

**UNIVERSITY OF SWAZILAND
FIRST SEMESTER FINAL EXAMINATION 2011**

TITLE OF PAPER : Natural Products

COURSE NUMBER : C604

TIME : Three Hours

INSTRUCTIONS : Answer any **FOUR** Questions. Each Question carries 25 Marks.

This Paper contains three (3) pages.

You must not open this paper until the Chief Invigilator so has granted permission to do.

Question 1

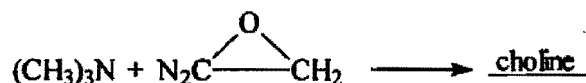
Briefly describe the process of fatty acid biosynthesis from acetylcoenzymeA($\text{CH}_3\overset{\text{O}}{\parallel}\text{CCoA}$) (25 marks)

Question 2

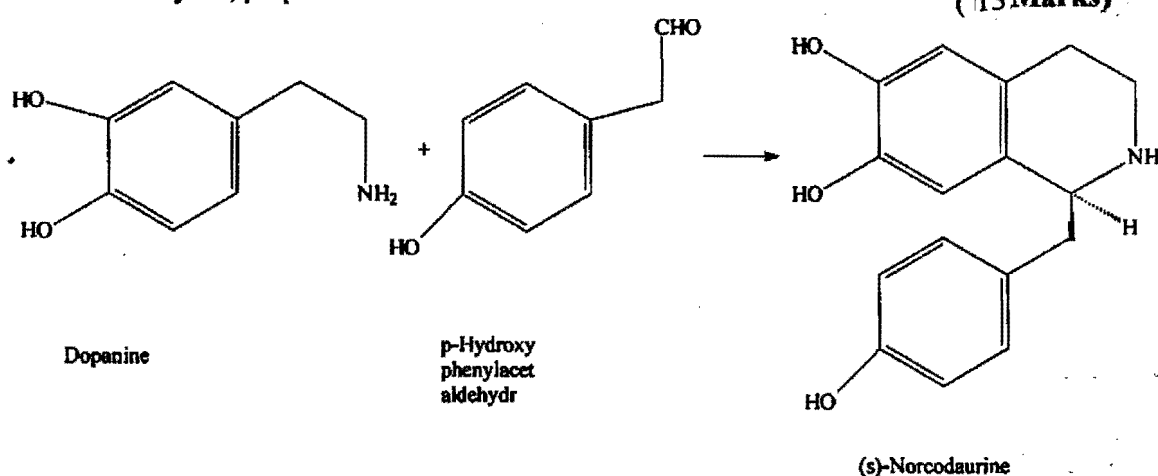
Write a short essay on Terpenes: Naturally occurring alkenes. (25 marks)

Question 3

- (a) Choline a component of the phospholipids in cell membranes, can be prepared by $\text{S}_{\text{N}}2$ reaction of trimethylamine with ethylene oxide. Show the structure of choline, and propose a mechanism for the reaction. (12 Marks)



- (b) One step in the biosynthesis of morphine is the reaction of dopamine with p-hydroxyphenyl acetaldehyde to give (s)-norcodaurine. Assuming that the reaction is acid catalysed, propose a mechanism. (13 Marks)

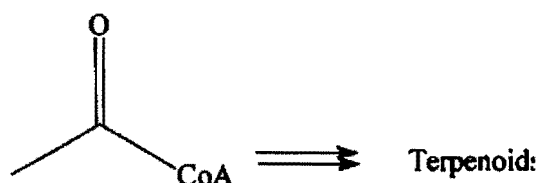


Question 4

Amino acids can be synthesized in racemic form by several methods. Give a summary of the methods for laboratory synthesis of amino acids. (25 marks)

Question 5

Describe an overview of terpenoid biosynthesis from acetyl CoA. (25 marks)



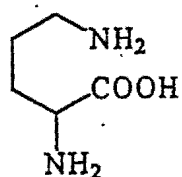
Question 6

(a) Write a short essay on natural alkaloids with specific focus on the following general aspects:

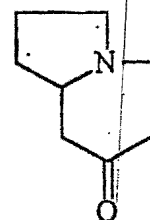
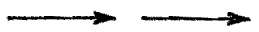
- Definition
- Occurrence and distribution
- Properties
- Isolation
- Importance in human health care

(9 marks)

(b) Give a brief outline of the biosynthesis of the alkaloid hygrine from ornithine.



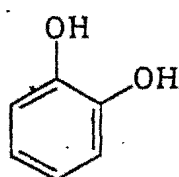
Ornithine



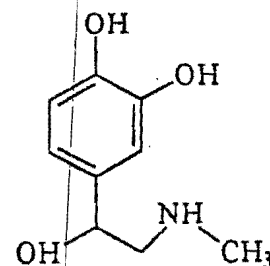
Hygrine

(8 marks)

(c) Outline the sequence of steps and show the appropriate reagents in the synthesis of adrenaline from catechol.



Catechol



Adrenaline

(8 marks)