

UNIVERSITY OF ESWATINI
FINAL EXAM – 2019

TITLE OF PAPER : Heterocyclic Chemistry

COURSE NUMBER : CHE 431

TIME : Three Hours

INSTRUCTIONS:

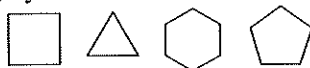
Answer any four (4) questions of the six (6) questions and every question holds 25 marks.
NB: all questions are to be answered in a separate answer sheet.

Question 1

- Pyridines prefer the β position as compared to the (α , γ) position in electrophilic substitution. why? Explain. (8)
- Would it also be the same with Nucleophilic Substitution reaction? Compare? (7)
- Which one is more basic between among pyrrole and Pyrrolidine? Explain your reasoning. (5)
- Which one is more reactive between pyridine and imidazole? (5)

Question 2

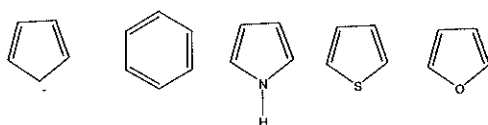
- Cyclohexane and Benzene are two organic molecules with six membered rings, much contrasting reactions and properties such aromaticity.
 - Define aromaticity.
 - what are the necessary conditions for aromaticity? (10)
 - How do the structures of cyclohexane and benzene differ? (5)
- Arrange the following cyclic alkanes in the order of their stability.



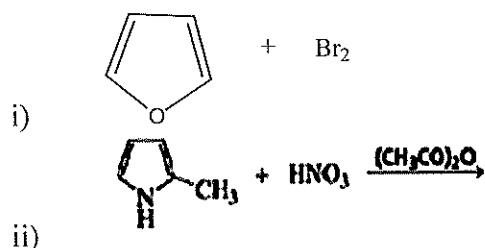
- Give reasons for your order.
- Which one among the cycloalkanes has the highest ring strain? Why? (10)

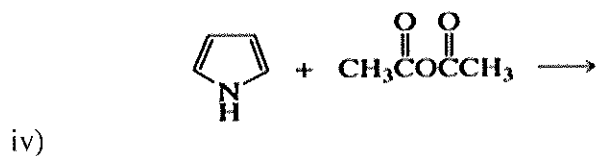
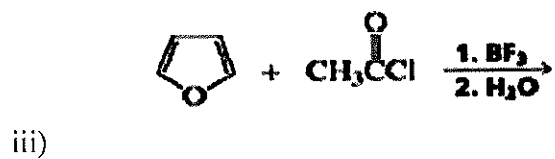
Question 3

- Why is pyridine less reactive than piperidine? Explain. (7)
- Arrange the compounds in the increase of their resonance energies and give reasons for that. (6)



Show the missing reaction products in the following reactions: Produce the missing reaction products in the following reaction condition. (12) in

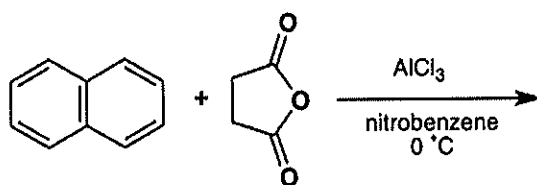




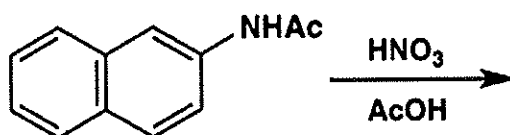
Question 4

a) What are the most probable main product of the following reactions?

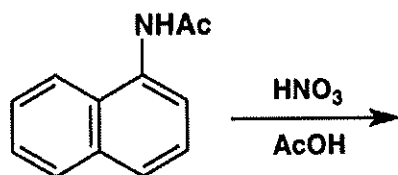
i)(5)



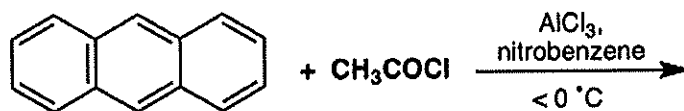
ii) (5)



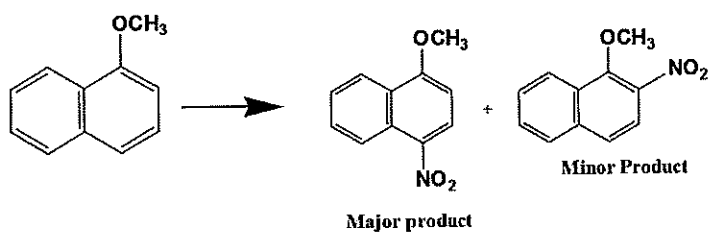
iii) (5)



iv) (5)

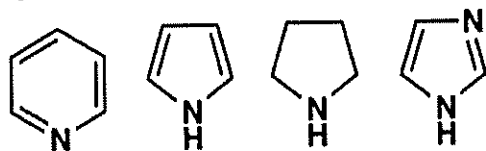


- v) Give reasons why the reaction below goes as indicated below. (5)

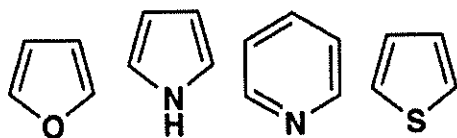


Question 5

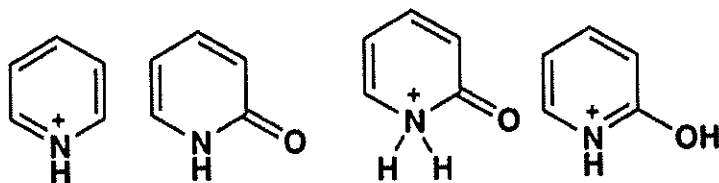
- a) Which of the following compounds show base properties? Arrange them in order of basicity and give reasons for the order. (8)



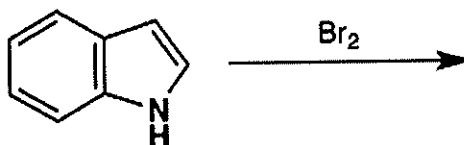
- b) Which of the following compounds are reactive in electrophilic aromatic substitution? Arrange them in the order of reactivity and give reasons. (8)



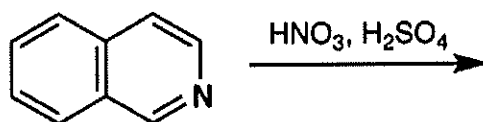
- c) Which of the following structures is not aromatic? Explain (5)



- d) What is the most probable main product of the following reaction? (5)

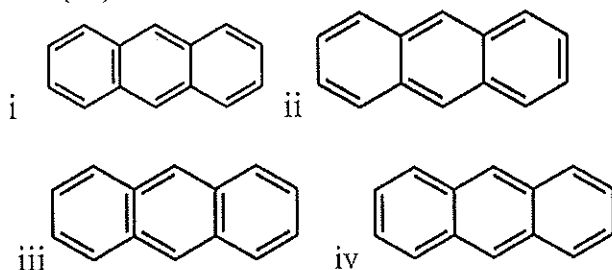


e) What is the most probable main product of the following reaction? Explain (5)



Question 6

a) Which of the following structures is not a resonance contributor of Anthracene? Explain. (10)



b) Naphthalene-2-ol (2-naphthol) readily gives a dibromo substitution product with bromine in ethanoic acid. What is the most likely structure of this compound? (7)

c) Which is most reactive towards an electrophile? Arrange them in order. (8)

