

THE COLLEGE OF THE BAHAMAS



EXAMINATION

SEMESTER 04-2004

FACULTY OF PURE AND APPLIED SCIENCES
SCHOOL OF NATURAL SCIENCES AND ENVIRONMENTAL STUDIES

X NASSAU
FREEPORT
EXUMA
ELEUTHERA

DATE AND TIME OF EXAMINATION: Thursday, December 16, 2004 at 7 p.m.
DURATION: 3 HOURS

COURSE NUMBER: Chem 330

COURSE TITLE: Organic Chemistry II

STUDENT NAME:

STUDENT NUMBER:

LECTURER'S NAME: Dr. D. Davis

INSTRUCTIONS TO CANDIDATES:

This examination paper consists of 9 questions on 6 pages (excluding this instruction page). Answer ALL questions in the spaces provided on the examination paper.

Only handheld calculators are allowed during this examination. The use of any other electronic device, *e.g.*, cellular phones or PDA's, is strictly prohibited for the duration of this examination.

1. The addition of 1 equivalent of HCl to 2-methyl-1,3-cyclohexadiene results in the formation of 5 possible products. The formation of two of these products (4-chloro-2-methylcyclohexene and 4-chloro-3-methylcyclohexene) is not observed.

(a) Write a curved arrow mechanism to explain the formation of the 5 possible products.

[6 marks]

- (b) Why are 4-chloro-2-methylcyclohexane and 4-chloro-3-methylcyclohexane NOT observed in the product mixture?

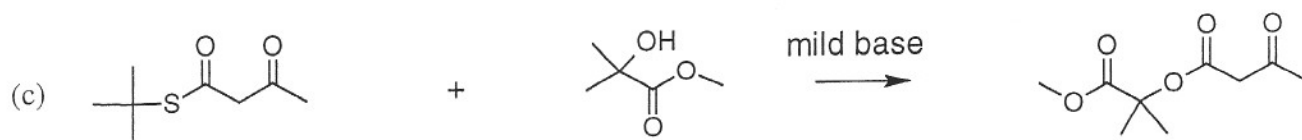
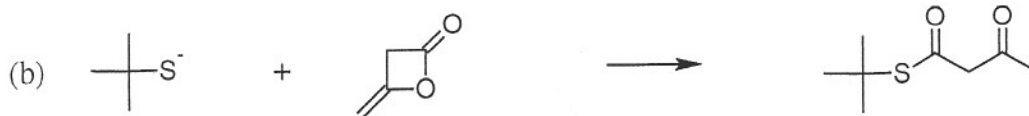
[1 mark]

- (c) What is the major product in the reaction mixture? Explain.

[2 marks]



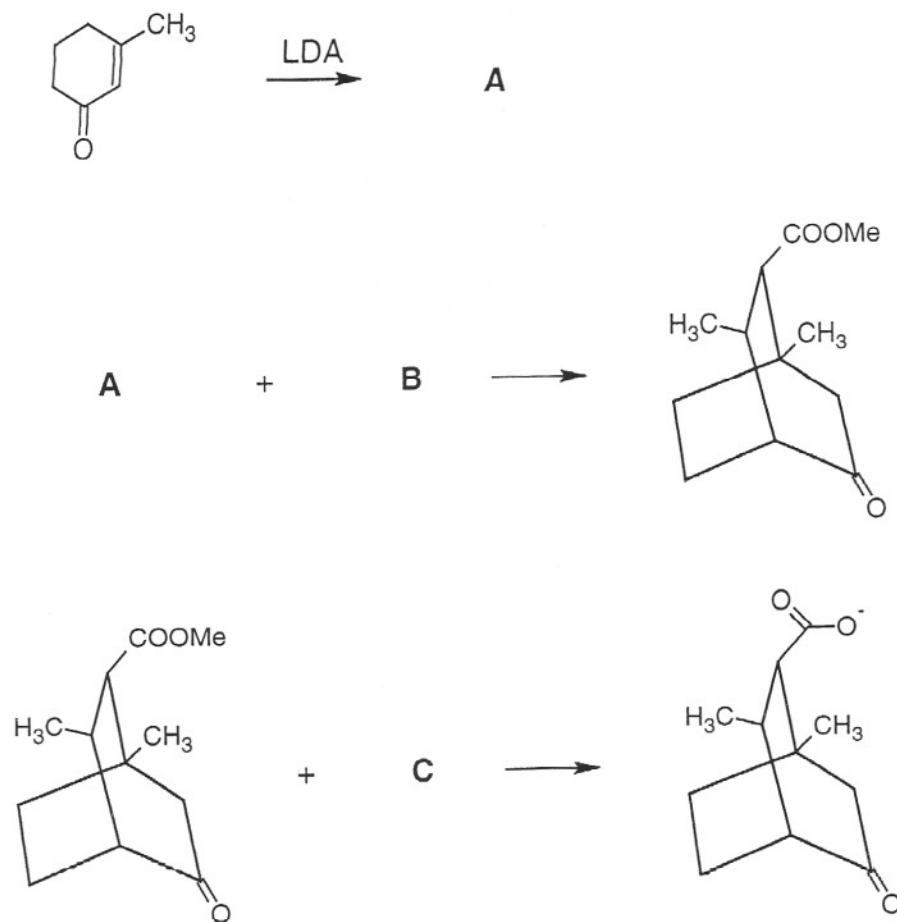
2. Steps (a) through (d) below, taken from the journal "Organic Syntheses", show the preparation of 3-acetyl-4-hydroxy-5,5-dimethylfuran-2(5H)-one. Draw a curved arrow mechanism to show the formation of each product.



[10 marks]

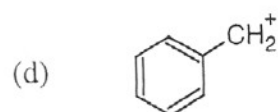
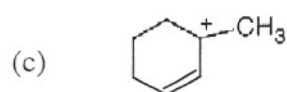
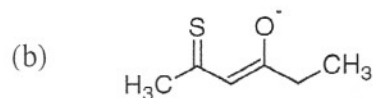
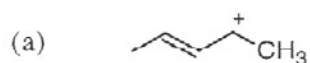


3. Draw the chemical structure for compounds **A**, **B** and **C** in the reaction.



[4 marks]

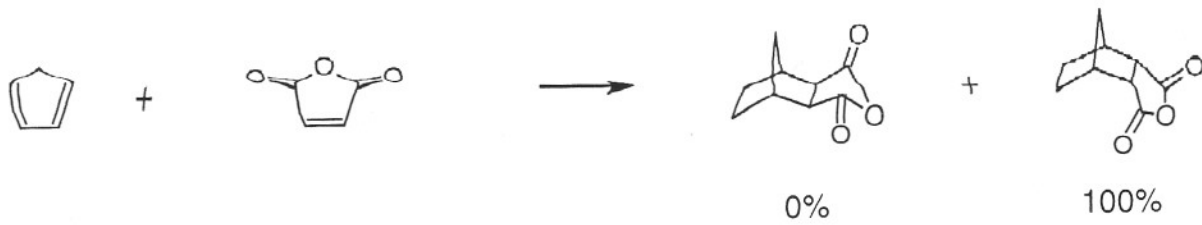
4. Draw all of the (reasonable) other resonance structure(s) AND indicate the most/more stable resonance contributor in each set of structures. State the reason for your choice of the most stable contributor.



[8 marks]

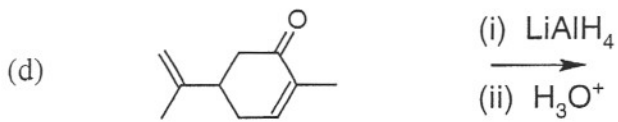
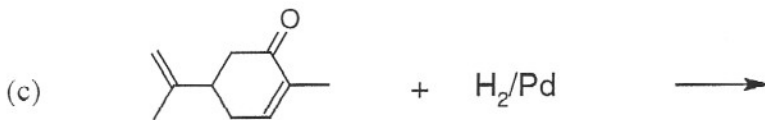
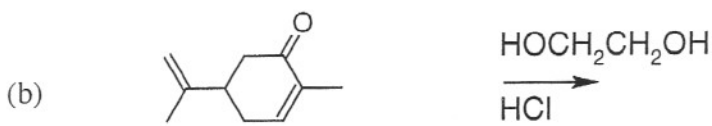
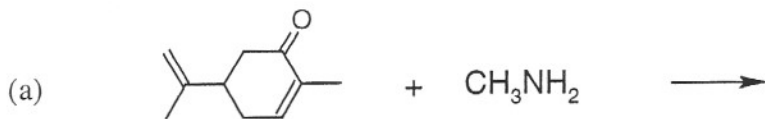


5. Give an explanation for the observed product ratio show in the equation below.



[4 marks]

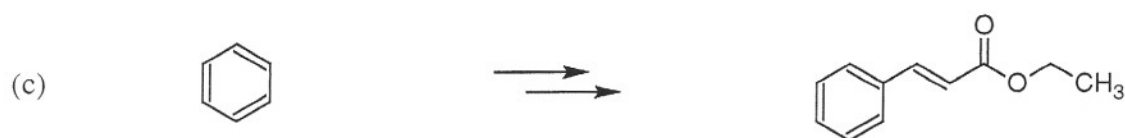
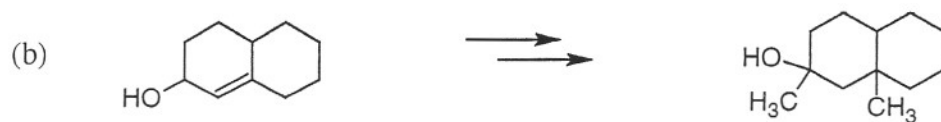
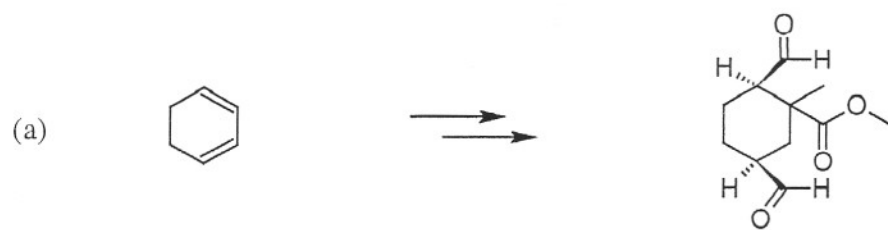
6. Draw the major product(s) for the following reactions.



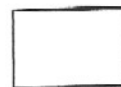
[5 marks]



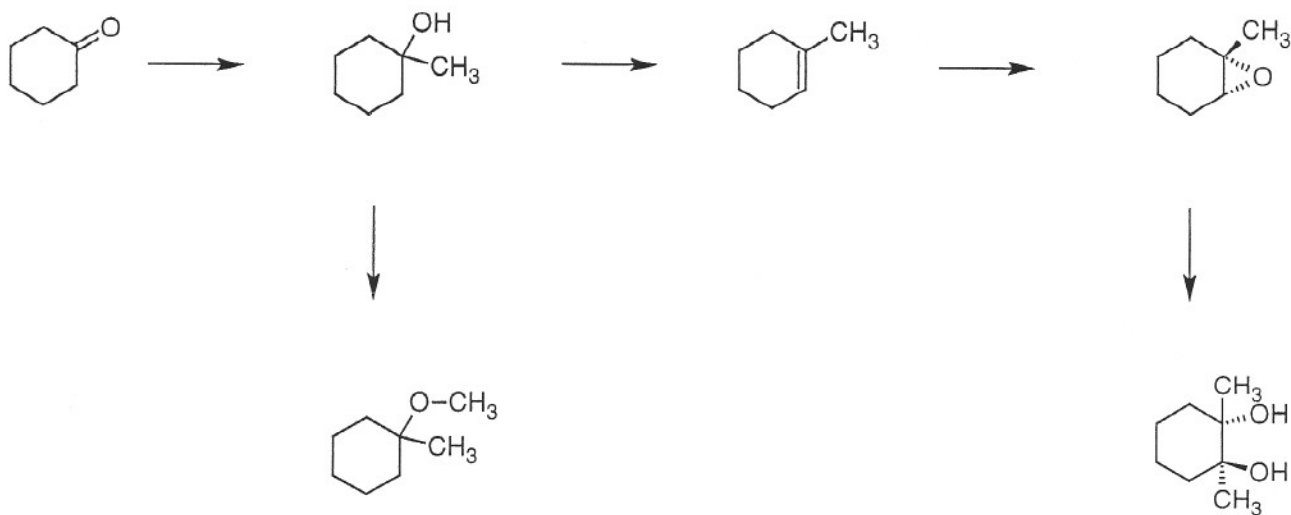
7. Devise a synthetic scheme to prepare the following compounds. More than one step is required.



[12 marks]

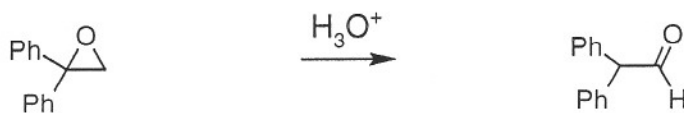


8. Identify the reagents required to complete the following reactions.



[5 marks]

9. Draw a curved arrow mechanism to explain the formation of the following product shown below.



[4 marks]

***** End of Examination *****

