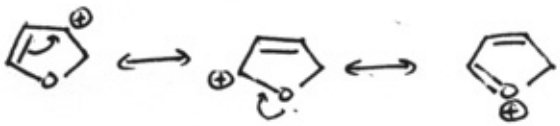
Homework #1:

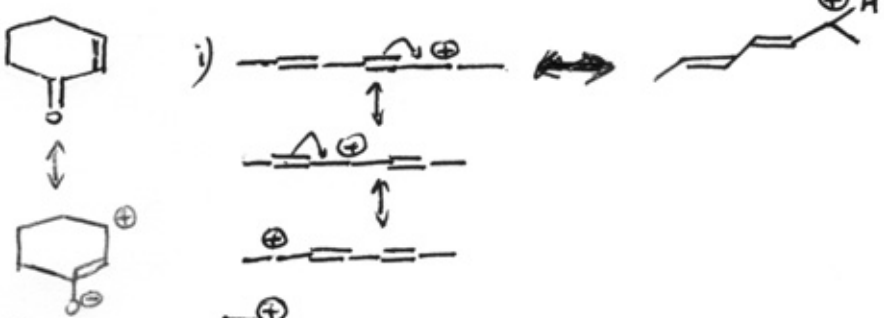
a) $CH_3CH_2-OH + {}^{\ominus}OH \xrightarrow{CH_3-Li} CH_3CH_2-O^{\oplus}Li + CH_4$

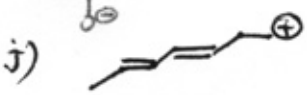
Conjugate acid ⇒ weak acid.

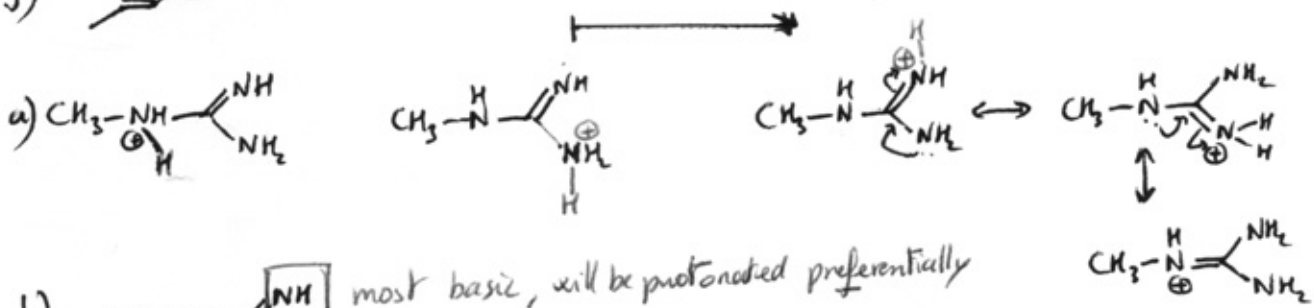
b) CH_4, Strong Base: conjugate base of the weakest acid (pK_a is >40) is a strong base

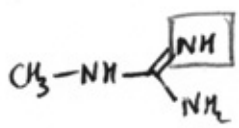
⇒ Draw resonance form.

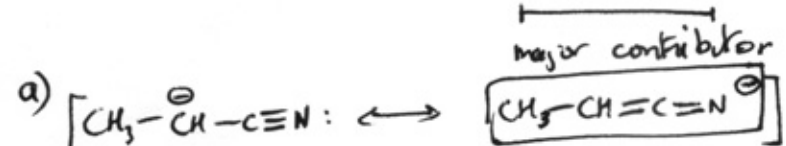


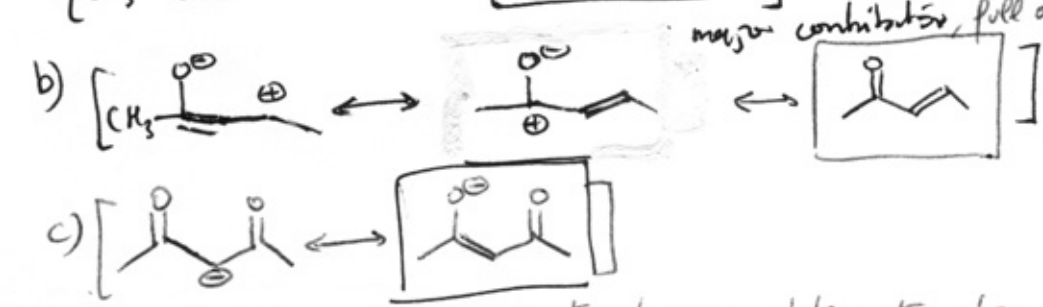




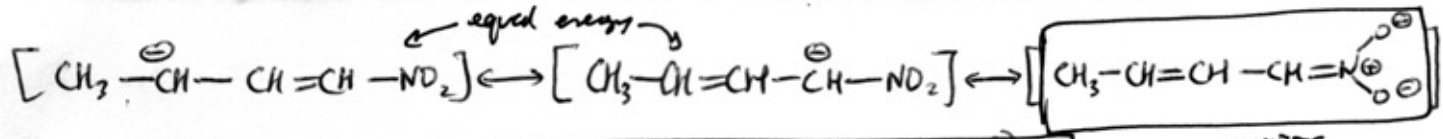


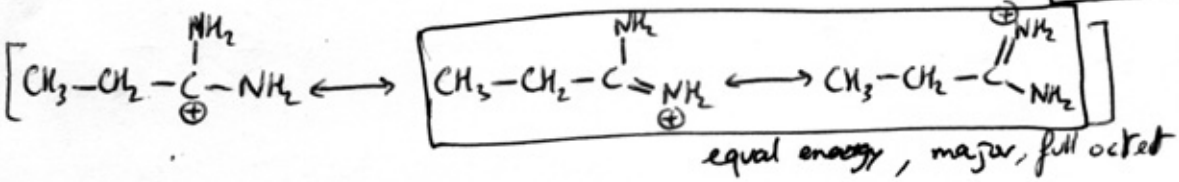
b)  most basic, will be protonated preferentially

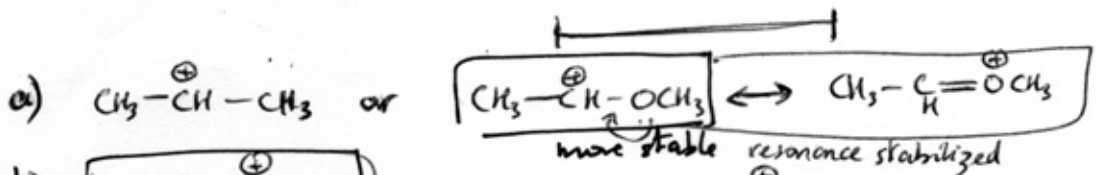


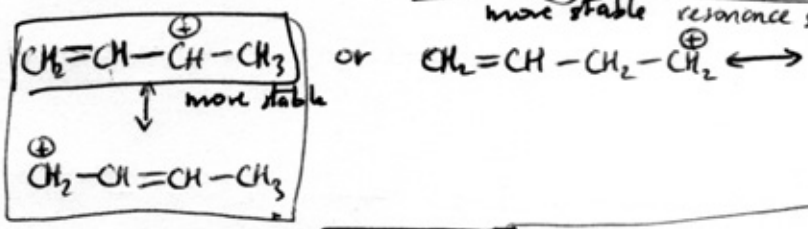


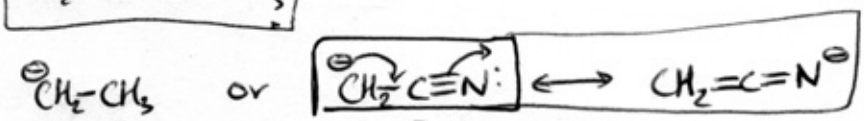
negative charge on electronegative atom

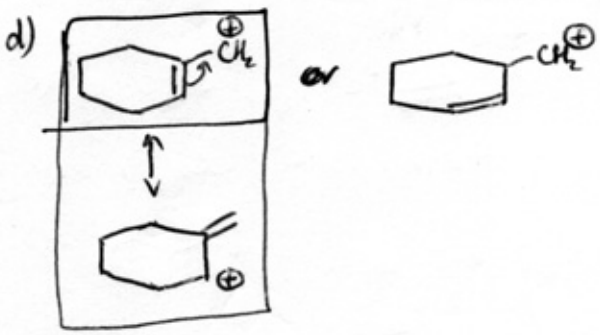
d) 
equal energy
equal energy
major
negative charge on electronegative atoms
2

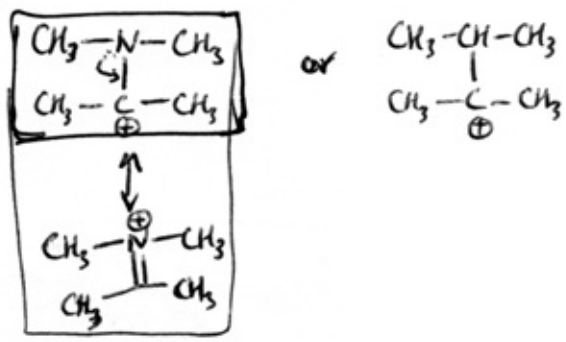
e) 
equal energy, major, full octet

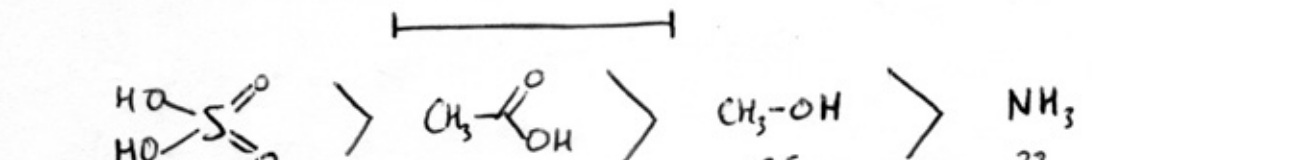
a) 
or
more stable
resonance stabilized

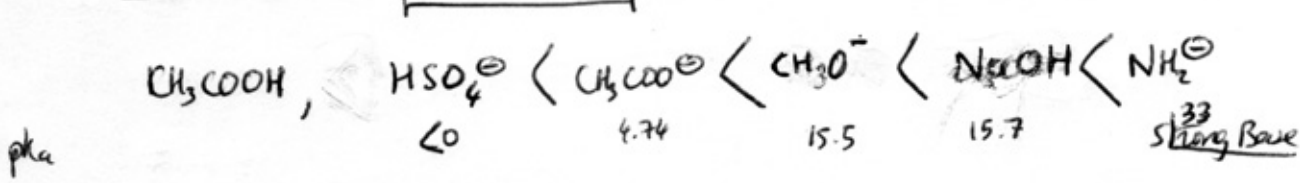
b) 
or
more stable

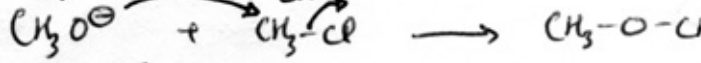
c) 
or

d) 
or

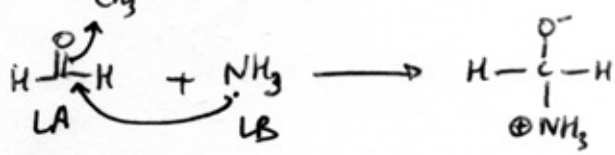
e) 
or


pKa
strong Acid
<0
4.74
15.5
33
least acidic


pka
<0
4.74
15.5
15.7
33
strong Base

a) 
LB
LA

b) 
LA
LB

c) 
LA
LB

d) $CH_3NH_2 + CH_3-CH_2-Cl \longrightarrow CH_3-\overset{\oplus}{N}H_2-CH_2CH_3 + Cl^-$
LB LA

e) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + H_2SO_4 \longrightarrow CH_3-\overset{\oplus O-H}{\overset{\|}{C}}-CH_3 + HSO_4^{\ominus}$
LB LA

f) $(CH_3)_3CCl + AlCl_3 \longrightarrow (CH_3)_3C^{\oplus} + {}^{\ominus}AlCl_4$
LB LA

g) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + {}^{\ominus}OH \longrightarrow CH_3-\overset{O^-}{\overset{|}{C}}=CH_2 + H-O-H$
LA LB

h) $CH_2=CH_2 + BF_3 \longrightarrow {}^{\ominus}BF_3-CH_2-\overset{\oplus}{C}H_2$
LB LA

i) ${}^{\ominus}BF_3-CH_2-\overset{\oplus}{C}H_2 + CH_2=CH_2 \longrightarrow {}^{\ominus}BF_3-CH_2-CH_2-CH_2-\overset{\oplus}{C}H_2$
LA LB

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a) $H_2SO_4 + CH_3COO^{\ominus} \rightleftharpoons HSO_4^{\ominus} + CH_3COOH$

b) $CH_3COOH + (CH_3)_3N \rightleftharpoons CH_3COO^{\ominus} + (CH_3)_3\overset{\oplus}{N}H$

c) 

d) $(CH_3)_3\overset{+}{N}H + {}^{\ominus}OH \rightleftharpoons (CH_3)_3N + H_2O$

e) $HO-\overset{O}{\overset{\|}{C}}-OH + 2\,{}^{-}OH \rightleftharpoons {}^{-}O-\overset{O}{\overset{\|}{C}}-O^{\ominus} + 2\,H_2O$

f) $H_2O + NH_3 \rightleftharpoons {}^{\ominus}OH + H\overset{\oplus}{N}H_3$

g) $HCOOH + CH_3O^{\ominus} \rightleftharpoons HCOO^{\ominus} + CH_3OH$

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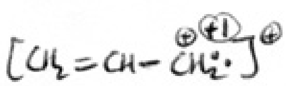
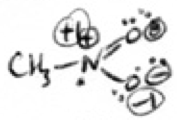
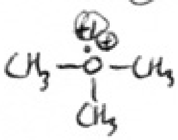
a) 

b) 

c) 

d) 

e) 

a) C—Cl large.

b) C—H Small

c) C—Li Large.

d) C—N small

e) C=O large.

f) C—B small.

g) C—Mg large.

h) N—H large.

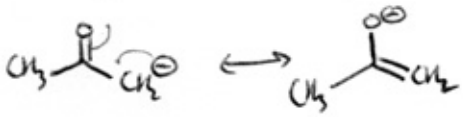
i) O—H large.

j) C—Br small

a) Different: a, e, h

b) resonance: b, c, d, f, g, i, j

a)



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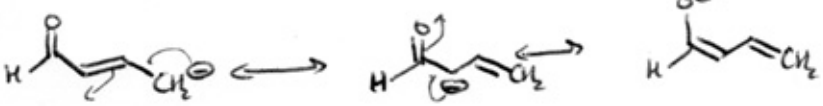

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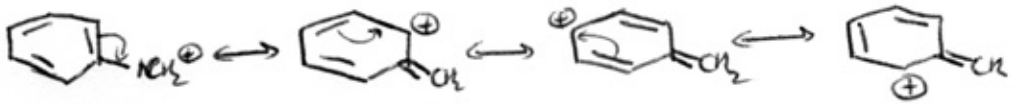
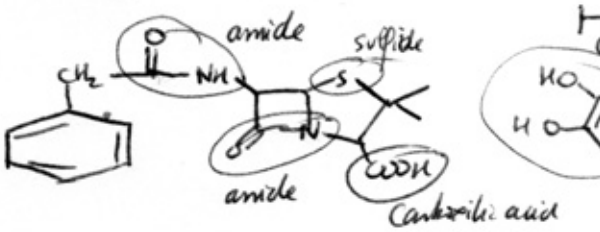
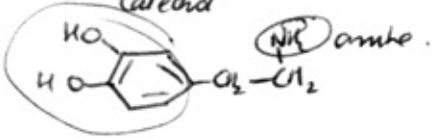
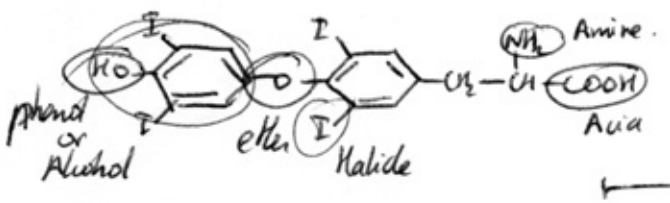
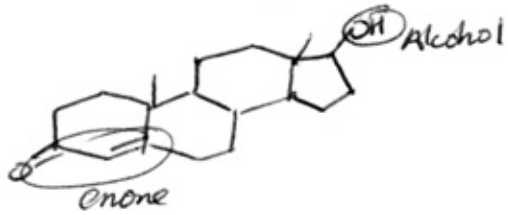


d)

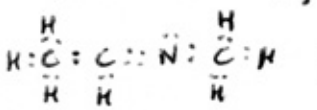


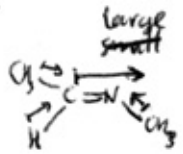




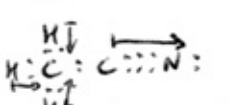


a) $CH_3-CH=N-CH_3$



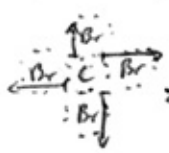


b) $CH_3-C\equiv N$

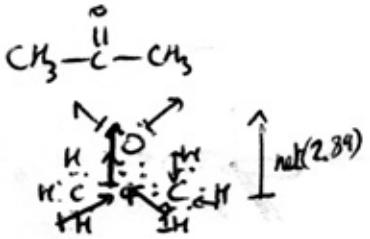


large dipole.

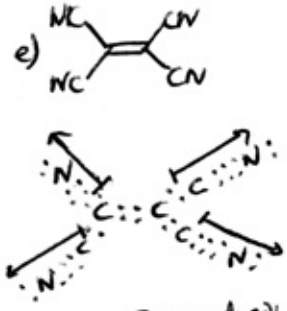
c) CBr_4



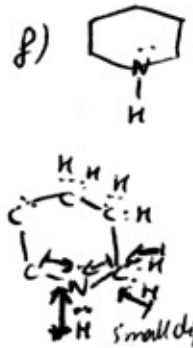
zero dipole.

d) 

large dipole

e) 

zero dipole.

f) 

small dipole.

g) 

large dipole

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form Hydrogen Bonds / Hydrogen Bonds with water.

HB HBW

a) HBW, HB b) HBW c) HB, HBW d) HBW e) — f) —

g) HBW h) HBW, HB i) HBW j) HBW k) HBW l) HB, HBW

---

a) $CH_3CH(OH)CH_3$ bp ↑ Hydrogen bonding, molecule polarity.

b) $CH_3CH_2CH_2CH_2CH_3$ bp ↑ higher molecule size.

c) $CH_3CH_2CH_2-CH_2-CH_3$ bp ↑, less branching

d) $CH_3CH_2CH_2CH_2CH_2Cl$. bp ↑, molecule size, dipole dipole interaction.

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a) ether, Propane

b) carboxylic acid or unsaturated acid, alkene

c) Aldehyde, or unsaturated Aldehyde, alkene

d) Ketone, or acetophenone., aromatic

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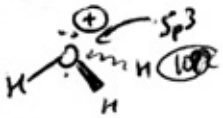
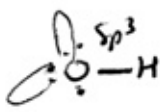
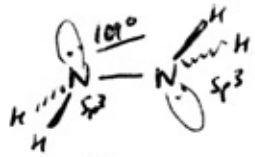
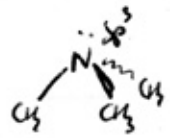
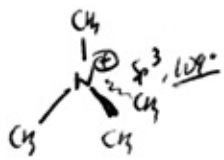
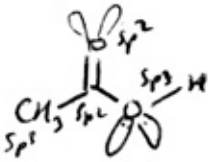
a) 

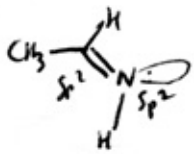
b) 

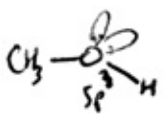
c) 

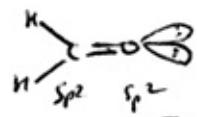
d) 

e) 

f) 

g) 

h) 

i) 

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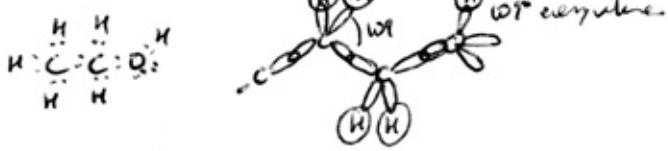
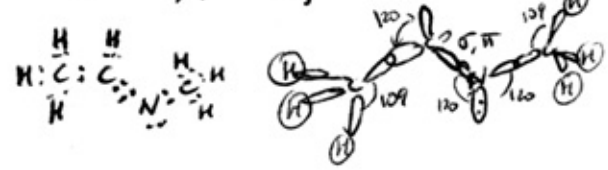
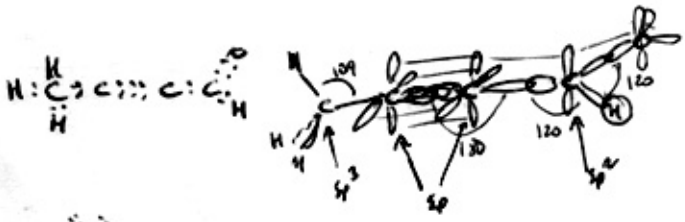
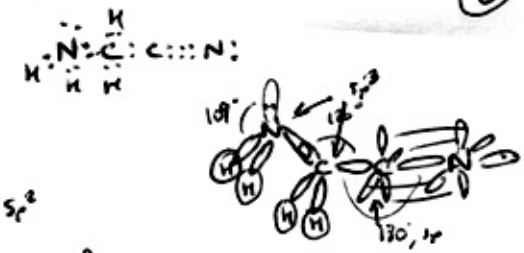
a) 

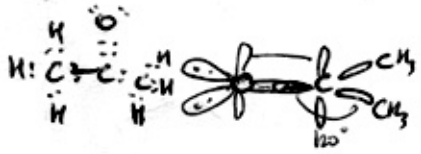
b) 

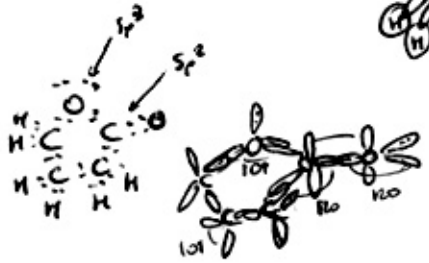
c) 

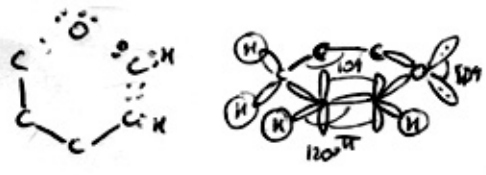
d) 

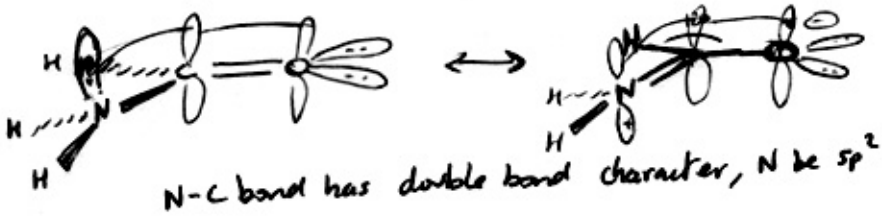
e) 

f) 

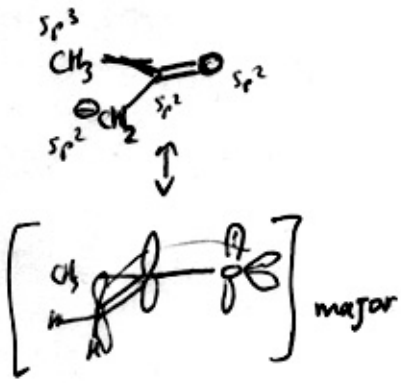
g) 

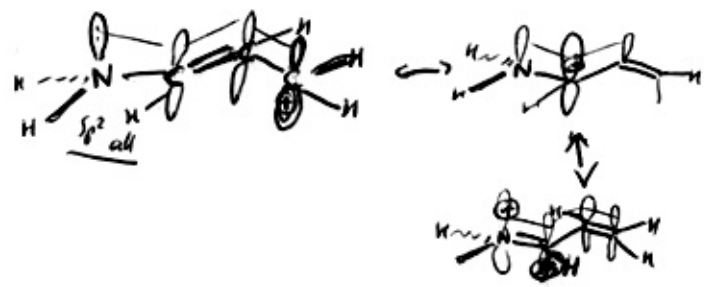
h) 

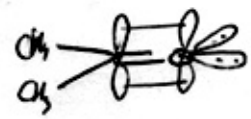
i) 



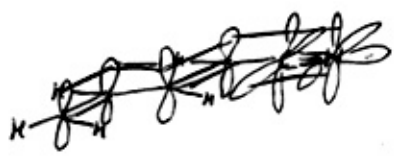
N-C bond has double bond character, N be sp^2 hybridized.

a) 

b) 

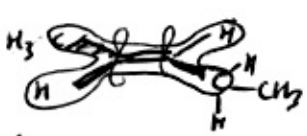
a) 

b) 

c) 

d) 

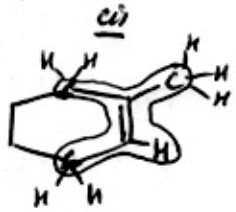
a) 



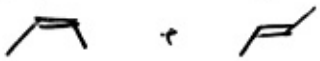
still 6 coplanar atoms

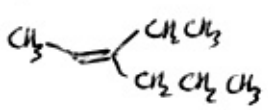
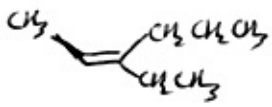
trans

cis

d) 

a), c), d) No ~~isomeric~~ geometric isomer

b) 

e)  + 

a) constitutional isomer.

b) ~~same compound~~ constitutional isomer.

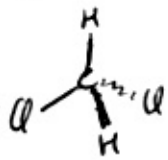
c) cis - trans isomer, geometrical isomer.

d) ~~Not isomer~~, constitutional isomer

e) cis-trans isome, geometrical isomer

f) Some compounds.

Definitions: read and check



No stereoisomer of CH_2Cl_2.