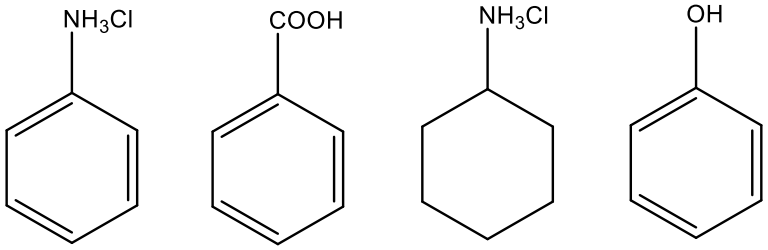
PILOT

Organic Chemistry I – Townsend

Problem-Set #2

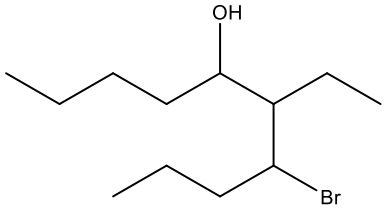
Fall 2017

1. Rank the following in the order of decreasing pKa:

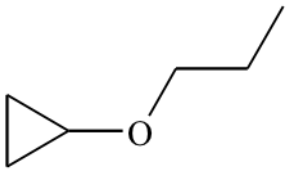


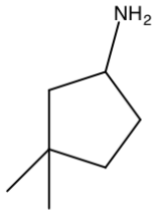
2. Name the following molecules:

A)



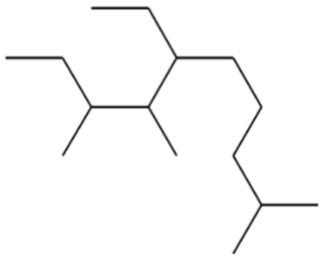
B)





C)

D)

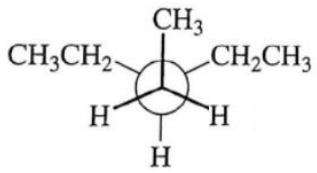


3. Draw the following compounds according to its name.

A) 5-chloro-3-ethyl-2,7-dimethylnonane

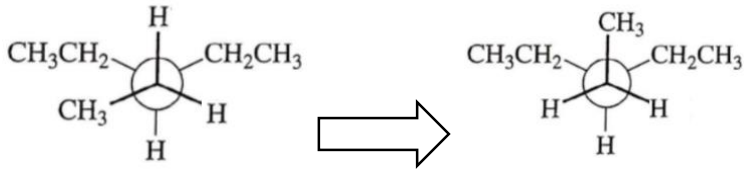
B) 1-methoxy-5-methl-3-propylhexane

4. A) Draw the energy diagram for this molecule:



Interaction	Energy cost (KJ/mol)
methyl-methyl *gauche*	3.8
methyl-ethyl *gauche*	4.2
methyl-H *eclipse*	6.0
ethyl-H *eclipse*	6.4
methyl-methyl *eclipse*	11.0
methyl-ethyl *eclipse*	12.0
H-H eclipse	4.0

B) Using the conformational energy values provided above, find the barrier to rotation between these two conformers in kJ/mol:



5. A) Draw the two chair conformations of cis-2-methylcyclobromide and its corresponding Newman projection.

B) What is the difference between an axial bond and an equatorial bond?

C) Which of these chair conformers is more stable? Why?

6. How would the potential energy profile of butane differ from that of 2-methyl propane?

7. The heat of formation of a molecule is the amount of energy needed to construct the molecule from its constituent elements. The heat of formation for cyclopropane is 17.7 kcal/mol, what would the relative value be for cyclohexane?

8. How many isomers are there with the formula of C_5H_{10} assuming that there is a ring?

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Tip of the Week

Did you know that the chairs in Hodson 110 (the large lecture hall) have outlets hidden in the side-arms? Great to know if you need to recharge your laptop, phone, or tablet!!