

Chem 30C, Spring 2005

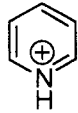

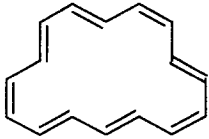
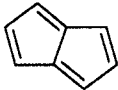
Midterm Exam (Ch 20 and 21)

Prof. Ohyun Kwon, UCLA

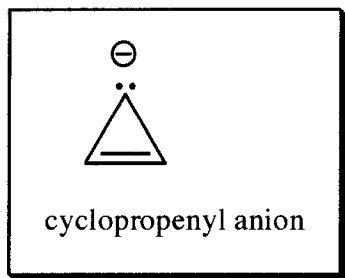
Your Name (Please Print)

Question	Your Points
1 (16 points)	
2 (14 points)	
3 (20 points)	
4 (20 points)	
5 (20 points)	
6 (20 points)	
7 (20 points)	
Total (130 points)	

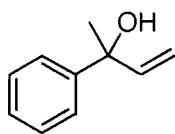
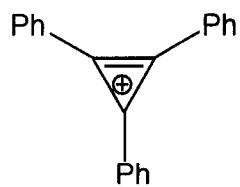
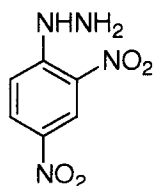
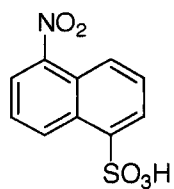
1. (16 points) Give the number of pi electrons and determine whether each of the following compounds is aromatic, anti-aromatic, or non-aromatic.

compound	π electrons	aromaticity
		
		
		
		

2. (10 points) Draw the relative energies for the molecular orbitals (MO energy diagrams) of the cyclopropenyl anion below. Indicate in which MO's the electrons are located and predict the stability of this species in a very short sentence.

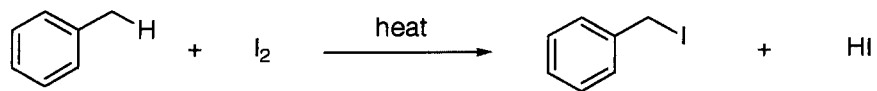


3. (16 points) Name the following molecules and an ion.



4. (16 points) Six thousand tons of Aspirin (acetylsalicylic acid) is consumed each year in America. Aspirin can be synthesized from benzene by employing simple chemical reagents. Provide reaction conditions for the synthesis of aspirin starting from benzene.

5. (20 points) Following is an equation for a hypothetical iodination of toluene.

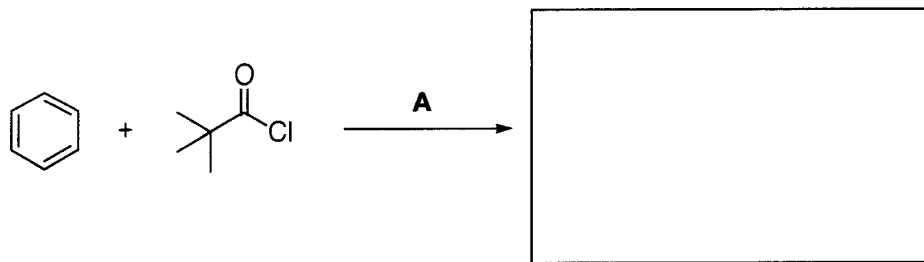


BDE (kJ/mol) 368 151 201 297

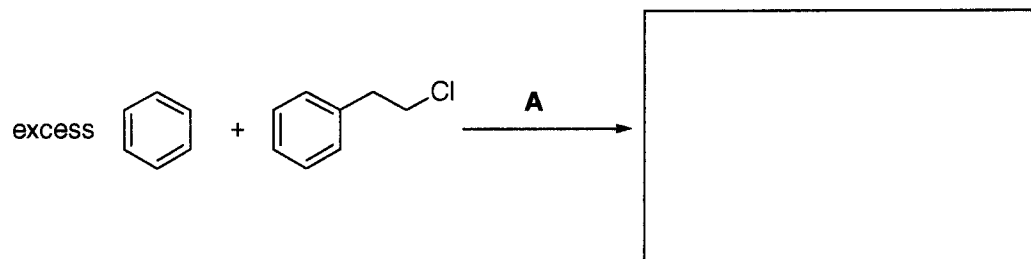
This reaction does not take place. All that happens under experimental conditions is initiation to form iodine radicals, $I\bullet$, followed by termination to reform I_2 . Explain why using the bond dissociation energy (BDE) data.

6. (a) (12 points) Draw the structures for the products from Friedel-Crafts alkylation or acylation of benzene with the following compounds. What reagent **A** do you need to facilitate the reaction?

(1)



(2)



(b) (4 points) To get a single product, excess benzene is needed for the reaction (2) above. Explain why.

7. (16 points) Propose a synthesis of this compound starting from toluene and phenol. The dotted line indicates a major bond disconnection. Partial credit will be given if you show the synthesis of each piece.

