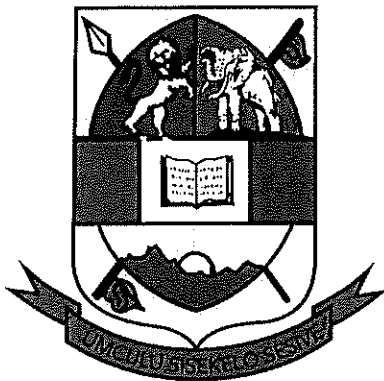


UNIVERSITY OF ESWATINI



Resit-Exam - 2019/2020

TITLE OF PAPER: Advanced Organic Chemistry

COURSE NUMBER: C403

TIME ALLOWED: Three (3) Hours

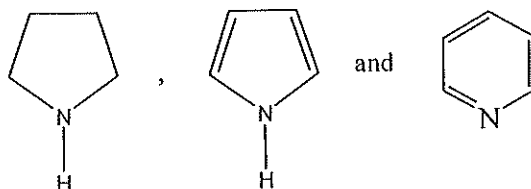
INSTRUCTIONS: There are six (6) questions and answer any four (4) questions in this paper and each question carries 25 Marks. All questions must be answered in the answer sheet.

Please do not open this paper until authorised to do so by the Chief Invigilator.

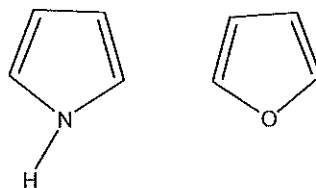
Answer any four of the six questions and all questions have 25 marks each

Question 1

- i) Compare and discuss the reactivity of the following heterocyclic compounds and explain your choice. (7)



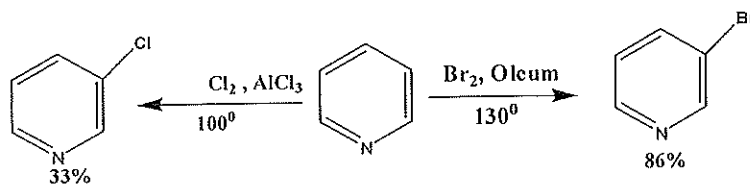
- ii) How would compare the stability of 3 and 4 as well as 5 and 6 membered heterocyclic rings in nature and their ease of formation in the laboratory? Explain the reasons for your answer and elaborate with an example. (7)
- iii) Briefly describe the structure and bonding characteristics in Pyrrole and Furan in terms of orbital hybridization. What is the impact in reactivity of these two heterocyclic compounds? and which one is more aromatic. (6)



- iv) Benzene, polycyclic benzenoids and cyclic conjugated polyenes can be aromatic when they have a set of π electrons. Put the relation and indicate the once that are aromatic and not aromatic. (5)

Question 2

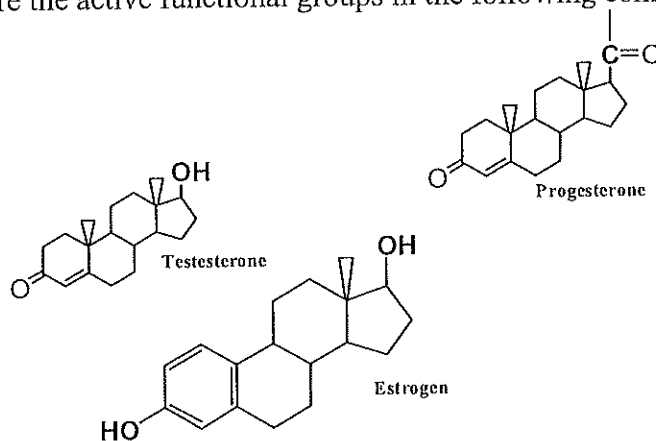
- i) Discuss the reduction in yield of the two Halogenation products of Pyridine. (6)



- ii) Why do we study secondary metabolites from microorganisms, plants and animals? Explain using an example. (10)
- iii) What is the mechanism of action between Heroin and Cocaine? Compare the effect of these two alkaloids and compare them functionally. (9)

Question 3

- i) Friedel-Crafts reactions are not usually possible on free pyridines, why? Can that be modified? (5)
- ii) What is the precursor of the following physiologically active compounds? and What are the active functional groups in the following compounds? (10)



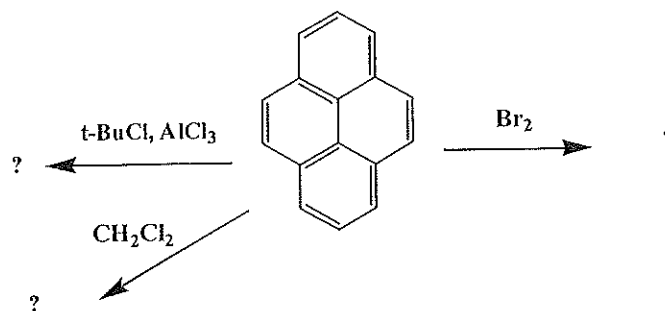
- iii) Why is β cholesterol considered to be exclusive precursor of steroidal hormones?(5)
- iv) What are the common types of hormones in the human body? How do they transmit information? (5)

Question 4

- i) Write a short essay on natural alkaloids, and flavonoids with specific focus on the following general aspects. (20)
- Definition
 - Occurrence and distribution
 - Properties
 - Importance in human health care
- ii) Discuss the biosynthesis of proteins, and terpenoids. (5)

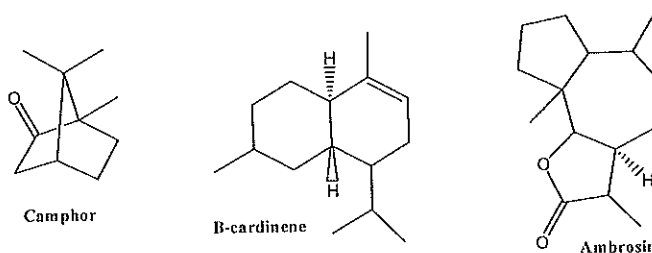
Question 5

- i) Complete the reaction products of the following reactions. (6)



ii) What is interesting about the stability of allylic and benzylic carbocation intermediates of conjugated compounds? (4)

iii) The following Terpenes are made up of more than one isoprene units. Draw the compounds and with dotted lines identify the five carbon units corresponding to the isoprene units in each compound. (6)



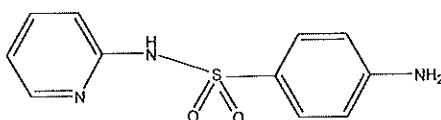
iv) Order the following aromatic structures in their energy of resonance magnitude and give your reasons for that.(9)

Order these structures in increasing resonance Energy

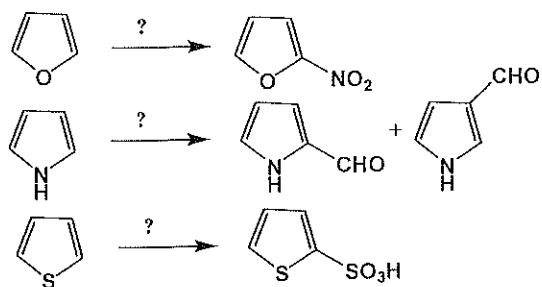


Question 6

i) What is interesting about this molecule? Discuss it; it is one of the oldest antibiotics. (6)



ii) Fill the missing reagents in the following reaction scheme. (9)



- iii) Differentiate between Primary, secondary, tertiary and quaternary structures of proteins. (10)