RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. Honours in Chemistry
Third Year - Semester II Examination – July 2020

CHE 3215 – HETEROCYCLIC AND SYNTHETIC ORGANIC CHEMISTRY

Time: Two (02) hours

Answer **all** questions.

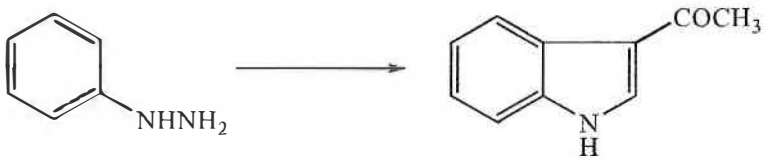
1.

a) Elaborate the reactivity of Pyridine-N-oxide towards nucleophilic substitution compared to that of pyridine. (20 marks)

b) Would you expect pyrrole to be an extremely weak base? Explain your answer. (15 marks)

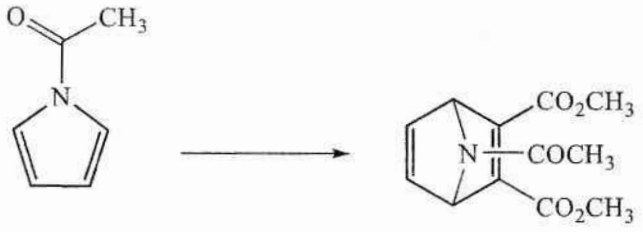
c) Justify the observation that 2-chloropyridine undergoes nucleophilic substitution much faster than 3-chloropyridine. (15 marks)

d) Giving necessary reagents and conditions show how you would effect the following conversions.

(i) 

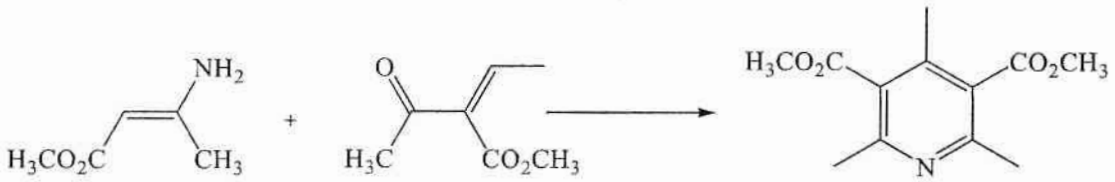
(14 marks)

(ii)



(6 marks)

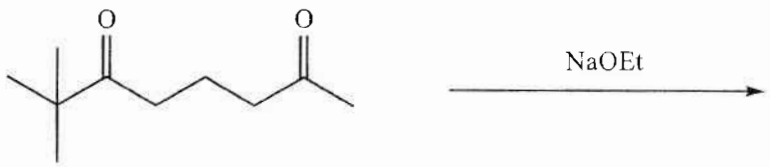
e) Giving necessary reagents, conditions and appropriate mechanisms, show how you would carry out the following synthesis.



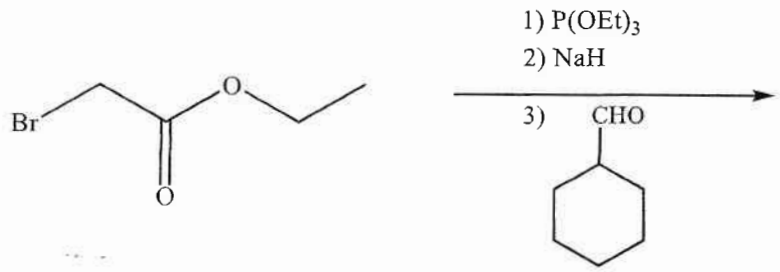
(30 marks)

2. Write down the major product in each of the reaction given. **Specify the stereochemistry** and/or regiochemistry, where relevant.

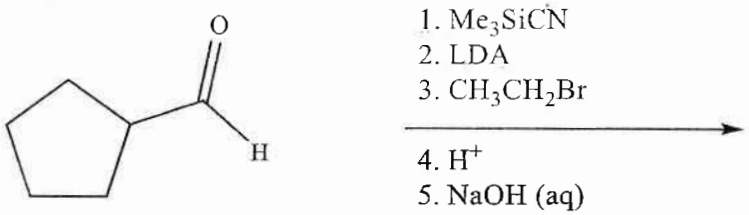
a)



b)



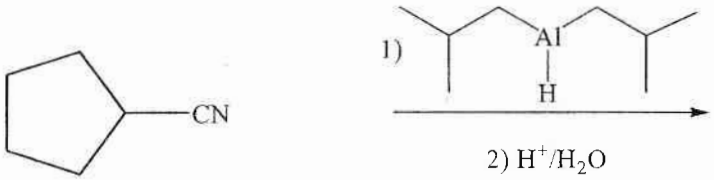
c)



d)

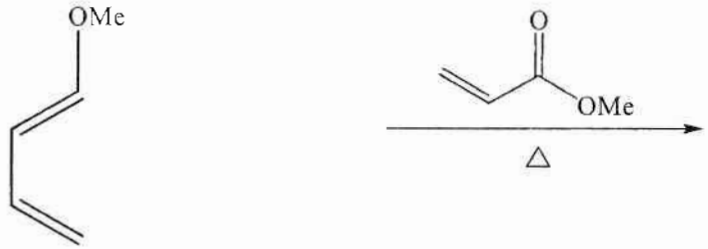
e)

f)



g)

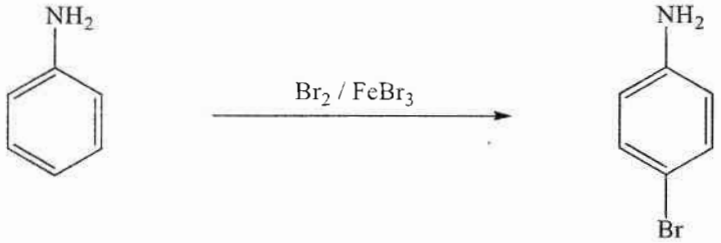
h)



(100 marks)

3.

a) Consider the monobromination of aniline.



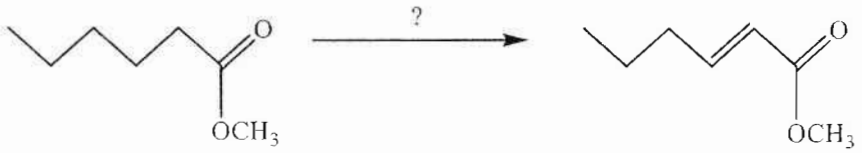
i. This reaction is a poor way to obtain the indicated product. Clarify.

ii. Give a preferred pathway that you can carry out to obtain the interested product.

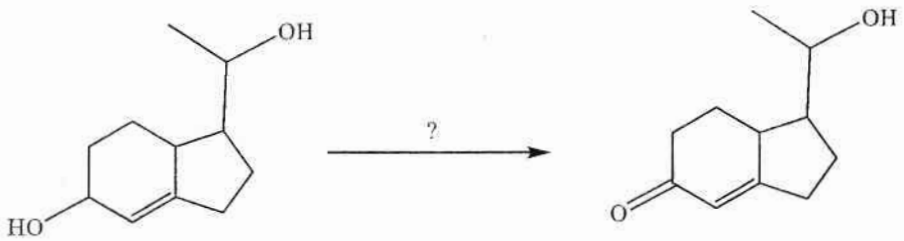
(25 marks)

b) Write down the chemical reagents required to carry out following reactions. If reagents are added stepwise, number them accordingly.

i.



ii.



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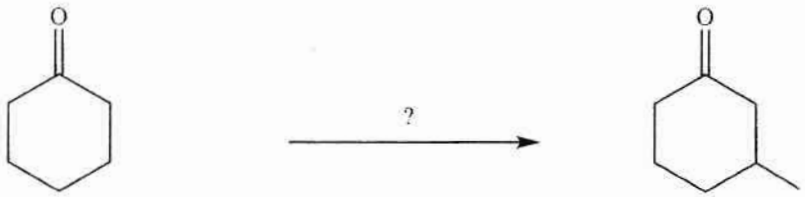
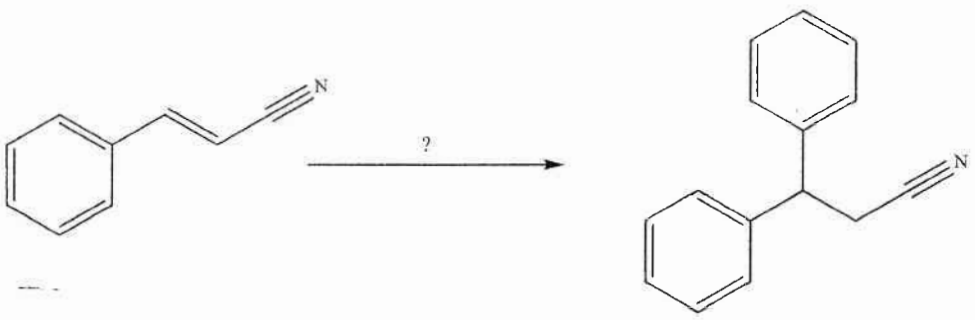
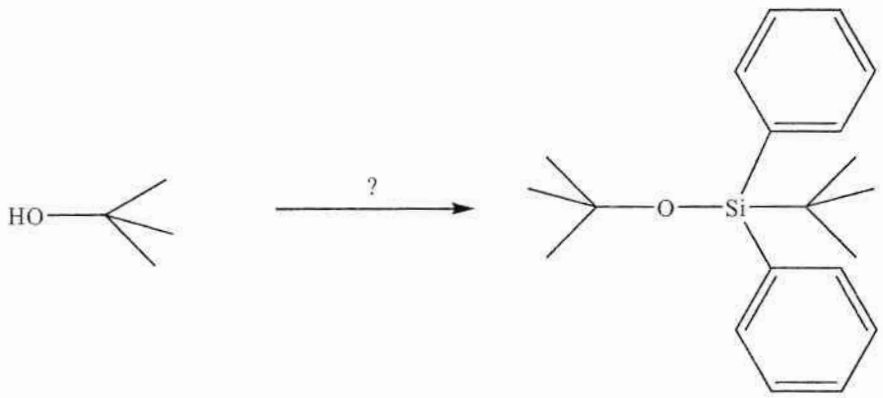


iv.

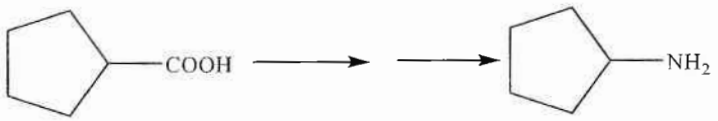


v.



(50 marks)

c) Show how to carry out following transformation. Several steps will be required.



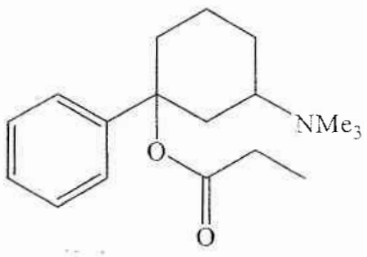
(25 marks)

4.

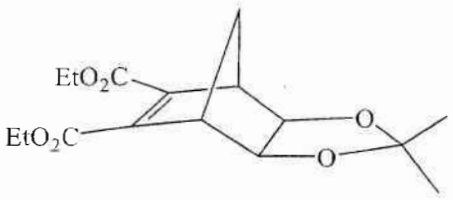
a) Comment on the stability of ylids. Discuss the impact of their stability on the product formation of Wittig reaction. (20 marks)

b) Illustrate how to synthesise any two **(02)** of following compounds, from commercially available materials. Include both retrosynthetic analysis and the actual synthetic procedure separately in your answer. (2 x 40 marks)

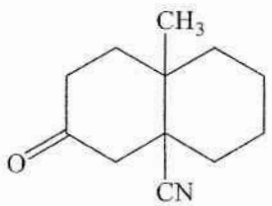
i.



ii.



iii.



(2 x 40 marks)

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