

UNIVERSITY OF ESWATINI



Final Examination 2019/2020

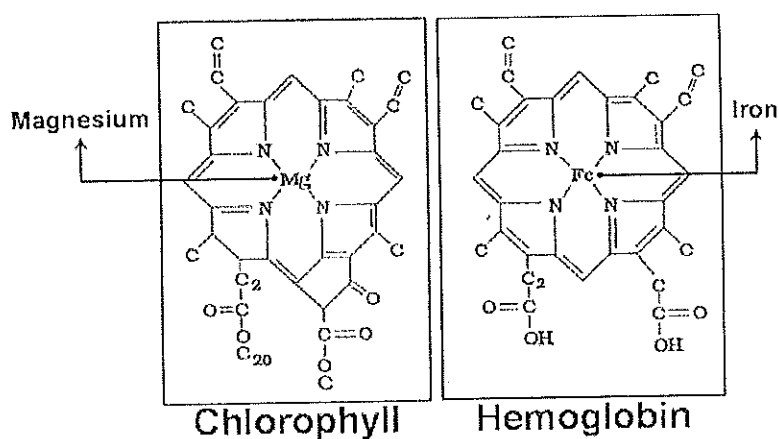
TITLE OF PAPER:	Advanced Organic Chemistry
COURSE NUMBER:	C403
TIME ALLOWED:	Three (3) Hours
INSTRUCTIONS:	There are six (6) questions and answer any four (4) questions in this paper and each question carries 25 Marks. All questions must be answered in the answer sheet.

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

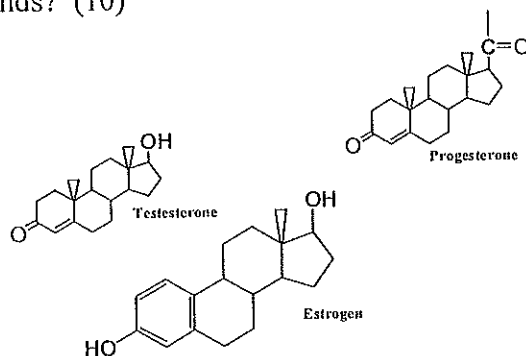
Question 1

- What is interesting about the stability of allylic and benzylic carbocation intermediates of conjugated compounds? (5)
- Discuss the reactivity of pyridine in comparison with benzene. (5)
- What heterocyclic compounds are involved in the physiologically active macro molecules chlorophyll and Hemoglobin? What are the roles of these heterocyclic macro molecules in life and what similarities do you see in their chemical composition and action? (10)

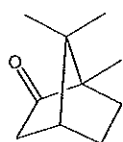


Question 2

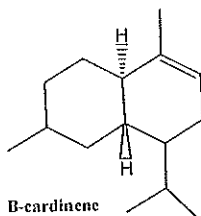
- What is the precursor of the following physiologically active compounds and what could be said about the structure of the carbon polycyclic compounds? Indicate the sources of these compounds? (10)



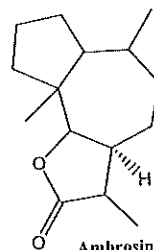
- b) The following Terpenes are made up of more than one isoprene units. Draw the compounds and with dotted lines identify the five carbon units corresponding to the isoprene units in each compound. (6)



Camphor



B-caradinene

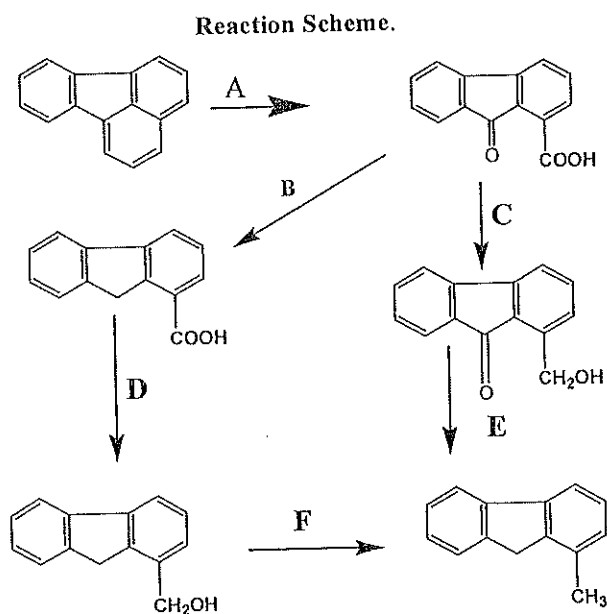


Ambrosin

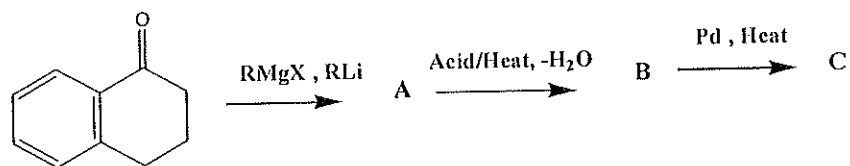
- c) Why do we study biosynthesis of natural products? (5)
 d) Write down the structure of the principal product in the following reaction. (4)

Question 3

- a) What is the distinguishing feature of all aromatic compounds? Explain. (7)
 b) Determine the identity of the following reactants in the reaction scheme. (12)



- c) Give the structure of A, B and C in the sequence of reactions below. (6)



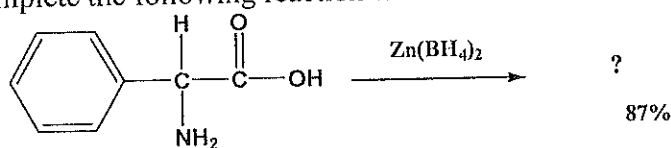
Question 4

a) Discuss the different classes of natural products given below. In your discussion give examples of each and show how they are biosynthesized from CO_2 and H_2O in the presence of sun light? (25)

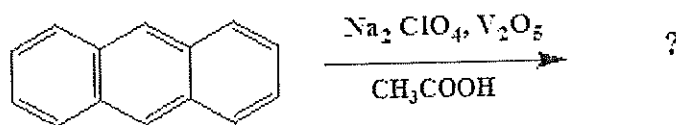
- i) Terpenes (7)
- ii) Alkaloids (8)
- iii) C) Flavonoids (9)

Question 5

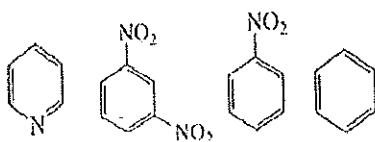
a) Complete the following reaction which is common with amino acids. (5)



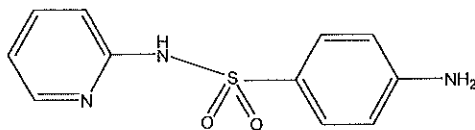
b) What are the reaction products of the following reactions? (5)



c) What is the relative reactivity in electrophilic aromatic substitution? Explain? (10)



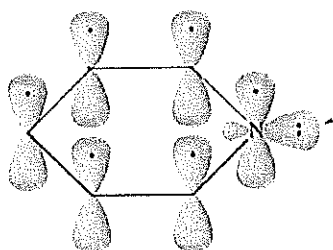
d) What is interesting about this molecule? Discuss it. By the way it is one of the oldest antibiotics. (5)



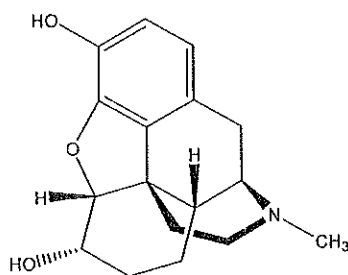
Question 6

- Differentiate between Primary, secondary, tertiary and quaternary structures of proteins. (10)
- The following orbital diagram is for a hetrocyclic compound A. Determine the structure and reactivity. (6)

A



- Morphine is a natural product that is a psychoactive chemical and it is an opioid analgesic drug that directly acts on the nervous system. Compare the bioactivity between morphine, codeine and heroin. What is responsible for the difference in bioactivity? (9)



Morphine