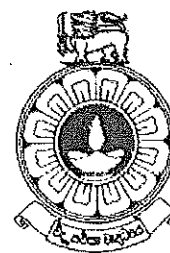


The Open University of Sri Lanka  
Faculty of Natural Sciences  
B.Sc. Degree Programme



Department	: Chemistry
Level	: 5
Name of the Examination	: Final Examination
<b>Course Code and Title</b>	<b>: CYU5303 Organic Chemistry II</b>
Academic Year	: 2019/2020
Date	: 19 <sup>th</sup> December 2019
Time	: 1.30 pm to 3.30 pm
Duration	: 2 hours
Index number	:

### General Instructions

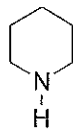
1. Read all instructions carefully before answering the questions.
  2. This question paper consists of **Four** questions in **six** pages.
  3. **Answer All FOUR (04) questions. All questions carry equal marks.**
  4. Answer for each question should commence from a new page.
  5. Draw fully labelled diagrams where necessary
  5. Relevant log tables are provided where necessary.
  6. Having any unauthorized documents/ mobile phones in your possession is a punishable offense
  7. Use blue or black ink to answer the questions.
  8. Circle the number of the questions you answered in the front cover of your answer script.
  9. Clearly state your index number in your answer script
-

1) Answer any **FOUR (04)** parts from (a) – (e).

a) Giving reasons compare the reactivities of pyridine and piperidine with HCl.



pyridine



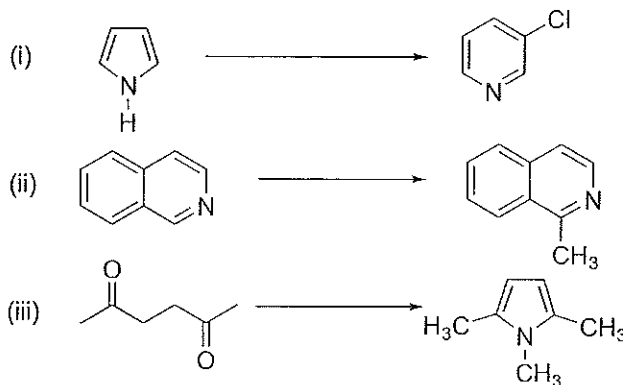
piperidine

b) Explain why nitration of thiophene results in substitution at C-2 position predominantly.



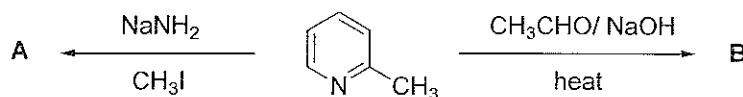
thiophene

c) Give the suitable reagents and reaction conditions for the following conversions.



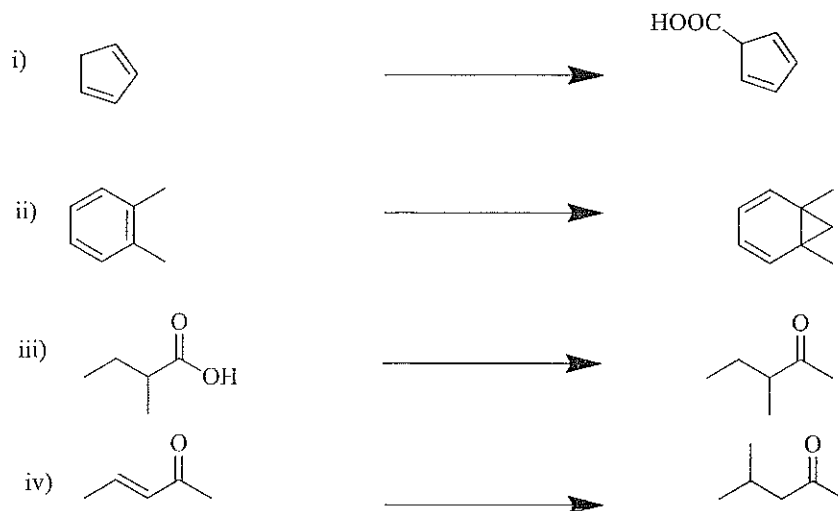
d) Using resonance theory show how pyridine oxide can be reactive towards both electrophilic and nucleophilic reagents.

e) Give the possible structures of the products **A** and **B**.  
Write the mechanism for the formation of **B**.



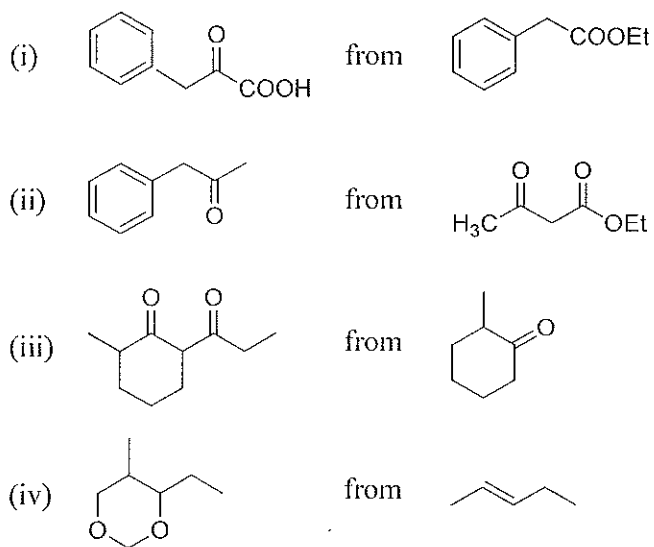
(25 x 4 = 100 Marks)

2) (a) Show how would you carry out the following syntheses using **organometallic reagents**.



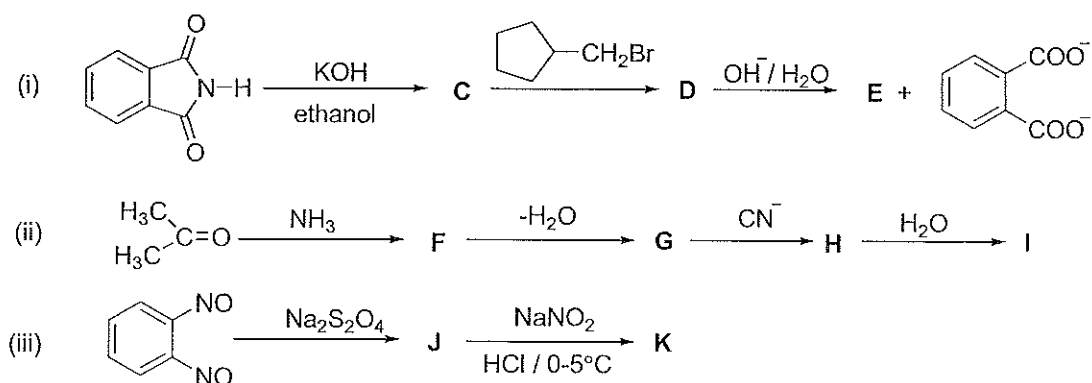
(40 Marks)

(b) Giving necessary reagents and conditions show how you would carry out any **three (03)** of the following syntheses.



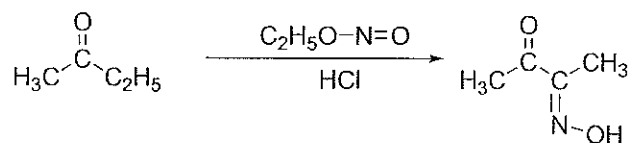
(60 Marks)

3) (a) Give the structures of the compounds **C – K** in the following reaction schemes.



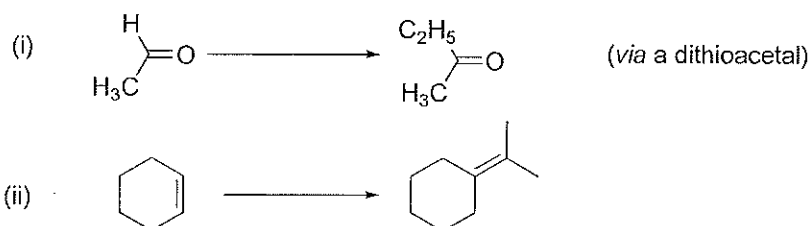
(45 Marks)

(b) Write down the mechanism for the nitrosation reaction given below.



(15 Marks)

(c) Give necessary reagents and conditions to carry out the following multistep transformations.



(40 Marks)

4) (a) Explain the terms, Bathochromic shift and Hypsochromic shift used in UV spectroscopy.

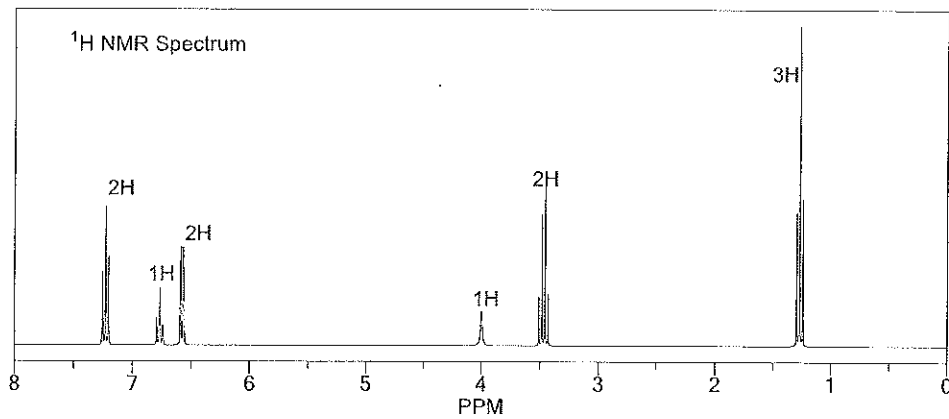
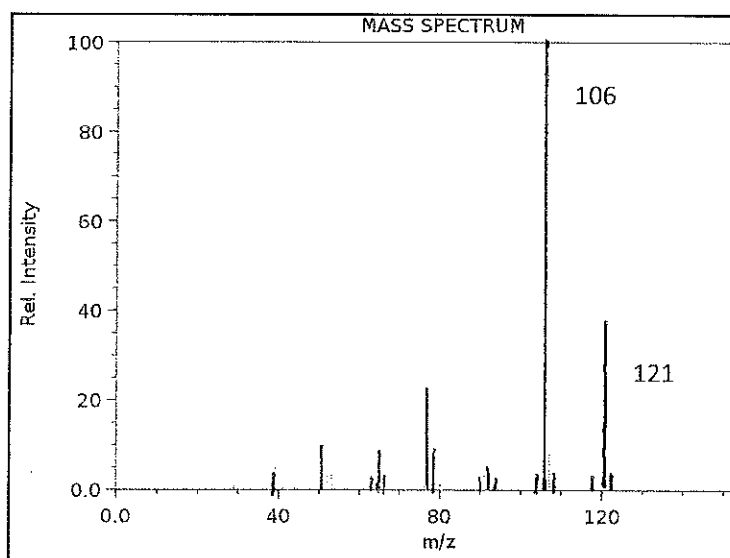
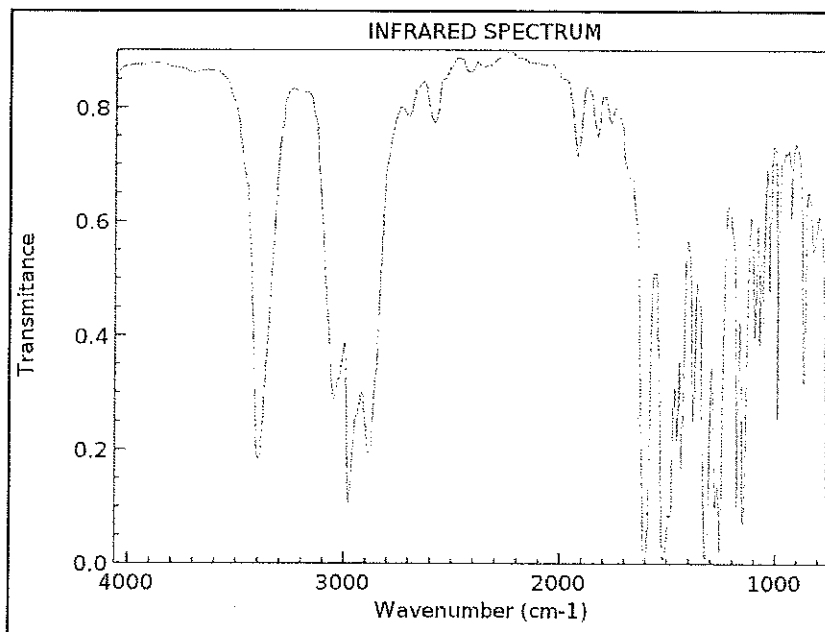
(10 Marks)

(b) Explain the following spectral data.

- (i) IR stretching frequencies of
- |                       |                       |
|-----------------------|-----------------------|
| C-C                   | C=C                   |
| 1200 $\text{cm}^{-1}$ | 1650 $\text{cm}^{-1}$ |
- (ii) The  $\lambda_{\text{max}}$  of
- |                   |        |
|-------------------|--------|
| Ethylene          | 175 nm |
| $\beta$ -carotene | 465 nm |

(10 Marks)

(c) Given below are IR, Mass and  $^1\text{H}$  NMR spectra of compound M ( $\text{C}_8\text{H}_{11}\text{N}$ ).



- (i) What are the functional groups present in **M**?
- (ii) How many different types of protons are present in compound **M**?
- (iii) Deduce the structure of compound **M** and assign the  $^1\text{H}$  NMR data.
- (iv) Show the fragmentation pathway leading to the ion giving the base peak for compound **M** and explain why it is likely to be the base peak.

(80 Marks)

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