CHEM 341 Section 75 Test #1

Dr. Burns 9/22/15 120 points possible

Page #	Points
2	20 pts
3	14 pts
4	17 pts
5	12 pts
6	11 pts
7	20 pts
8	15 pts
9	11 pts
Total pts	120 pts

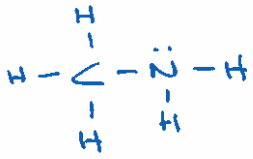
KEY
9/22/15 JR

Signature:

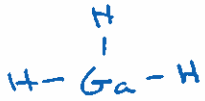
Printed Name:

1) Give all the possible Lewis Structures for the following compounds. (20 pts)

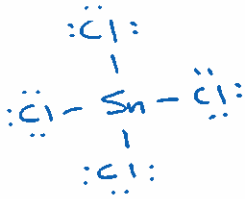
CH_5N



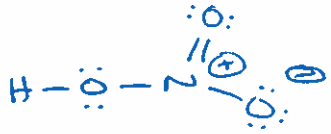
GaH_3



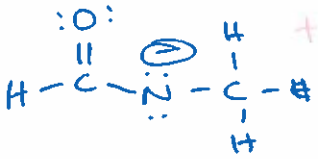
$SnCl_4$



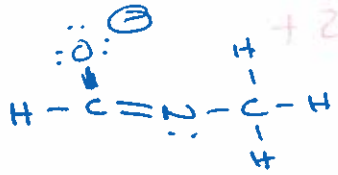
HNO_3



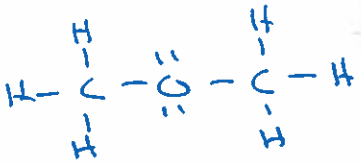
$HCONCH_3^-$



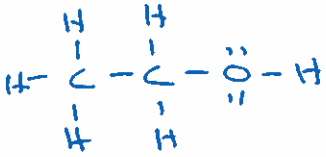
and



C_2H_6O

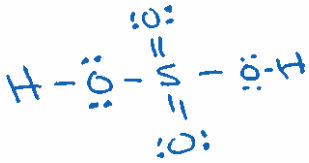


and

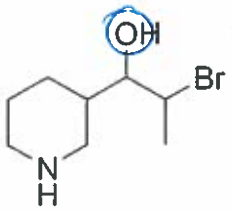


H_2O

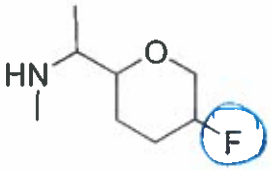
H_2SO_4



2) Circle the most electronegative atom in the compound below? (4 pts)



+2

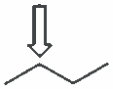


+2

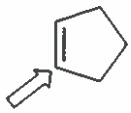
3) Labeled the hybridization for the indicated atoms in the compounds below. (10 pts)

CH_2=P-H

sp^2 +2



sp^3 +2



sp^2 +2

CH_3CH_2CN

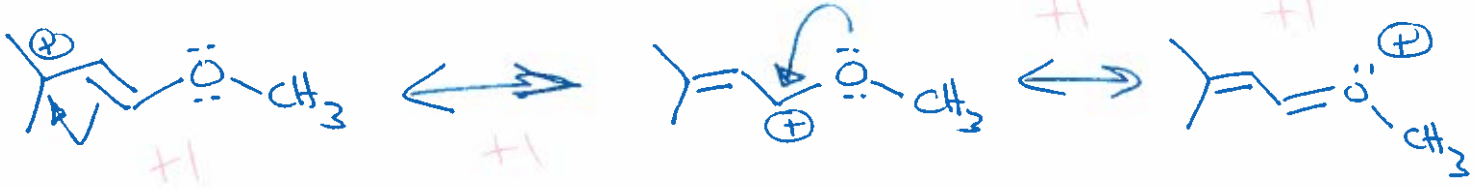
sp +2

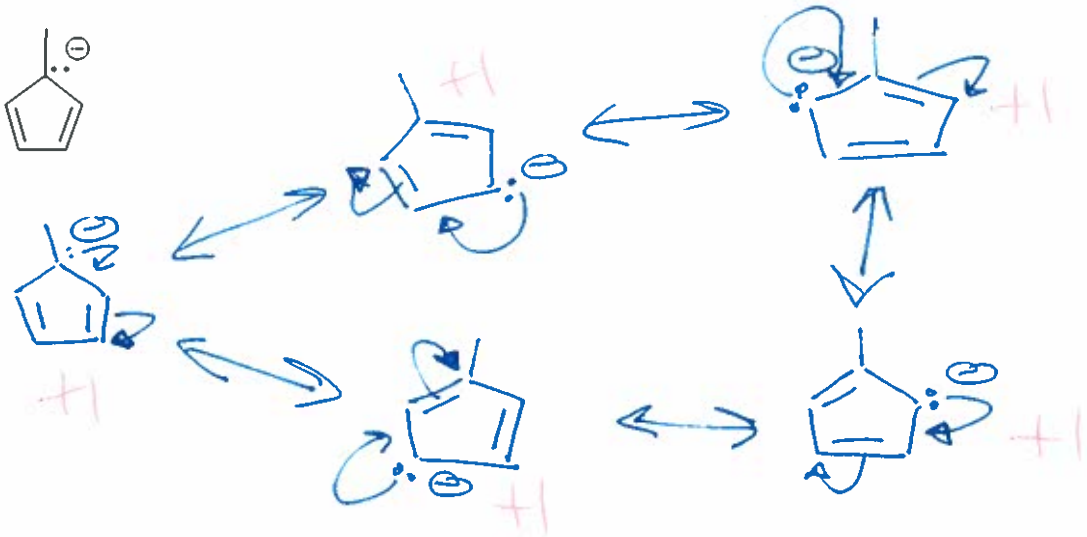
$CH_3CH_2CCCH_2CH_2CN$

sp +2

4) Draw the skeletal formula for the charged compounds below and show all reasonable resonance forms. (10 pts)

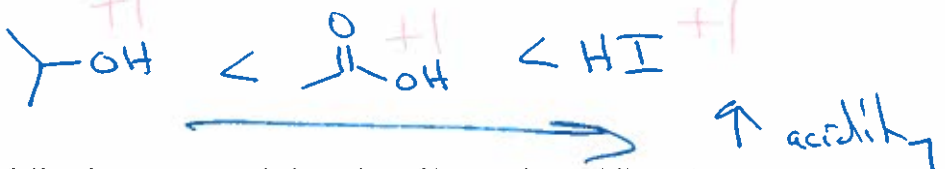
$(H_3C)_2\overset{\oplus}{C}CHCHOCH_3$



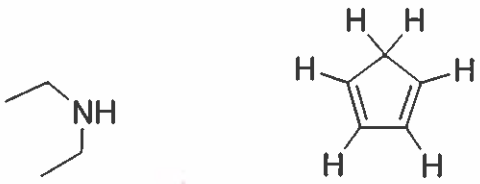


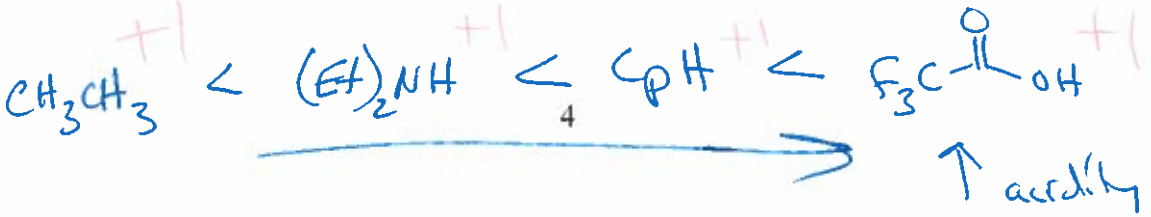
5) Rank the following compounds in the order of increasing acidity. (3 pts)

CH_3COOH HI $(CH_3)_2CHOH$



6) Rank the following compounds in order of increasing acidity. (4 pts)

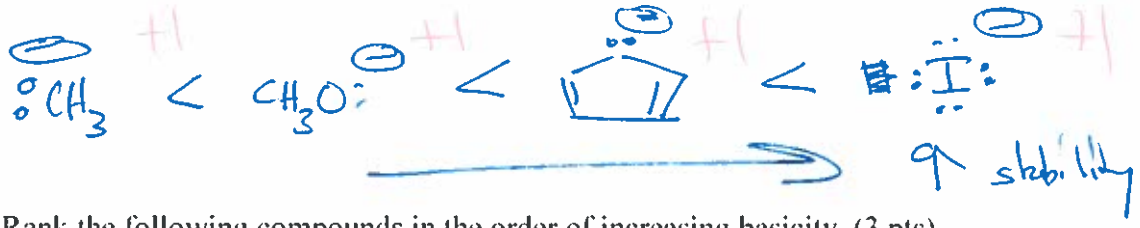




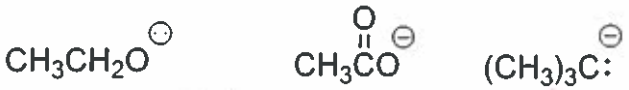
7) Consider the following acid-base reaction. Which way does the equilibrium lie? (2 pts)

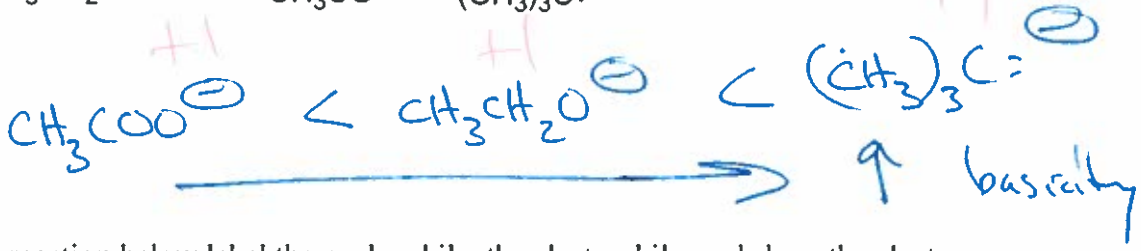
equilibrium lies to Right (Product side) +2

8) Rank the anions in order of increasing stability. (4 pts)

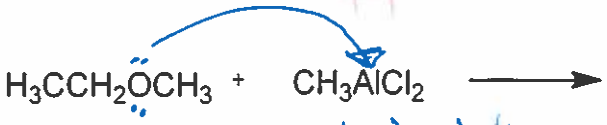


9) Rank the following compounds in the order of increasing basicity. (3 pts)



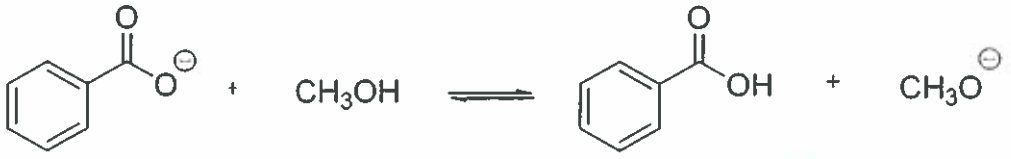


10) In the reaction below label the nucleophile, the electrophile, and show the electron movement (include electrons where necessary). (3 pts)



nucleophile electrophile +1 +1 +1

11) Which way does the equilibrium for the reaction below lie? (2 pts)



+2

to the left (Reactant)

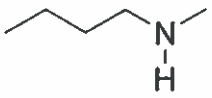
12) Which of the following compounds has the lowest boiling point? (3 pts)

$CH_3CH_2CH_2CH_2OH$ $CH_3CH_2OCH_2CH_3$ $CH_3OCH(CH_3)_2$

$CH_3CH_2CH_2CH_2CH_3$ $CH_3CH_2CH(CH_3)_2$

+3

13) Consider the molecule below. The nitrogen atom can best act as a(n) ? (2 pts)



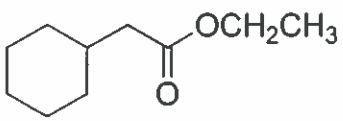
A. electrophile
B. nucleophile
C. base
D. electrophile and base
E. nucleophile and base

+2

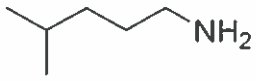
14) Circle the compounds below that should have dipole-dipole interactions. (4 pts)

+1 +1 +1 +1

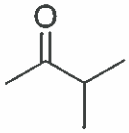
15) Match the major functional groups in each compound with the appropriate name. (20 pts)



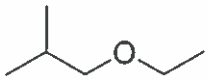
Carb. Ester +1



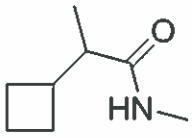
Amine +1



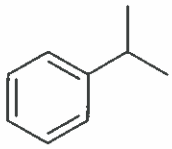
Ketone +1



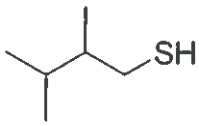
Ether +1



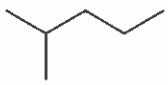
Amide +1



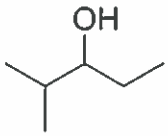
Phenyl Ring +1



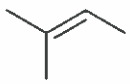
Thiol +1



Alkane +1



Alcohol +1



Alkene +1

A) Alkane

B) Ether

C) Alcohol

D) Thiol

E) Phenyl Ring

F) Amine

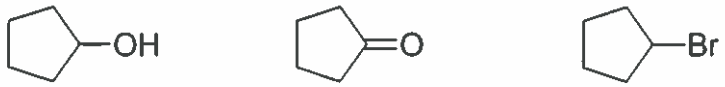
G) Alkene

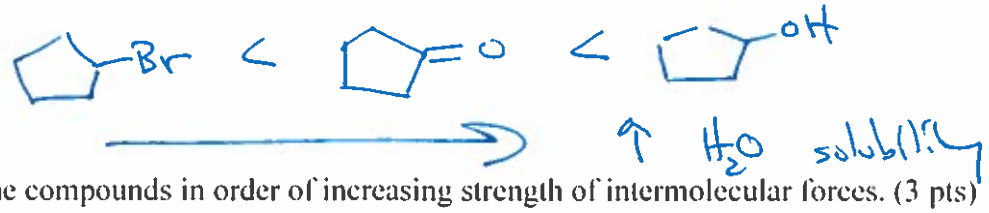
H) Carboxylic Ester

J) Ketone

I) Amide

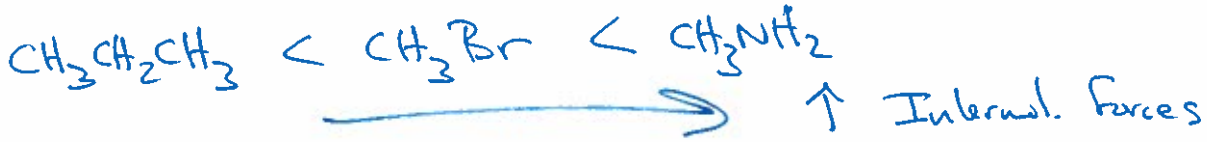
16) Rank the compounds in order of increasing water solubility. (3 pts)



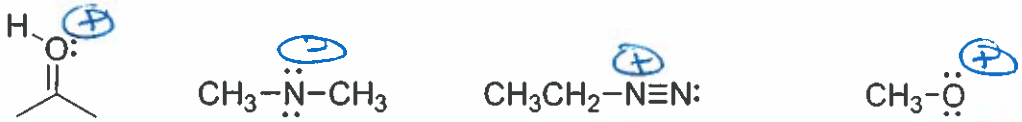


17) Rank the compounds in order of increasing strength of intermolecular forces. (3 pts)

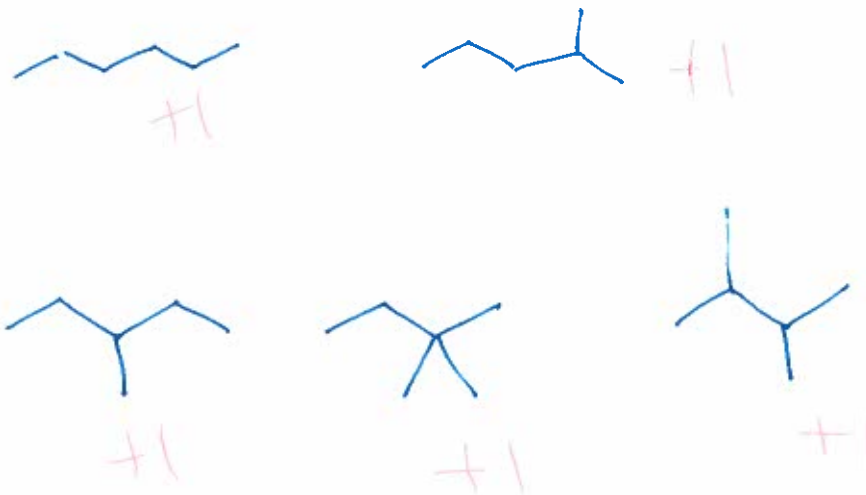
CH_3NH_2 $CH_3CH_2CH_3$ CH_3Br



18) Assign formal charges to each N and O atom in the given molecules. All lone pairs have been drawn in. (4 pts)



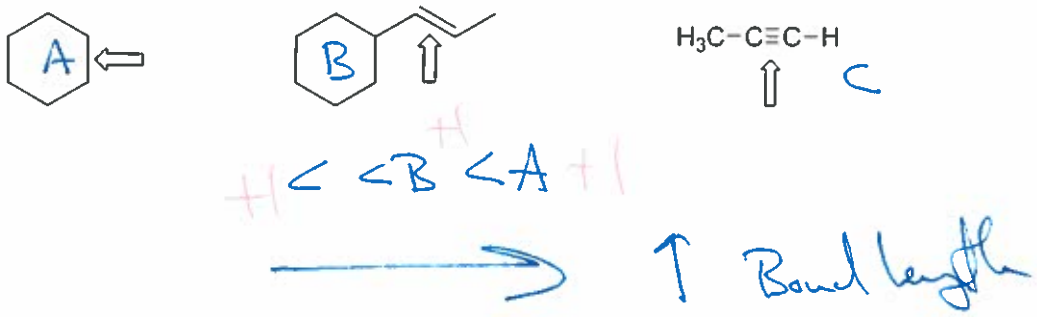
19) Draw the constitutional isomers having molecular formula C_6H_{14} (hexane). (5 pts)



20) What is the phrase Dr. Burns believes can be used to describe all chemical reactions? (3 pts)

Electrons go from where they are to where they ain't

21) Rank the following bonds in order of increasing bond length. (3pts)



22) Use the symbols δ^+ and δ^- to indicate the polarity of the labeled bonds. (5 pts)