University of Canterbury

Mid Year Examination and Test Period 2007

Prescription Number(s):	CHEM 322 CHEM 362
Paper Title:	Organic Chemistry

Time Allowed:	TWO HOURS
Number of pages:	SEVEN

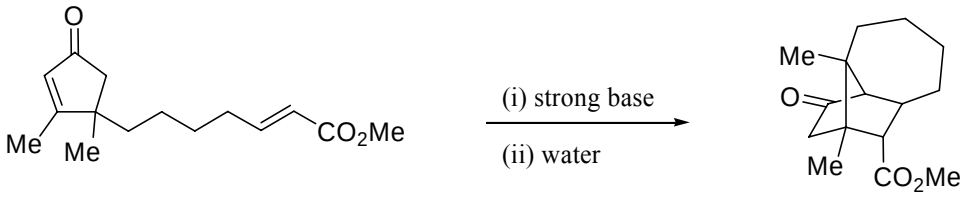
Answer **ALL** questions

All questions are of equal value

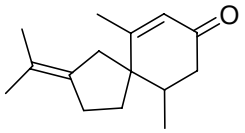
TURN OVER

1. Answer **TWO** of the following (a) – (c):

(a) Draw a stepwise mechanism for each step in the following reaction:

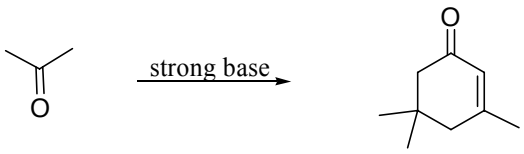


(b) How might you prepare β-vetivone?



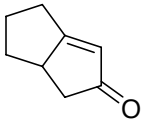
β-vetivone

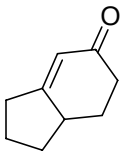
(c) Show how isophorone can be formed from three molecules of acetone in the presence of base.

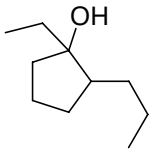


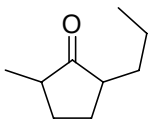
isophorone

2. Show how you could synthesise **three** of the following compounds (a) – (d) from cyclopentanone as the starting material:

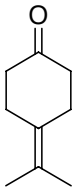
(a) 

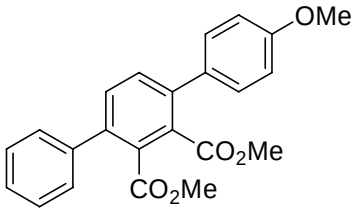
(b) 

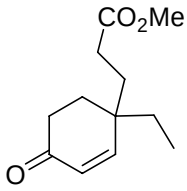
(c) 

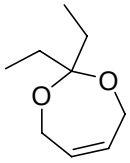
(d) 

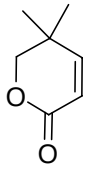
3. Show how **FIVE** following molecules could be prepared using retrosynthetic analysis to aid in the design of your synthesis:

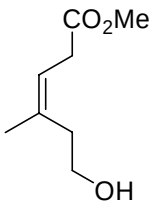
(a) 

(b) 

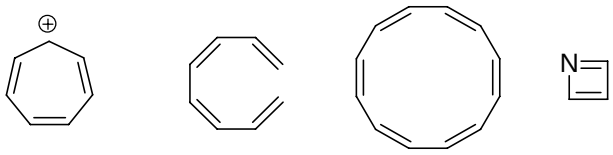
(c) 

(d) 

(e) 

(f) 

4. (a) For each of the following structures, indicate whether they are aromatic, anti-aromatic or non-aromatic.

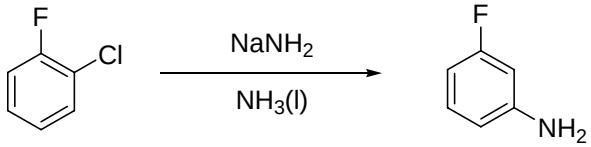


(b) Answer **THREE** of the following (i – iv):

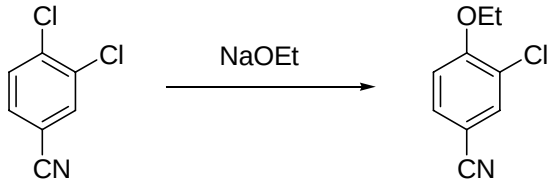
(i) Describe the two different types of bonds in C_{60} and briefly explain how this effects the reaction chemistry of C_{60}.

(ii) Explain why naphthalene undergoes electrophilic substitution at the α-position rather than the β-position.

(iii) Discuss whether the following observation is evidence for the existence of benzyne as an intermediate. You will need to include a mechanism to support your conclusion.



(iv) Discuss the regiochemistry of the following reaction. You will need to include a mechanism in support of your discussion.

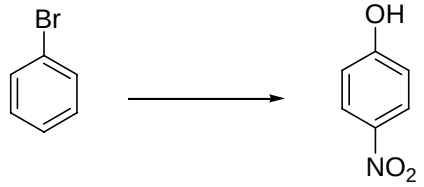


Question 4 continued on following page

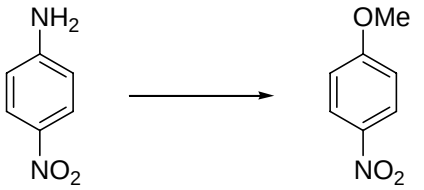
Question 4 continued

(c) Suggest reagents for **TWO** of the following transformations (all schemes require more than one step).

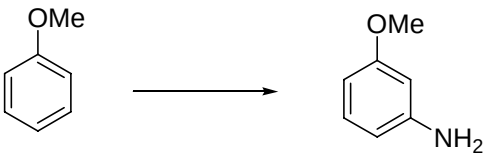
(i)



(ii)



(iii)



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