**CHEMISTRY 3331**: Fundamentals of Organic Chemistry I
First Exam

Prof. Randolph P. Thummel
Prof. Ognjen Š. Miljanić

Name: _____
(print legibly) Last First

February 20, 2009

Last 4 Digits of Student ID Number: _____

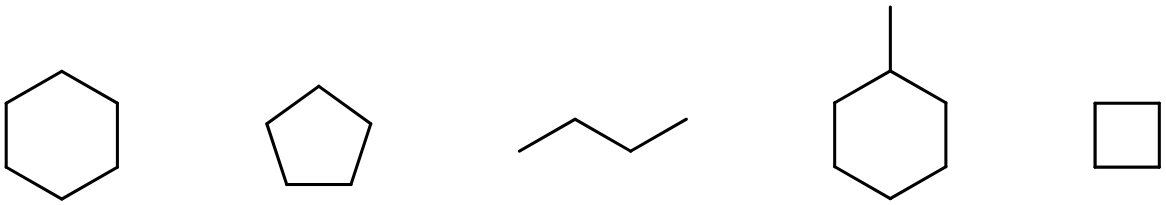
**Read all directions very carefully**. Write your answer legibly in the designated spaces and **think** about what you are doing. Give **only one** answer for each question. Total number of points is 100.

1. (8 points) This question has several parts. In each, **circle only one compound**.

Among the following five compounds, **circle the strongest acid**:

HF $H_2O$ $NH_3$ HI $CH_4$

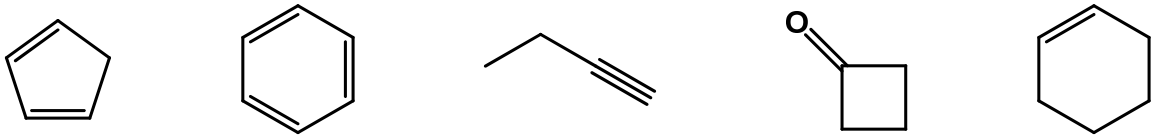
Among the following five compounds, **circle the most strained compound**:



Among the following five compounds, **circle the most polar compound**:

$CH_4$ $CH_3F$ $CO_2$ $CCl_4$ $CH_3Br$

Among the following five compounds, **circle the only alkyne**:

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FINAL SCORE



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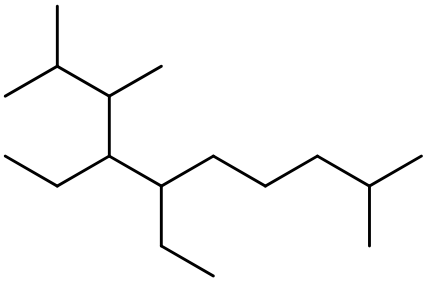
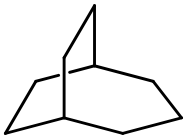
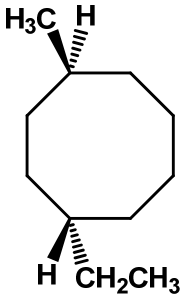
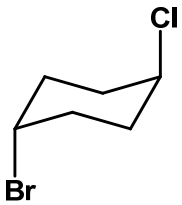
2. (16 points) For each of the following structures, give a **complete systematic IUPAC name**. Be sure to indicate stereochemistry where this is pertinent.



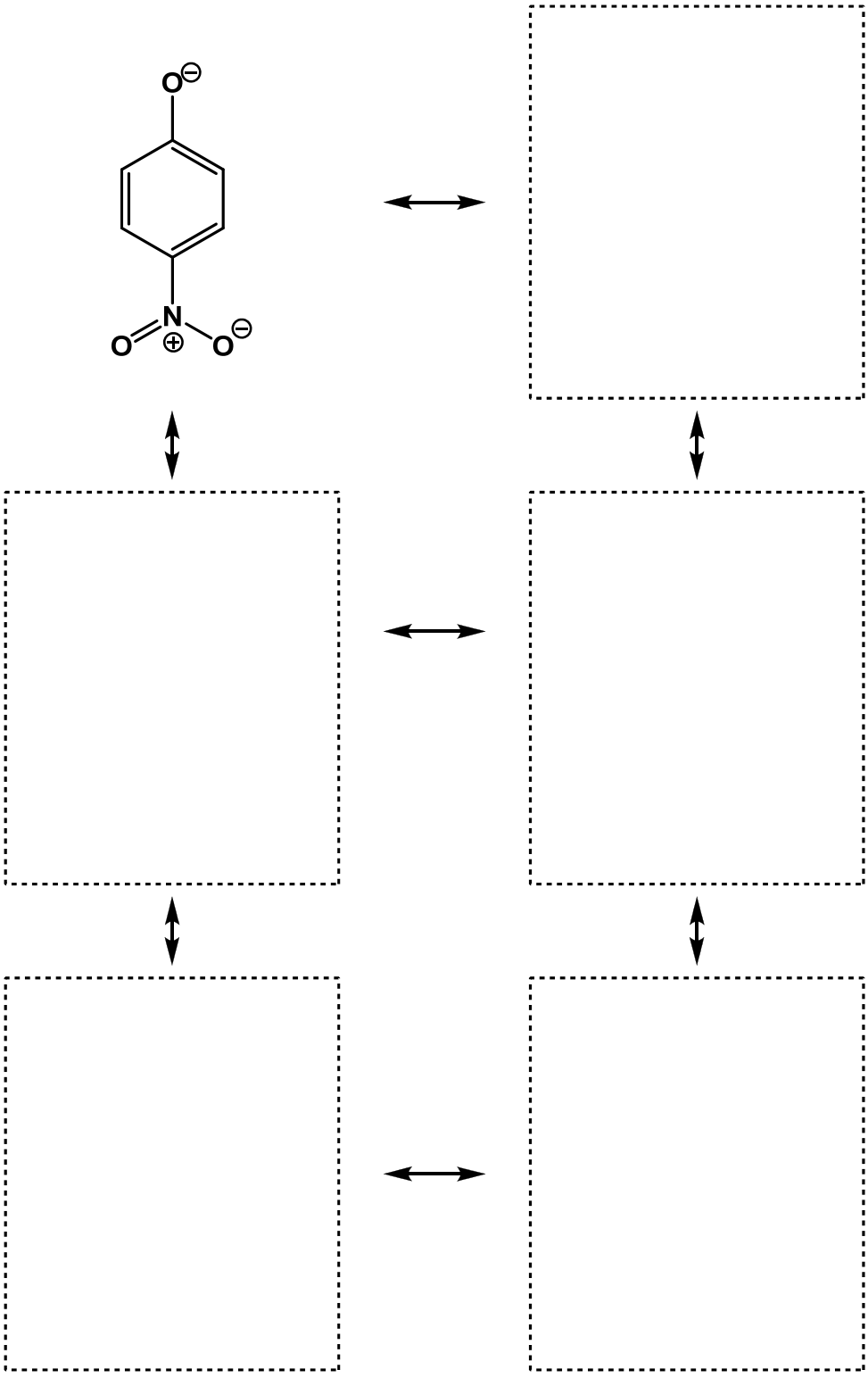




3. (12 points) Carefully draw both chair conformations of *all cis*-1,5-diethyl-2,4-dimethylcyclohexane. Circle the more stable conformation.

4. (17 points) Compound shown below is called *p*-nitrophenoxide. It has six resonance structures. We have drawn the first one, and you should complete the remaining five resonance structures. Among the five structures that you have drawn, circle the most stable one.



5. (14 points) Consider 1,2-dibromopentane. Looking along the C2–C3 bond, **carefully** draw the Newman projection of all three staggered conformations. Draw a circle around the least stable form.

6. (18 points) Consider the reaction of propane with fluorine ($F_2$) in the presence of light to afford 1-fluoropropane. Using the table at the back of this exam, calculate the $\Delta H^0$ for this reaction (show your work).

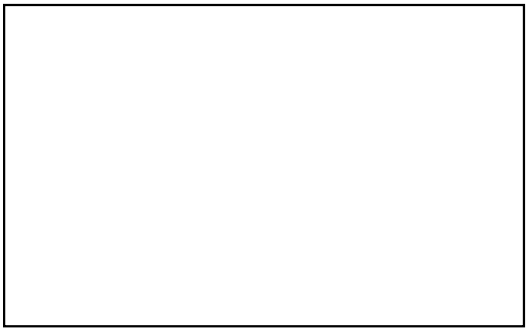
On the reaction coordinate below, diagram the second propagation step for this reaction. Indicate the positions of starting materials, products and transition state.

Is this step exothermic or endothermic (circle one)?

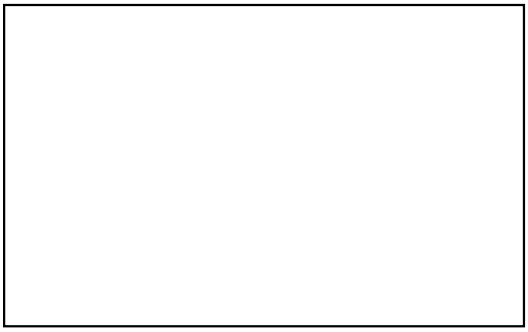

Draw the structure of a possible termination product for this reaction.

7. (15 pts) In a given box, draw the structure of:

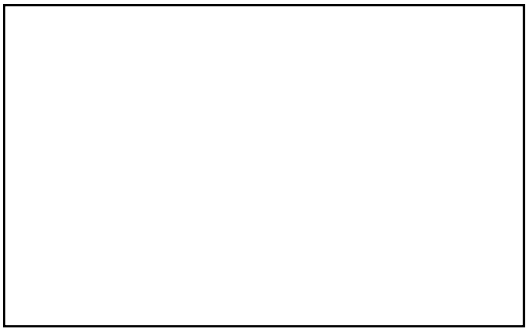
A 3° free radical:



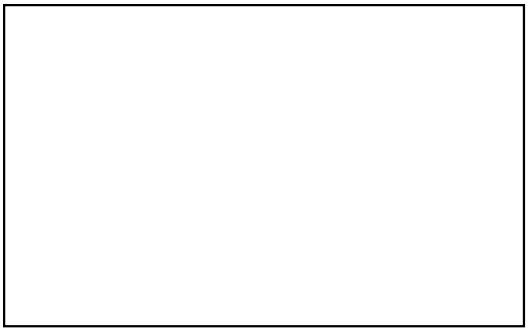
A Lewis acid containing only one atom:



A structural isomer of ethanol:



A neutral molecule with the formula $C_3NH$:



A molecule which can hydrogen bond to water but not to itself: