

THE COLLEGE OF THE BAHAMAS

EXAMINATION

SEMESTER 01-2008

FACULTY OF PURE AND APPLIED SCIENCES

SCHOOL OF SCIENCES AND TECHNOLOGY

X NASSAU
FREEPORT
EXUMA
ELEUTHERA

DATE AND TIME OF EXAMINATION: Tuesday, April 22, 2008 at 2 pm

DURATION: 3 HOURS

COURSE NUMBER: CHEMISTRY 330

COURSE TITLE: ORGANIC CHEMISTRY II

STUDENT NAME:

STUDENT NUMBER:

LECTURER'S NAME

INSTRUCTIONS TO CANDIDATES: This paper has 7 page and 10 questions. Please follow instructions given.

Read the instructions carefully. Questions are to be answered in the spaces provided on the question paper.

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

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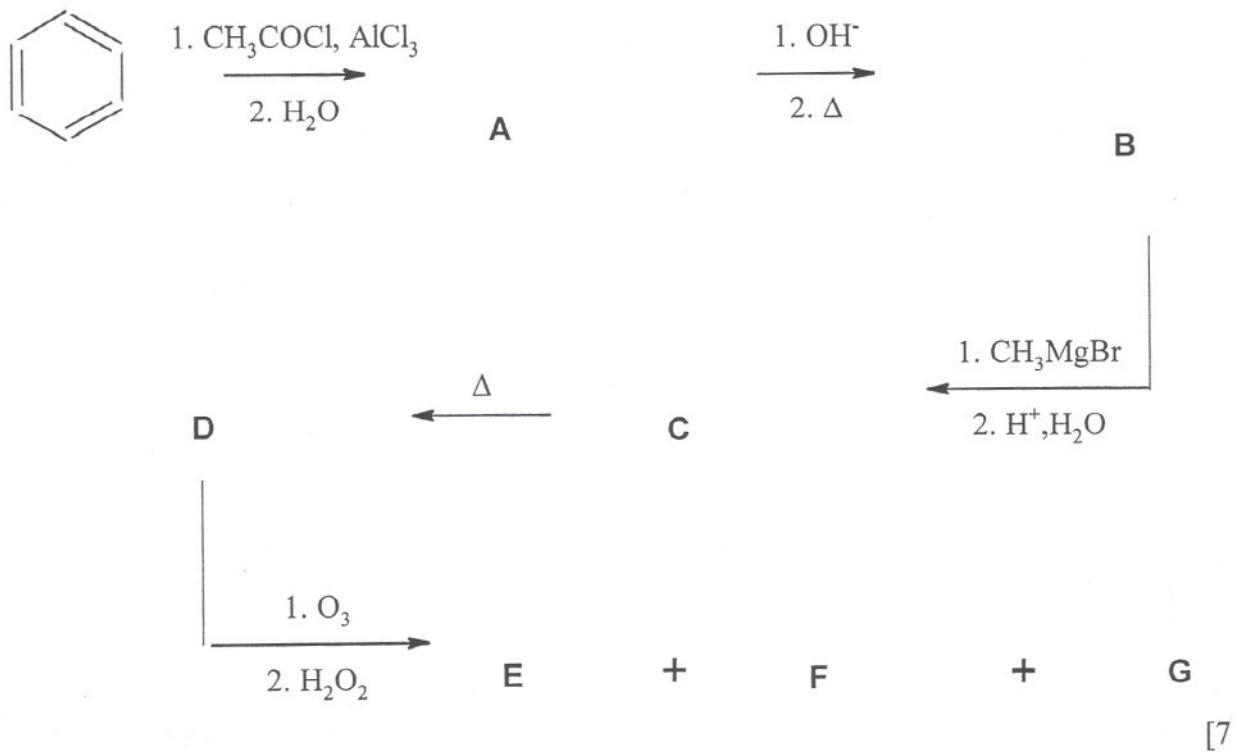
1. Acyl chlorides undergo hydrolysis so readily that they are not found free in nature.

a) Write an equation to represent the hydrolysis of propanoyl chloride. [2]

b) Propose a mechanism for the reaction. [2]

c) Explain why the following reaction does not take place. [2]
 $\text{RCOOH} + \text{Cl}^- \rightarrow \text{RCOCl} + \text{OH}^-$

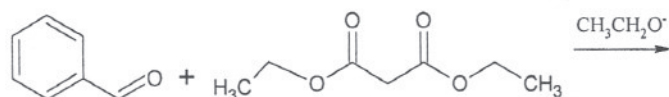
2. Identify the compounds A to G by drawing their structures.



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3. There are other condensation reactions similar to the aldol and Claisen condensations e.g. the Knoevenagel condensation is a condensation of an aldehyde or ketone with no α -hydrogens and a compound such as diethyl malonate that has an α -carbon flanked by two electron withdrawing groups.

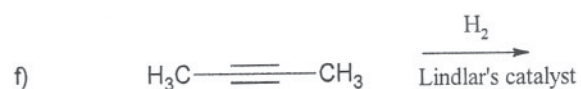
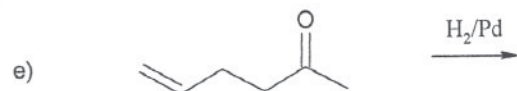
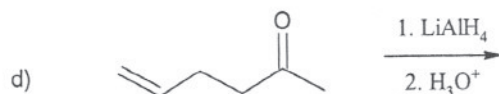
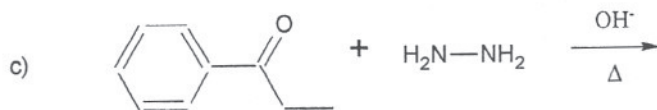
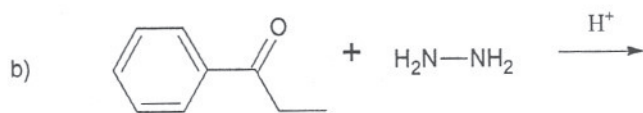
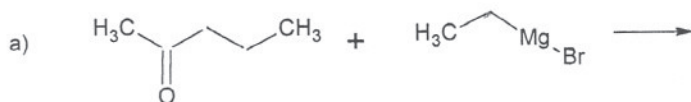
a) Give the product obtained from the following Knoevenagel condensation:



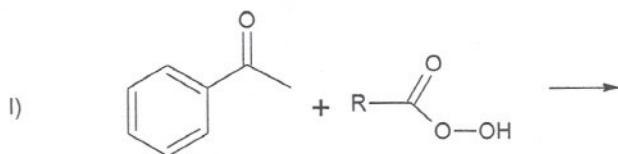
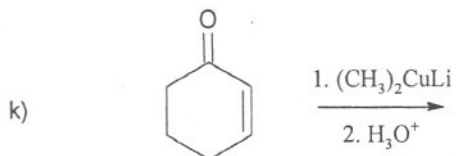
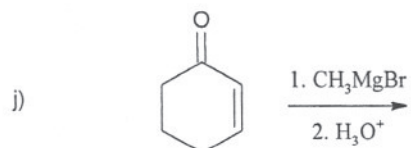
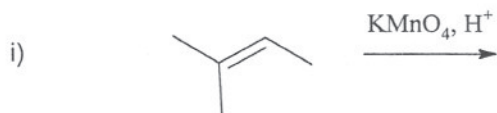
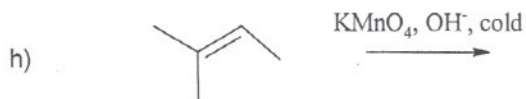
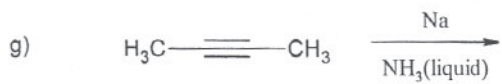
[2]

b) Give the products obtained by warming the Knoevenagel condensation product in an aqueous acidic solution. [2]

4. Draw the structures of the main organic product(s) of each reaction, showing stereochemistry where appropriate. Mechanisms and names of products are **not** required.

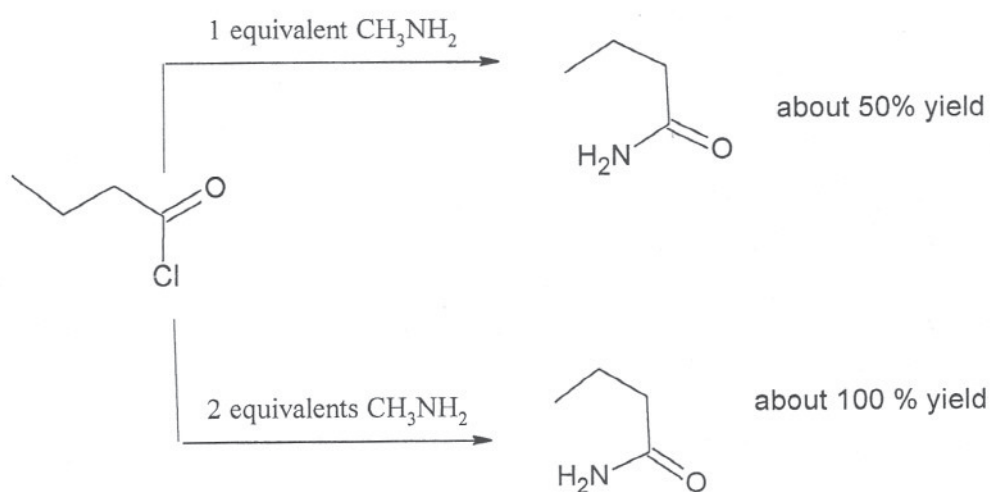


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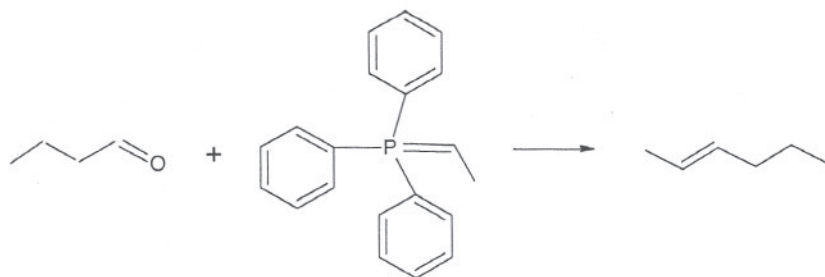
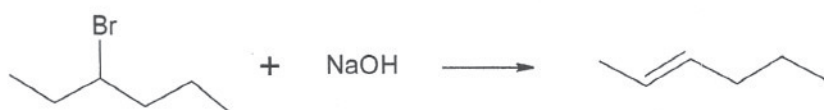
5. Explain the difference in the yield shown:

[3]



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6. 2-hexene can be prepared by either of the two reactions shown:

Reaction A:**Reaction B:**

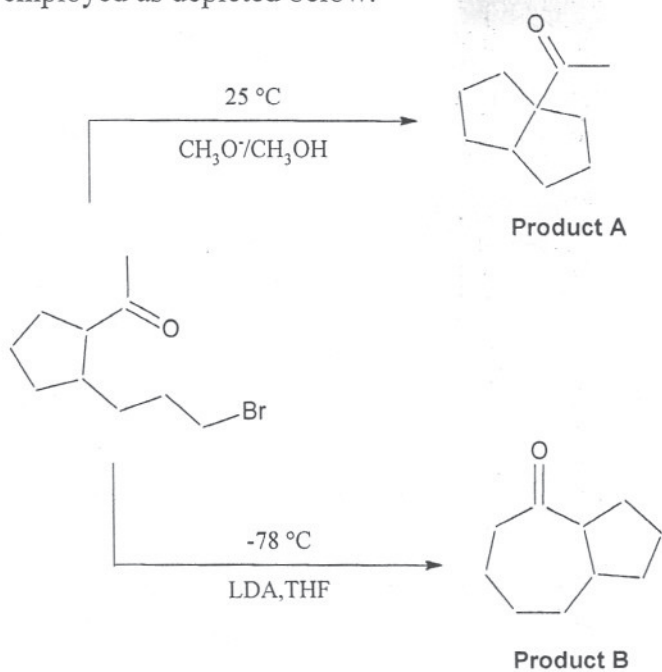
What is the advantage of using reaction A rather reaction B for the preparation of 2-hexene? [3]

7. a) Which alkyl bromide should be used in the malonic ester synthesis of 3-phenylpropanoic acid? [1]

b) Explain why C₆H₅CH₂COOH cannot be prepared by the malonic ester synthesis. [2]

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8. The bromoketone forms different products depending on the base and temperature employed as depicted below:



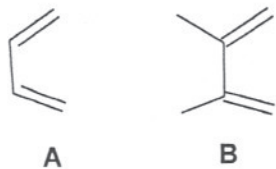
- a) i) Propose a mechanism for the formation of product A. [3]

- ii) Propose a mechanism for the formation of product B. [3]

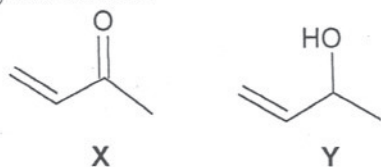
- b) Which is the thermodynamic product? Explain. [2]

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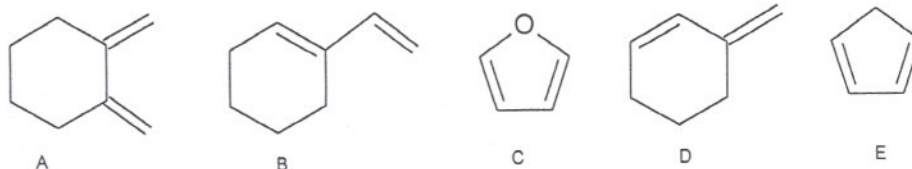
9. a) Which diene, A or B, is more reactive in a Diels-Alder reaction? Explain your choice. [2]



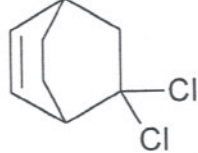
- b) Which dienophile, X or Y, is more reactive in a Diels-Alder reaction? Explain your choice. [2]



- c) Which one of the following dienes would not react with a dienophile in a Diels-Alder reaction? Explain your choice. [2]

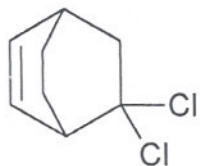


- d) i) Give the structure of the diene and dienophile which should be used to prepare



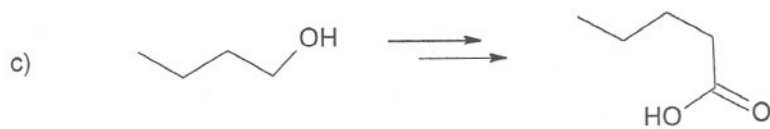
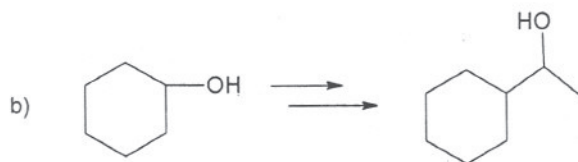
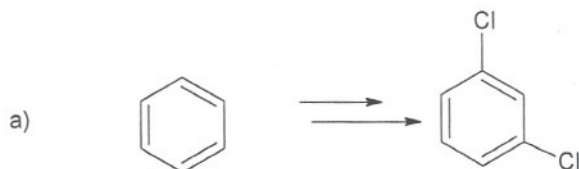
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ii) Name the compound

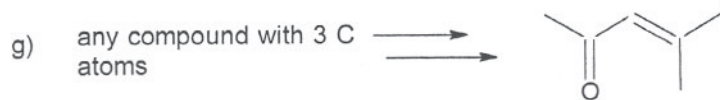
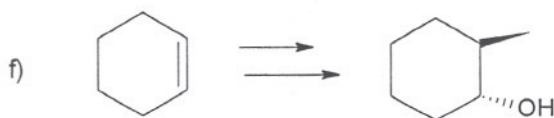
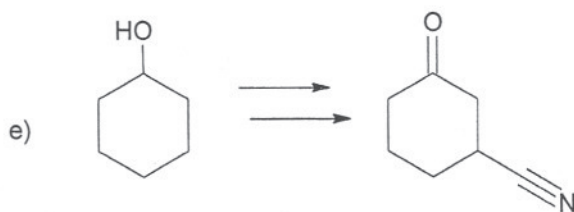
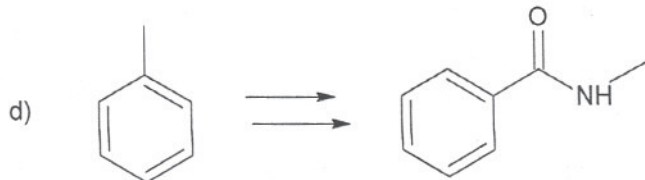


[1]

7. Indicate how **five** of the following compounds could be synthesized from the given starting material and any other necessary reagents. Mechanisms are not required. More than one step may be necessary. Show intermediate compounds formed.



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**END OF EXAMINATION**