130BL FINAL EXAM Name: _____

Instructor: John K.M. Mouser

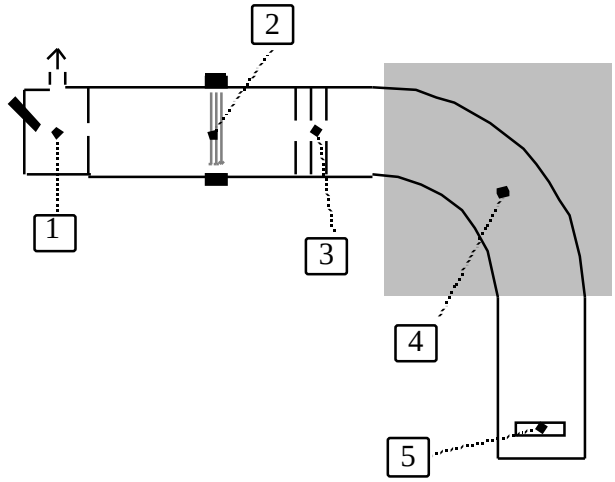
March 8th, 1999, Winter Quarter Signature: _____

Question	Points Possible	Score	Grader's Signature
1.	10 points		
2.	15 points		
3.	25 points		
4.	15 points		
5.	15 points		
6.	15 points		
7.	10 points		
8.	15 points		
9.	15 points		
10.	25 points		
11.	15 points		

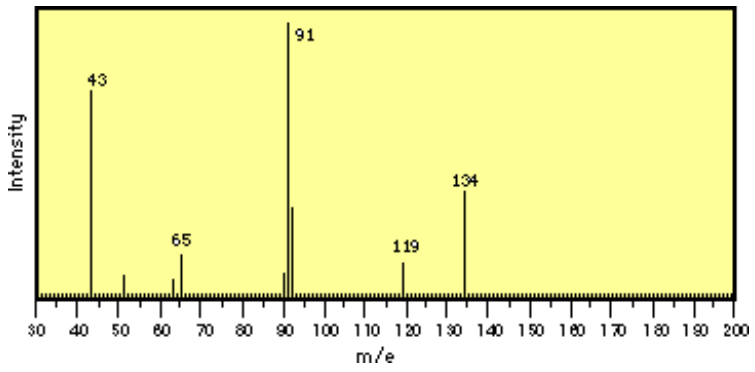
TOTAL:

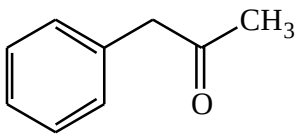
1. (10 points) Discuss two main strategies used in multistep syntheses.

2. (15 points) Using the below diagram of a mass spectrometer. Discuss what is occurring to an organic sample at points 1-5.



3. Given the following mass spectrum of 3-phenyl-2-propanone answer the following questions:





3-phenyl-2-propanone

a) (5 points) Which of the above peaks is the molecular ion?

b) (5 points) Supply the chemical structure of the molecular ion.

c) (5 points) Which of the above peaks is the base peak?

d) (5 points) Supply the chemical structure for the base peak.

e) (5 points) On the above spectrum there is a peak at 135 (too small to see). What is the best explanation for this peak?

4. (15 points) In the Wittig experiment, what was the structure of the ylide.

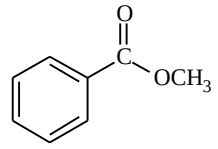
5. (15 points) In the Wittig experiment you did in lab, was is possible to make cis,cis-1,4-diphenyl-1,3-butadiene? **Explain.**

6. (15 points) Which is a stronger electrophile, then nitronium ion or the acylium ion? **Explain.**

7. (10 points) In the nitration experiment, water has a retarding effect on the nitration. Explain.

8. (15 points) In the nitration experiment, a student forgot to keep the reaction mixture cool during the addition of the sulfuric acid/nitric acid mixture. The mass spectrum gave a parent ion at 226. Explain (Supply the structure of the parent ion for full credit).

9. (15 points) Rank the following carbonyl compound in order of reactivity towards water. Where "1" is most reactive and "3" is least reactive.



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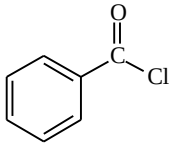

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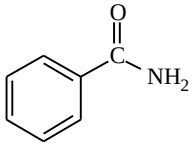

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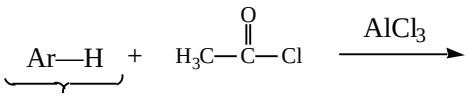
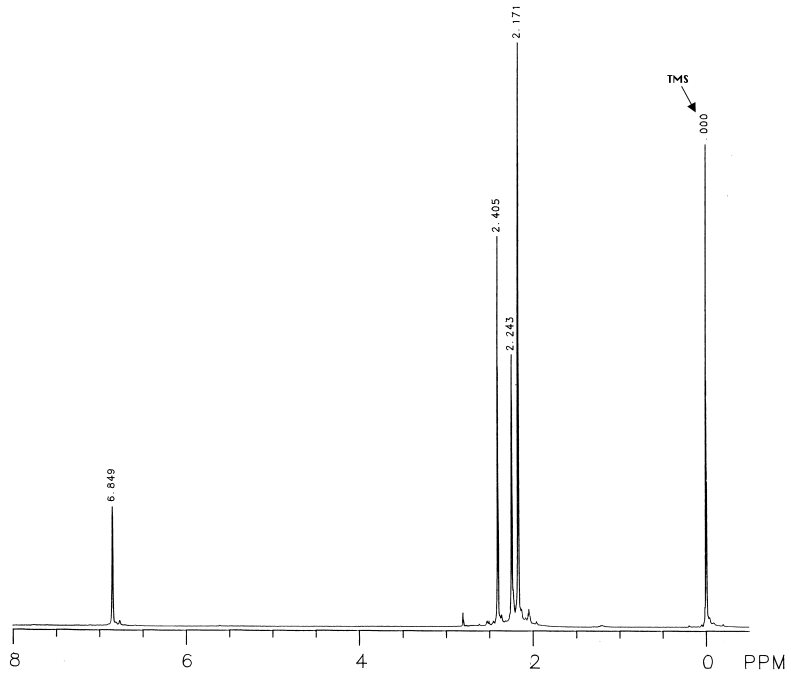
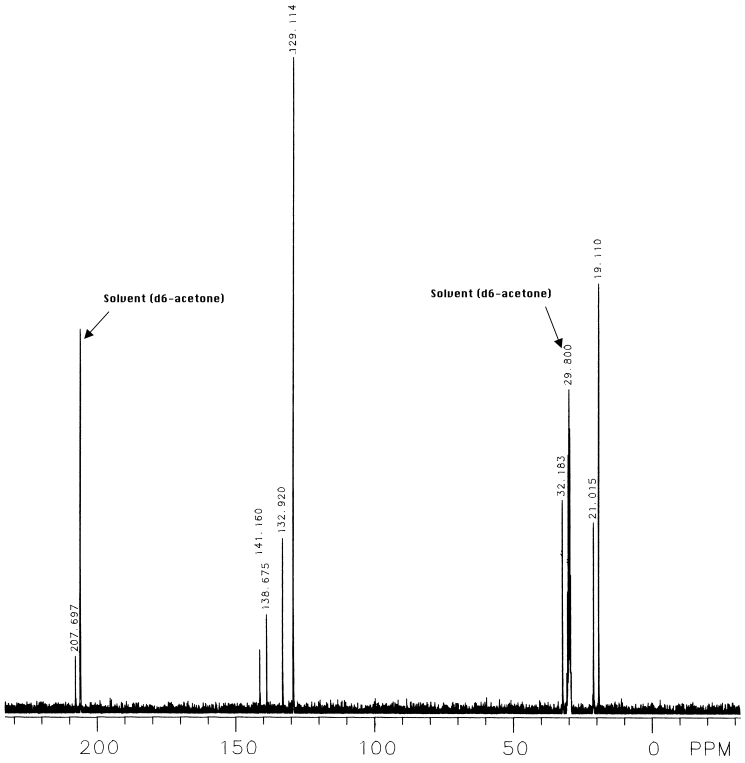
10. (25 points) An unknown aryl compound is acylated as shown below. Given below are the proton and carbon NMR of the product. **Propose a structure for the starting aryl compound**.



benzene
toluene
ethylbenzene
n-propylbenzene
cumene
anisole
t-butylbenznene
o, m, or *p*-xylene
mesitylene





11. (15 points) Propose a synthesis for octaphenylnaphthalene starting from 3,4,5,6-tetraphenylanthranilic acid and any needed reagents.