Reg. No: | | | | | | | | |

Q	Marks	
	Max	Awarded
1	30	
2	20	
3	10	
4	30	
5	20	
Total		

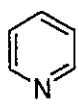
The Open University of Sri Lanka
B. Sc Degree / Stand Alone Programme 2008/2009
Organic Chemistry - CHU 3126 / CHE 5136
Level 5 - Assignment I – Test
Duration 1½ hours

Saturday 12th February 2009 Time: 4.00 – 5.30 p.m.

Answer all questions.

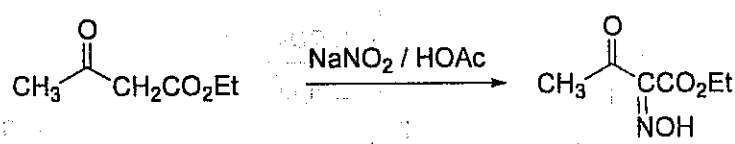
Maximum marks allocated to this paper are 110. However a candidate who scores 100 marks or above will be awarded 100% and those scoring less will be awarded the score they make.

1. a. Draw resonance structures for pyridine



(ii). Giving reasons, explain which of the following is more basic, pyridine or piperidine.

(iii). During the synthesis of pyrroles, ethyl acetoacetate reacts with $NaNO_2$ / HOAc. One of the primary reactions that take place is as follows.

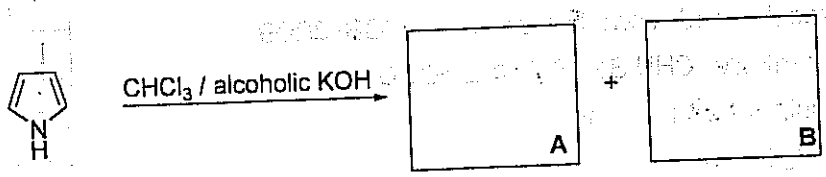


Give the mechanism of this reaction. (*Hint: ^{+}NO is formed from $NaNO_2$ and HOAc*)

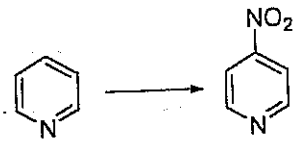
(30 Marks)

Reg. No: | | | | | | | | |

2. (i) Identify the structures of the products **A** and **B** formed in the reaction given below.



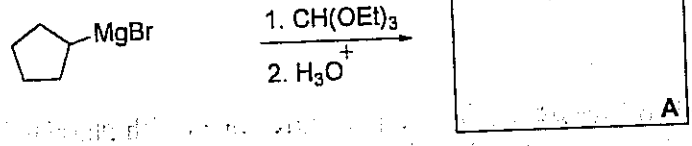
(ii). Giving necessary reagents and conditions show how you would carry out the following conversions.

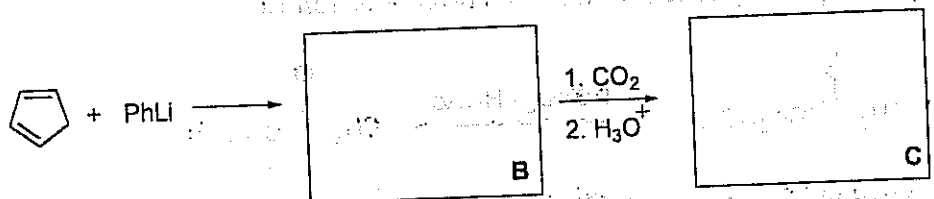


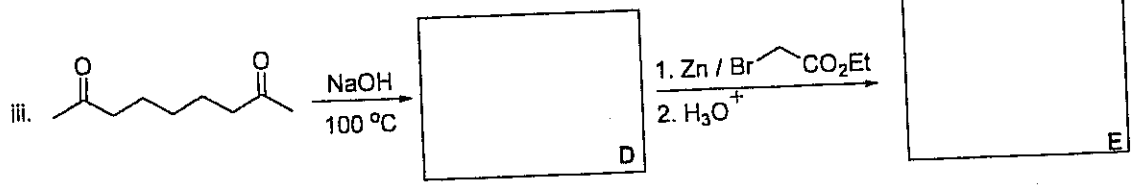
(20 Marks)

3. Give **ONE** example to illustrate nucleophilic substitution reaction of isoquinoline (10 Marks)

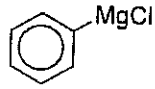
4. Give the structures of products **A**, **B**, **C**, **D** and **E** of the following reactions.

i. 

ii. 

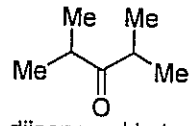
iii. 

Reg. No: | | | | | | | | |

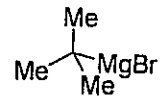
iv. 

(30 Marks)

5. Ketones with bulky groups do not undergo nucleophilic addition with Gignard reagents with bulky alkyl group.
Giving appropriate mechanisms, predict what happens when diisopropyl ketone reacts with *tert*-butylmagnesium bromide.



diisopropyl ketone



tert-butylmagnesium bromide

(20 Marks)

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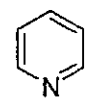
Answer Guide

1. a. Draw resonance structures for pyridine

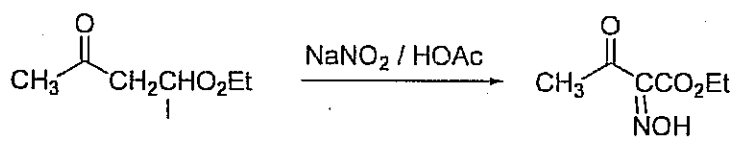


The answer is given in page 4 of your level 5 unit I book Due to the electron withdrawing ability of N atom the ring becomes electron deficient and a positive charge delocalizes.

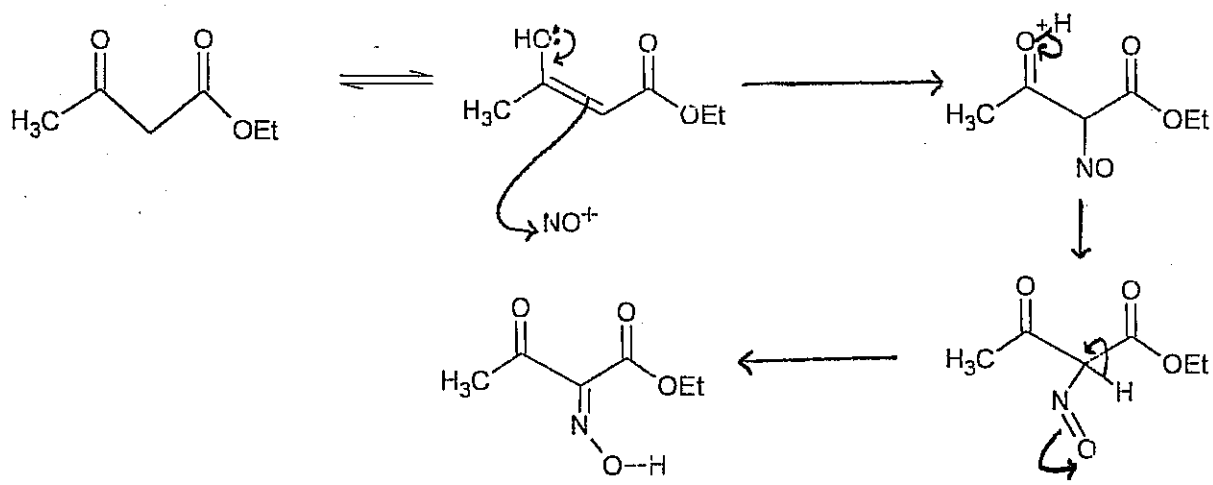
(ii). Giving reasons, explain which of the following is more basic, pyridine or piperidine.

N atom of piperidine is sp^3 hybridized. N atom of pyridine is sp^2 hybridized. Lone pair electron of pyridine is in sp^2 orbital. Lone pair electron of piperidine is in sp^3 orbital. Donation of lone pair to a proton is difficult from sp^2 orbital than from sp^3 orbital. Therefore pyridine is less basic than piperidine.

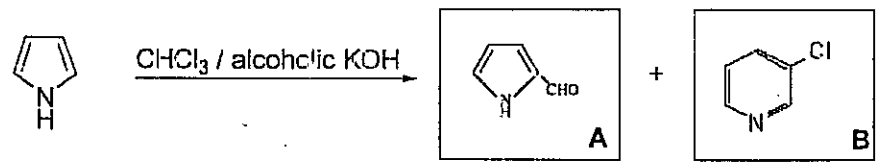
(iii). During the synthesis of pyrroles, ethyl acetoacetate reacts with $NaNO_2$ / HOAc. One of the primary reactions that take place is as follows.



Give the mechanism of this reaction. (*Hint: ^+NO is formed from $NaNO_2$ and HOAc*)



2. (i) Identify the structures of the products **A** and **B** formed in the reaction given below.



The answer is given in page 30 of your level 5 unit I book.
Reimer-Tiemann Reaction.

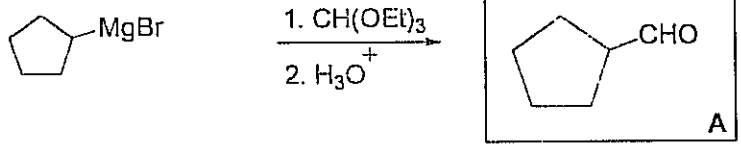
(ii). Giving necessary reagents and conditions show how you would carry out the following conversions.

The answer is given in page 16 of your level 5 unit I book.
Chemistry of pyridine-N-oxides.

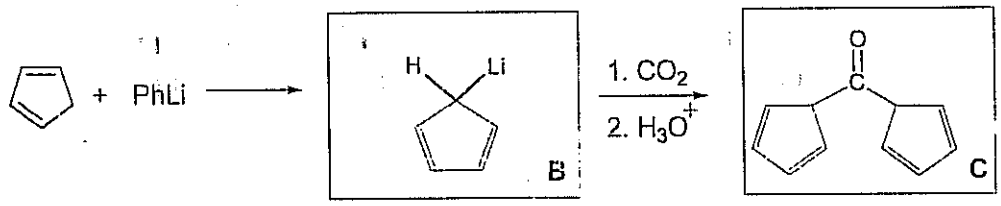
3. Give **ONE** example to illustrate nucleophilic substitution reaction of isoquinoline

The answer is in page 41of your level 5 unit 1 book. Neucleophilic Substitution Reaction.

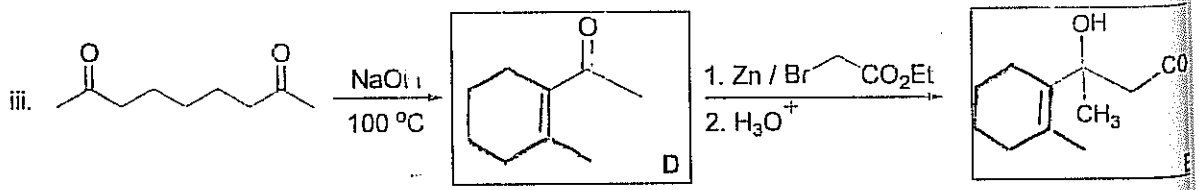
4. Give the structures of products **A**, **B**, **C**, **D** and **E** of the following reactions.

i. 

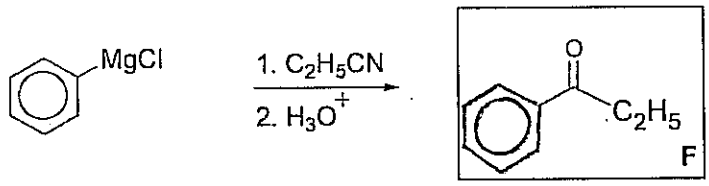
Ref: Unit II Synthetic organic Chemistry Part I Page No. 14
1.4.4. Preparation of aldehydes

ii. 

Ref: Unit II Synthetic Organic Chemistry Part I Page No. 21
2.2.13- Metallation Reaction

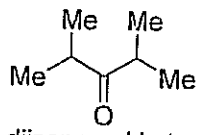
iii. 

Ref: Unit II Synthetic Organic Chemistry Part I Page No. 30
Reformatsky Reaction

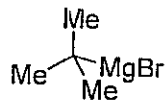
iv. 

Ref: Unit II Synthetic Organic Chemistry Part I Page No. 15
Preparation of ketones, alkyl nitriles with Grinard reagents.

5. Ketones with bulky groups do not undergo nucleophilic addition with Gignard reagents with bulky alkyl group.
Giving appropriate mechanisms, predict what happens when diisopropyl ketone reacts with *tert*-butylmagnesium bromide.

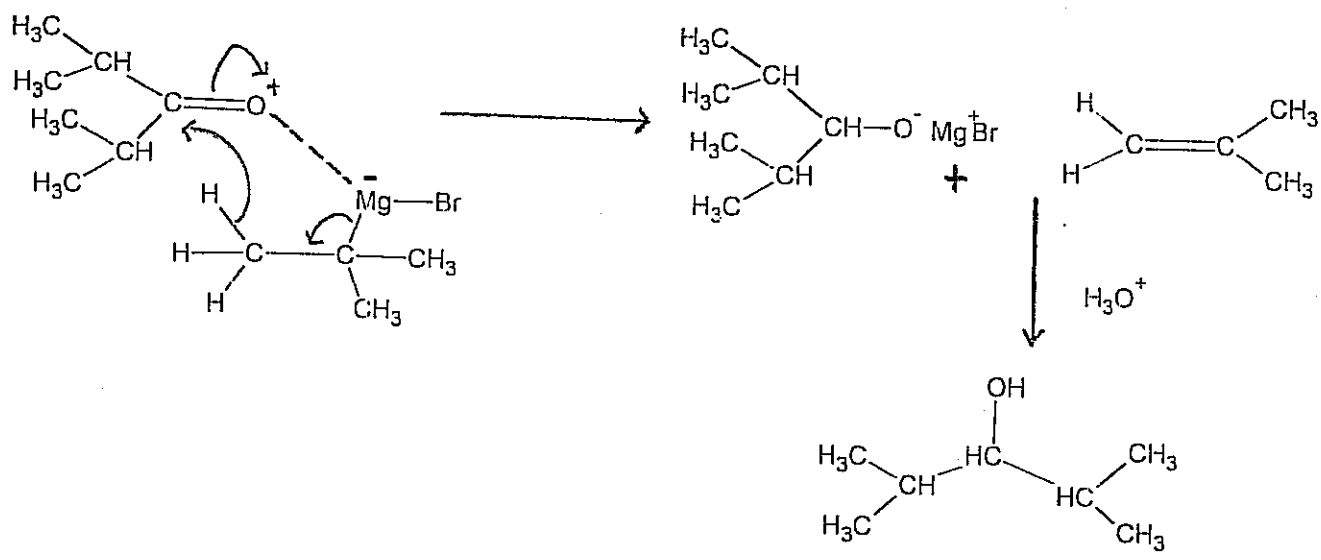


diisopropyl ketone

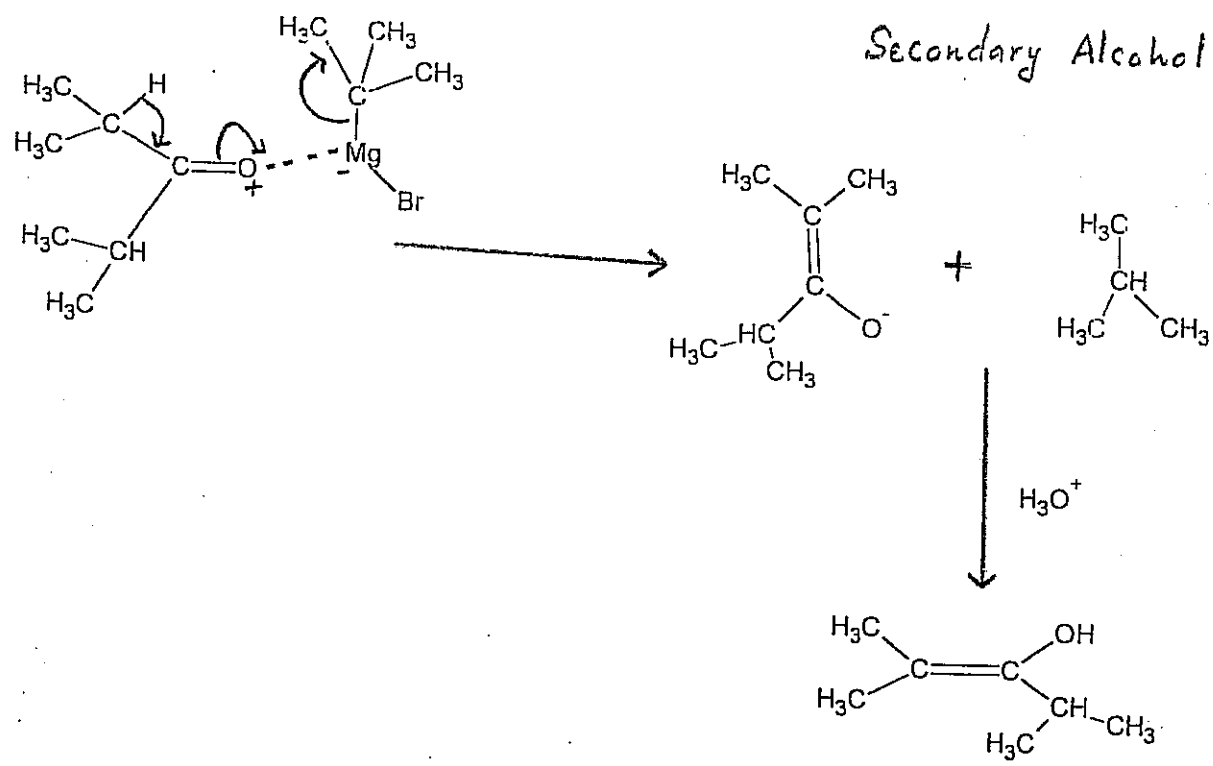


tert-butylmagnesium bromide

Diisopropyl alcohol contains ∝ H; tert butyl magnesium bromide contains β H.



Secondary Alcohol 65%



Enolate 35%