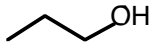
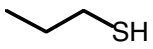
April 15,2002
Exam 2
Organic Chemistry
NESA – Fall 2001

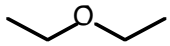
Name_____

This exam is closed book, closed notes, and no collaboration is permitted. The last page of this exam has some information you might find useful. All questions are worth two points unless specified in parentheses.

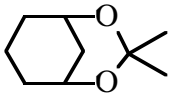
1. List the following compounds in order of increasing solubility (2):

a 

b 

c 

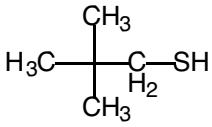
2. The synthesis of the acetal:

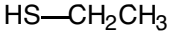


requires a reaction between which of the following pairs of molecules?

a. Cyclohexanone and 2-propanol
b. 1,2-cyclohexadiol and acetone
c. 1,3-cyclohexadiol and 2-propanone
d. Cyclopentanone and cyclohexanol

3. Draw the potential product(s) if the following compounds were placed in oxidizing conditions. Assume that more than one molecule of each compound is present. (3)





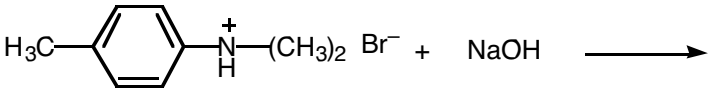
4. Arrange the following in order of increasing boiling point. (3 pts)

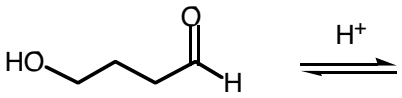
a $CH_3CH_2CH_2CH_2NH_2$ **b** $H_3CH_2C—O—CH_2CH_3$ **c** $CH_3CH_2CH_2CH_2OH$ **d** $H_3C—O—CH_2CH_3$

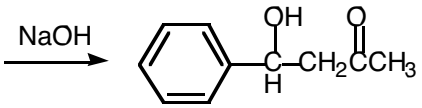
5. Complete the following equations: (2 pts each)

a. $(CH_3)_3N + H_2O$

b. $(CH_3)_3\overset{+}{N}H + HO^- \longrightarrow$

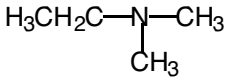
c. 

d. 

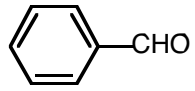
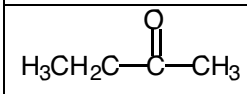
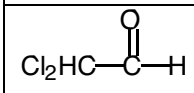
e. 

6. Circle the compound in each of the following pairs has the higher boiling point. (2 pts. each)

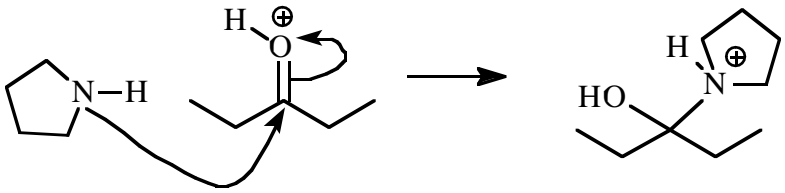
a $CH_3CH_2CH_2CH_2NH_2$ **b** $CH_3CH_2CH_2NH_2$ **c** $CH_3CH_2CH_2CH_2NH_2$

$CH_3CH_2CH_2CH_2CH_2$ $CH_3CH_2CH_2CH_2NH_2$ 

7. Consider the following compounds. What would the major product be if each were reacted with Tollen's reagent? With $NaBH_4$? Assume that other necessary compounds and conditions are present for each reaction. (3 pts)

Compound	Tollen's	$NaBH_4$
		
		
		

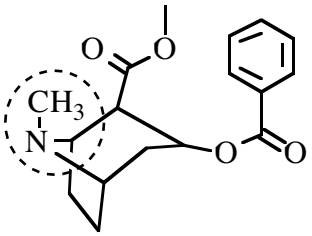
8. Consider the following step of a mechanism:



Which of the following explanations describes the processes that are depicted:

a. Nitrogen is performing a substitution reaction with a ketone.
b. Nitrogen is acting like a nucleophile, and adding to the ketone.
c. Nitrogen is performing an electrophilic substitution.
d. Nitrogen is causing an elimination reaction on the ketone.

9. The circled amine is the basic part of cocaine that leads to the expression "free base".

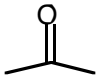


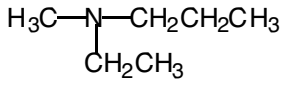
It is an example of a _____ amine.

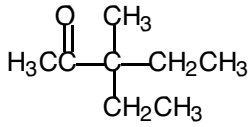
a. 1˚ b. 2˚ c. 3˚ d. 4˚

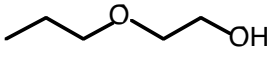
10. You have a bottle of butanal and are instructed to test the pH. Using litmus paper, you discover that the paper turns red when it contacts the liquid. This means that the liquid is acidic. How could this be possible if butanal is a neutral compound? If a neutral compound were placed in water you would not observe any ionization (no pH change). (3 pts.)

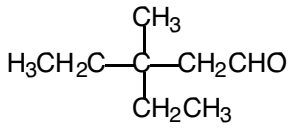
11. **Nomenclature**: For the following: when a structure is drawn write the IPUAC or common name for the compound. If a name is shown, draw the structure of the specified compound. (2 pts. each).

a. 

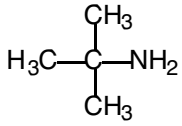
b. 

c. 

d. 

e. 

f. N,N-dipropylpentylamine

g. 

h. methyl *tert*-butyl ether

i. 3-chlorocyclohexanone

j.