Name _____ Slayter Box _____

Examination II Retake Thursday, November 1, 2012

Intermediate Organic Chemistry (CHEM 251-03)

Dr. Fantini

OPTIONAL RETAKE EXAM 2

Please do not open until instructed

You have two hours to complete this examination.

Intermediate Organic Chemistry (CHEM 251-03)
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Examination II

OPTIONAL RETAKE EXAM 2

Notes:

• This exam consists of **9 questions**. Please check to make sure that you have a complete copy of the exam.

• ***Please do not simply give me answers. Give me well-supported answers. Answers that are not backed by explanations will receive minimal credit.***

• Please write clearly; if I can't read your answer, I can't give you credit for your answer.
• Please note that different questions are worth different numbers of points. Plan your time accordingly.
• Remember to include units and significant figures where appropriate.
• No books or notes are to be used on this exam.
• Please do NOT share calculators; if you need a calculator but do not have one, please let me know!

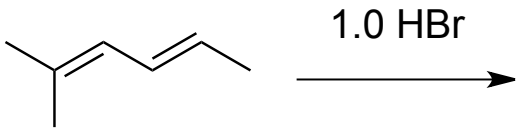
• *If you feel that you would be better able to answer **any** question if you had additional information, please do not hesitate to ask for it*. I will happily provide any information that I feel will help you answer the question without compromising the efficacy and fairness of the test.

Question	Possible	Score
1	6	
2	8	
3	16	
4	8	
5	16	
6	16	
7	10	
8	8	
9	12	
TOTAL	100	
	Approx. Letter:	

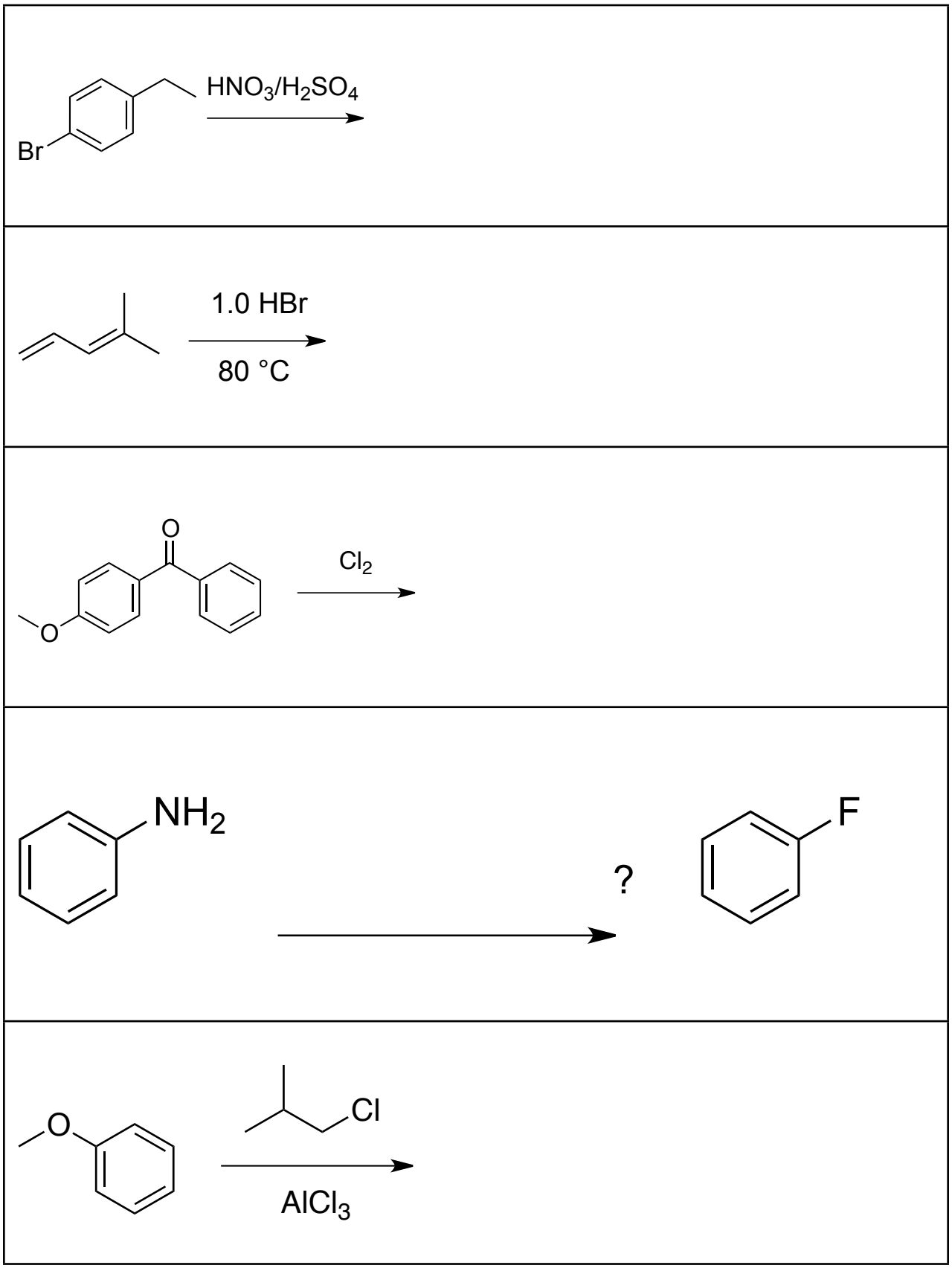
[6]1. Nomenclature. Please give name for structure or structure for name.

4-chloro-2-propylaniline	2-methylcyclohepta-1,4-diene

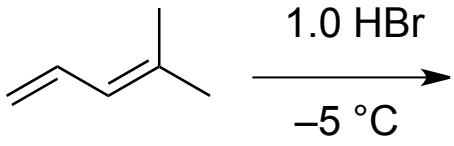
[8]2. Please predict the kinetic and thermodynamic products formed when (*E*)-2-methylhexa-2,4-diene (shown below) reacts with HBr. Justify your choices.

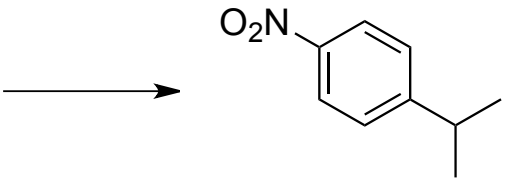


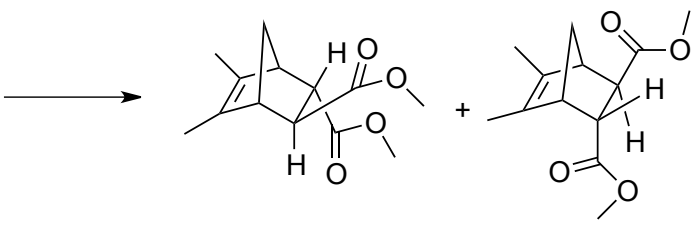
163. Fill in any of the missing starting material(s), reagent(s), and/or dominant product(s) for each single reaction. Please specifically denote all stereochemistry.



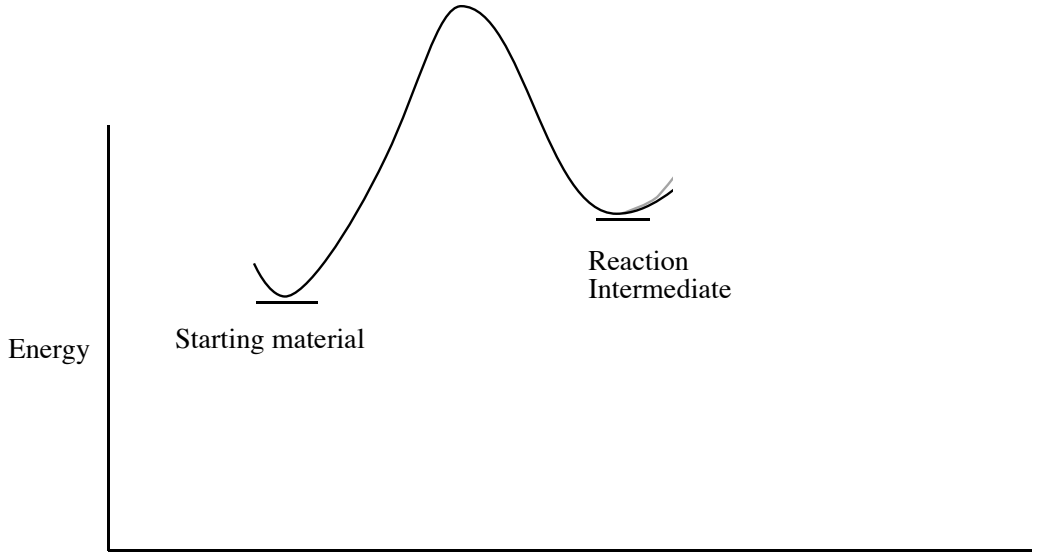
Question 3 continued.



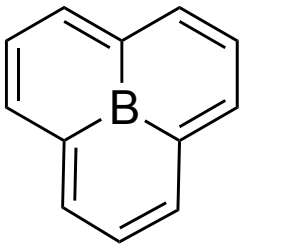


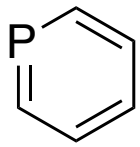


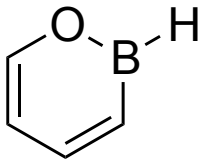
[8]4. ***PAY ATTENTION TO ALL DIRECTIONS!!!***
Below is a **partial** energy versus reaction coordinate diagram for a reaction. The reaction has two possible products, **X** and **Y**. ***Complete the diagram*** according to the following restrictions. **X** and **Y** are each more thermodynamically stable than the starting material. **X** is known to be the only product formed at low temperatures. At high temperatures, the only product formed is **Y**.

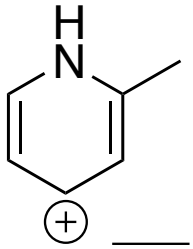


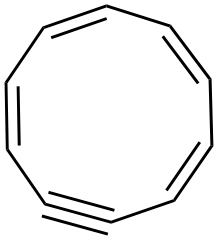
[16]5. Under each molecule, write the # of π electrons in each molecule. Circle each molecule that is **aromatic**, put a box around each molecule that is **not aromatic**, and put an X through each molecule that is **anti-aromatic**.

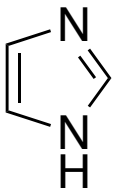


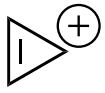




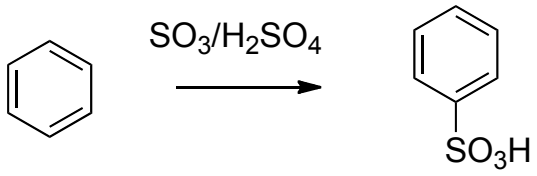


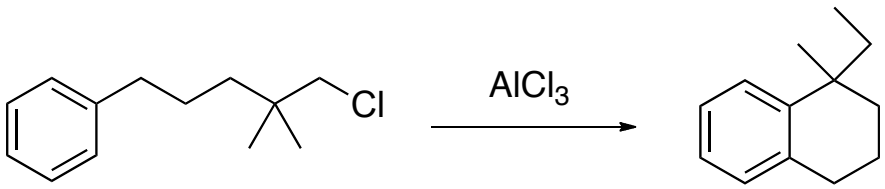




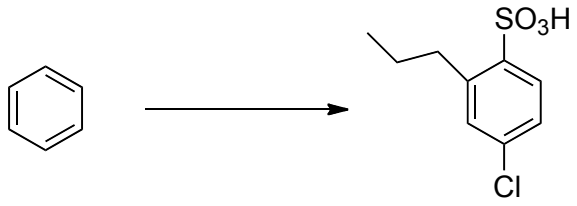


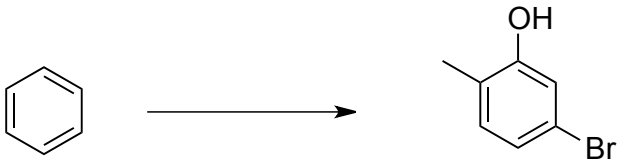
166. Please draw a stepwise electron pushing mechanism for the reactions shown below.





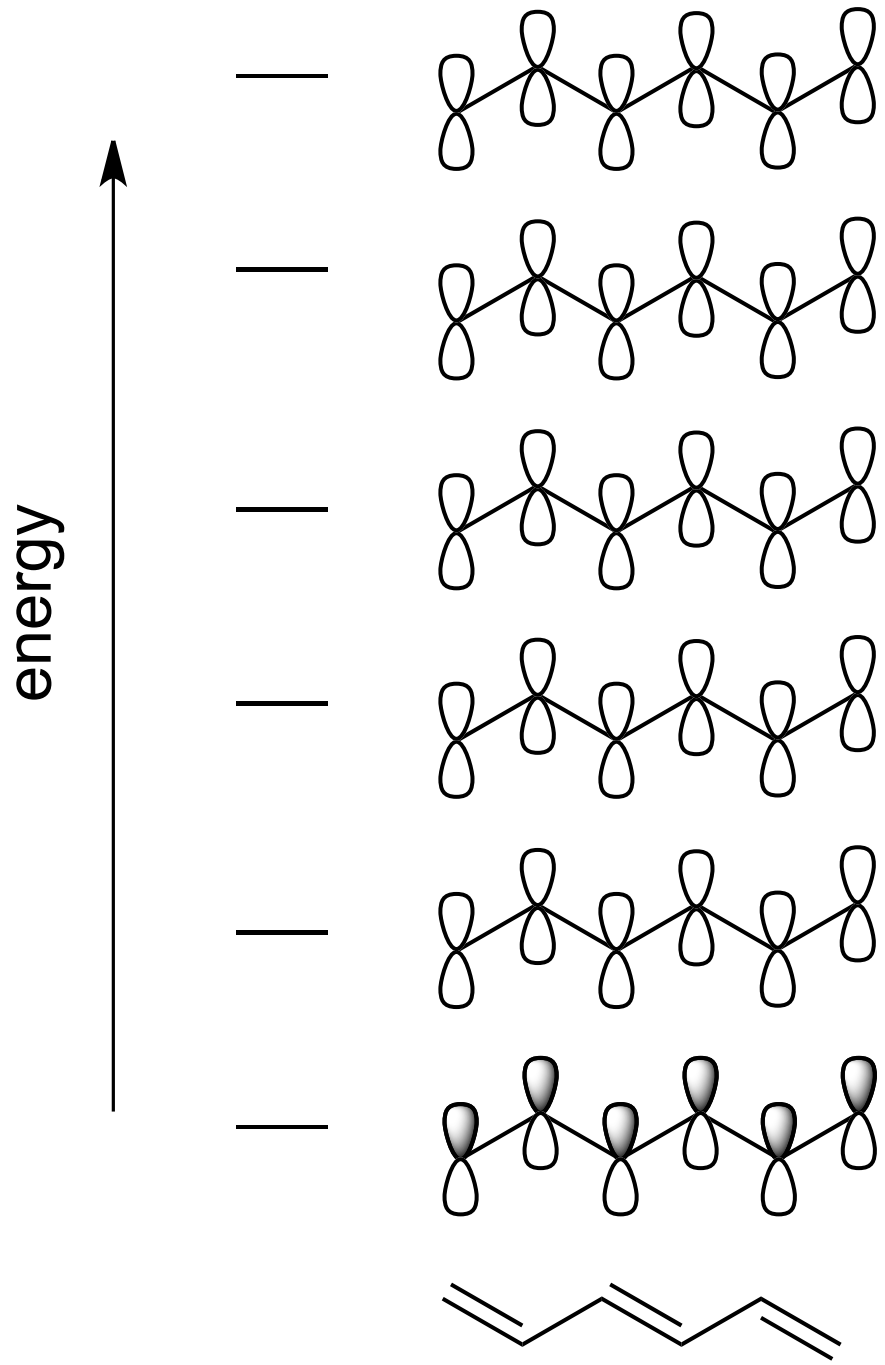
10. *Synthesis!* Please write a series of reactions that will produce the product from benzene. You may use any other reagent in your synthesis. You must draw every molecule along the way.



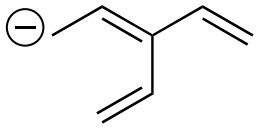


8. These are the π-molecular orbital diagrams for 1,3,5-hexatriene. ***The diagram for 1,3-butadiene is not complete***.

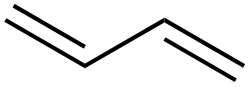
(a) Shade the lobes of the 1,3,5-hexatriene molecular orbitals correctly. The lowest energy orbital has been completed for you.
(b) Use dashed lines to show where nodes are present in the molecular orbitals.
(c) Fill in the electrons in each diagram for the **monocation of 1,3,5-hexatriene**.
(d) Identify the LUMO of ethene and the HOMO of the **monocation of 1,3,5-hexatriene**.



129. Please draw all of the resonance structures for the following molecule. Used curved arrows to show how you move elections to each new structure.



In 1,3-butadiene, the C–C single bond is shorter than a C–C single bond in butane. Explain, using either resonance theory or molecular orbital theory. Your answer will probably have both pictures and sentences.

	 (butane)	 (1,3-butadiene)
C2—C3 bond length (pm)	154	147