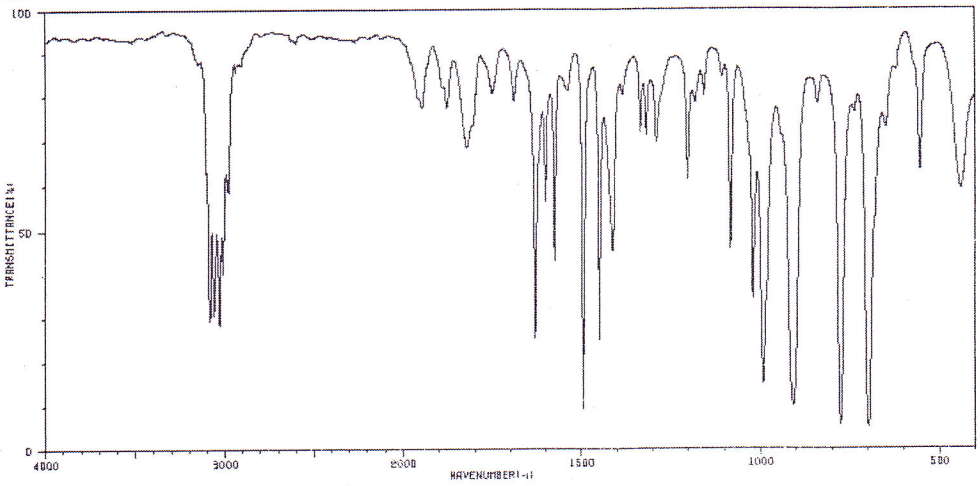
Structure Here

(3 pts)

NAME_____

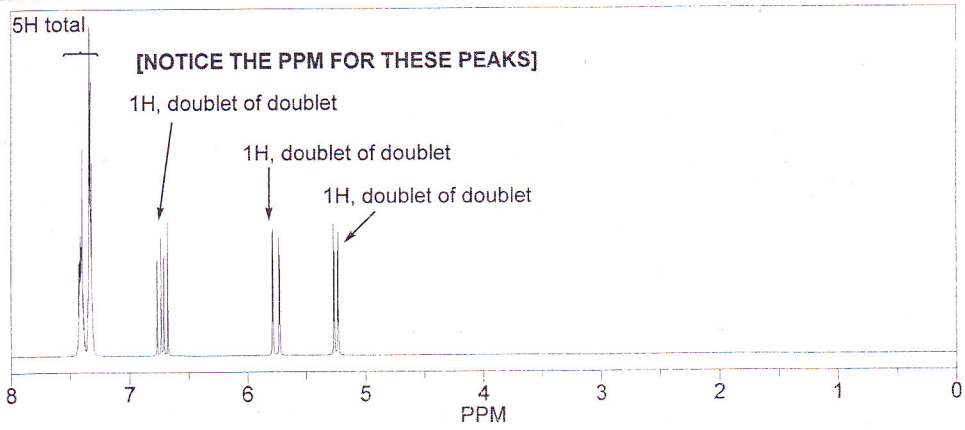
C_8H_8_____ Dous **(1 pt)**

IR



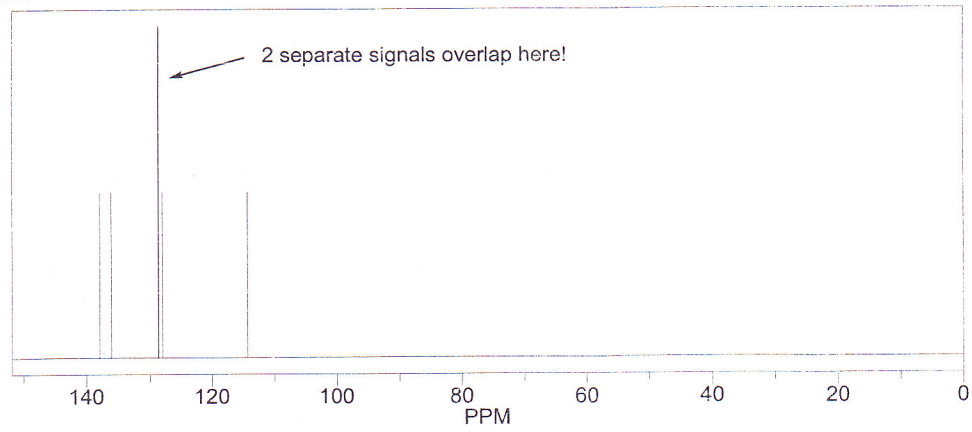
(2 pts)

1H NMR



(2 pts)

13C NMR



(2 pts)

Structure Here

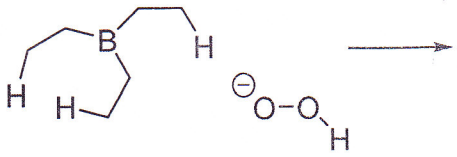
(3 pts)

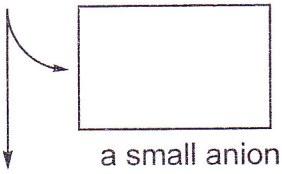
NAME_____

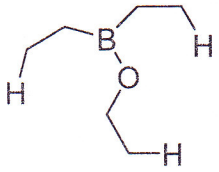
BONUS (MUST BE EXACTLY CORRECT FOR CREDIT!)
5 POINTS

Draw anion intermediate below line

Draw curved mechanism arrow
to show how the deborylation reaction begins



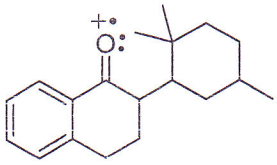




DRAW CURVED MECHANISM ARROW ON ANION INTERMEDIATE TO SHOW FORMATION OF PRODUCTS ABOVE

BONUS (SHOW THE MECHANISM AND PRODUCTS OF THE MCLAFFERTY REARRANGEMENT BELOW) 5 POINTS

MECHANISM HERE



CHARGED FRAGMENT

NEUTRAL FRAGMENT

NAME_____