

EASTERN UNIVERSITY, SRI LANKA

THIRD EXAMINATION IN SCIENCE-2010/2011 (APRIL/MAY' 2013)

FIRST SEMESTER

CH 302 Heterocyclic Chemistry and Molecular Rearrangement Reactions

(Proper and Repeat)

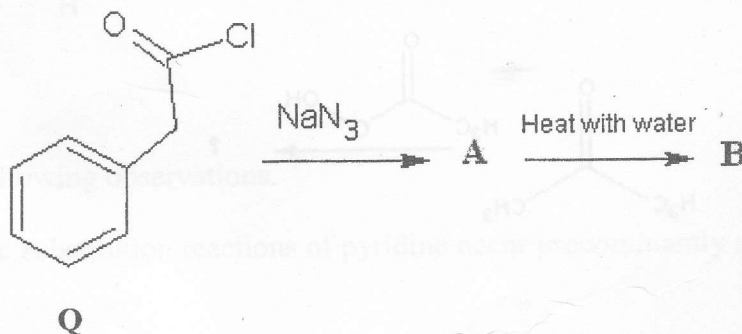
Answer all questions

Time Allowed: One hour

1. a) The compound **Q** was treated with sodium azide and then the formed product (**A**) was heated with water to get **B**.

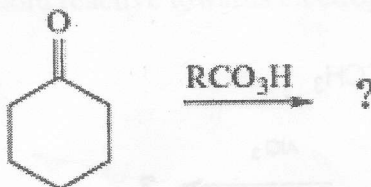
i) Draw the structure of the product **A** and **B**.

ii) Suggest a plausible mechanism for the reaction from **A** to **B**.



(20 marks)

b) Identify the product and write a suitable mechanism for the reaction.

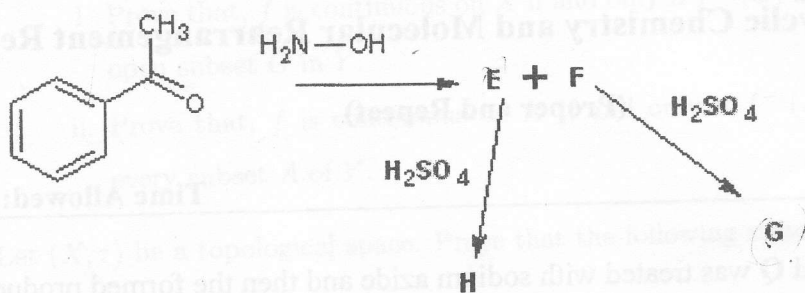


(20 marks)

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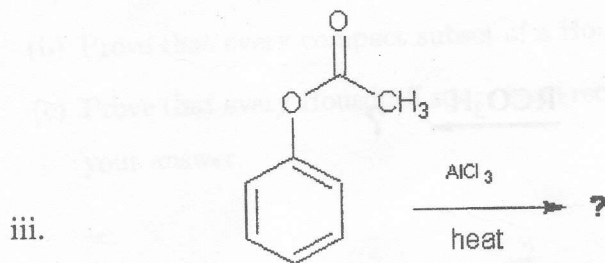
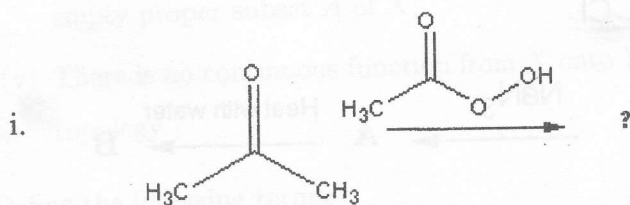
c) When acetophenone was treated with hydroxylamine it gave two compounds E and F. After separation, these products E (major) and F were further treated separately with sulphuric acid to get a compound G and H respectively. The rate of reaction for the formation of G was found to be faster than that of H.

- Predict the two products E and F
- Write the mechanism of the reaction E to H.
- Why is the compound E obtained as the major product?



(30 marks)

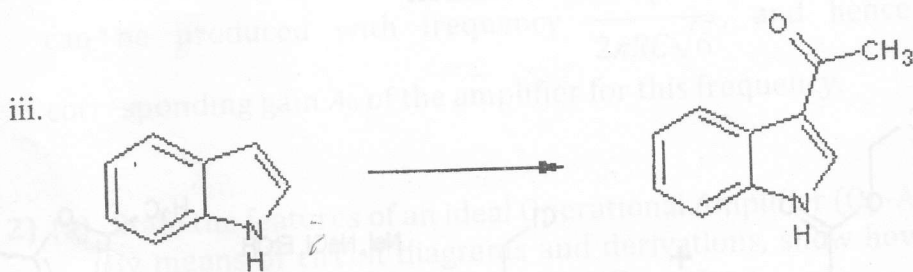
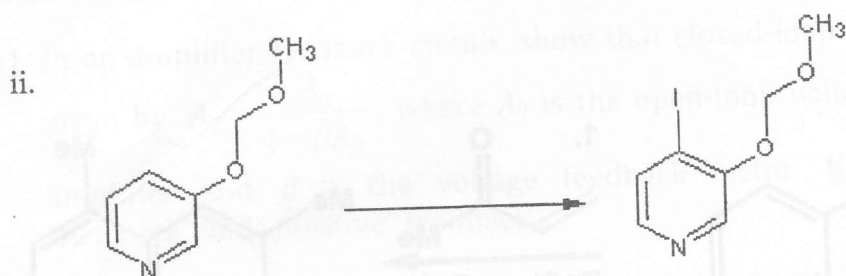
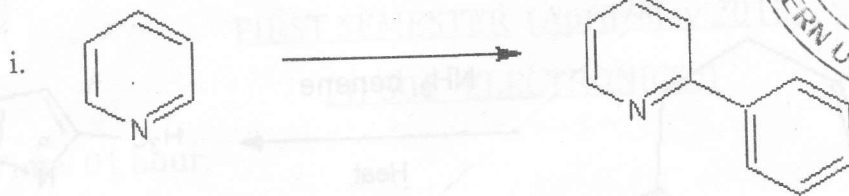
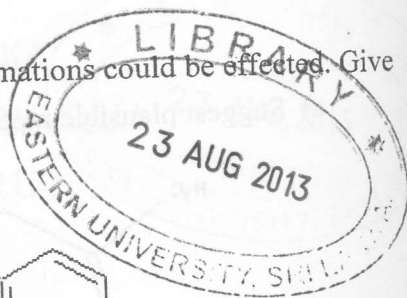
d) Give the structure of the product formed in each of the following rearrangement reaction and suggest plausible mechanism for their formation.



(30 marks)

Contd...

2. a) Indicate by means of equation how the following transformations could be effected. Give essential experimental conditions.



(30 marks)

b) Explain the following observations.

i. Electrophilic substitution reactions of pyridine occur predominantly at  $\beta$  position than at  $\alpha$  and  $\gamma$ . (15 marks)

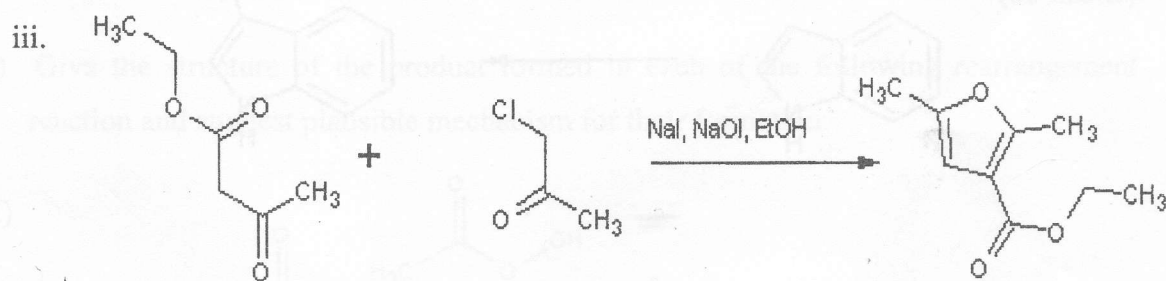
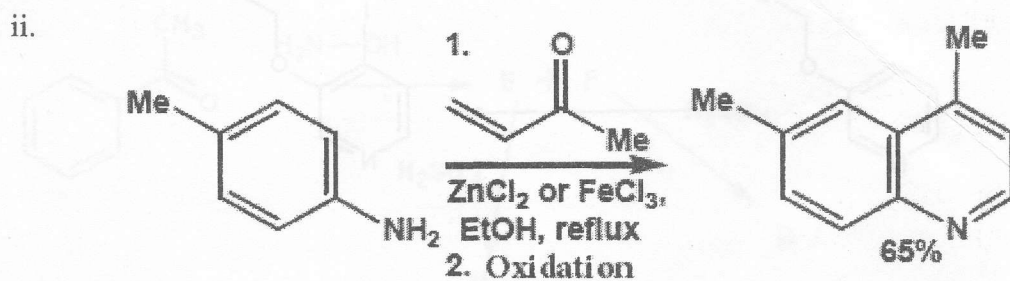
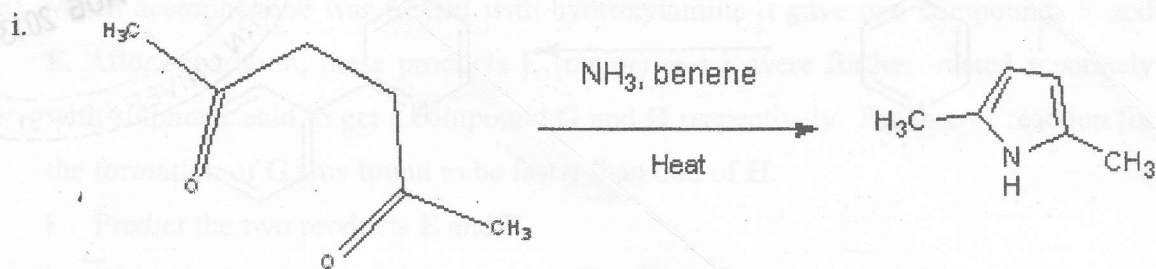
ii. Electrophilic substitution reactions of pyrrole furans and thiophenes occur predominantly at  $\alpha$  position than at  $\beta$ . (15 marks)

iii. Quinoline is much more reactive towards electrophilic substitution than pyridine. (10 marks)

(10 marks)

Contd...

c) Suggest plausible mechanisms for the following reactions.



(30 marks)

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