



RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General / Honours) Degree

Third Year Semester I Examination – June / July 2018

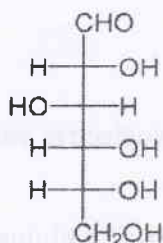
CHE 3209 – NATURAL PRODUCTS

Answer any four (04) questions.

Time: 02 hours

1. (a). i. What types of sugars can undergo mutarotation?
ii. Explain why does maltose undergo mutarotation but sucrose does not?
iii. Explain mutarotation of a hemiacetal. (30 marks)

- (b). Give the mechanism of D- glucose epimerization in to
i. D- mannose and
ii. enolate ion



D- glucose

(30 marks)

- (c). Complete the following reactions

i. β - D- fructofuranose

$\xrightarrow{\text{Ac}_2\text{O} / \text{pyridine}}$

ii. α - D- galactopyranose

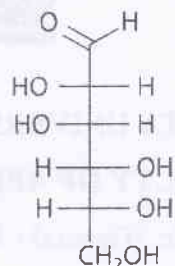
$\xrightarrow{\text{acetone, anhydrous CuSO}_4}$

$\xrightarrow{\text{Conc. H}_2\text{SO}_4}$

(40 marks)

2.

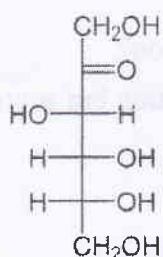
- (a). Write the reaction mechanism and the products when D-mannose is subjected to Kiliani-Fischer synthesis



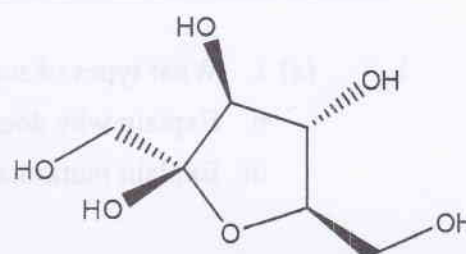
D-mannose

(20 marks)

- (b). Explain the mechanism of cyclic hemiacetal formation for following conversion



D- fructose



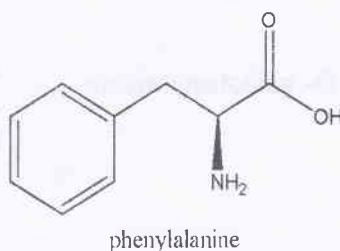
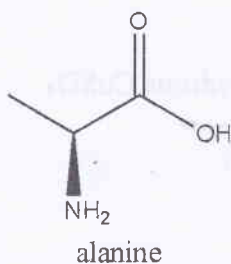
Beta-D-fructofuranose

(25 marks)

- (c). Write a short note on Isoelectric point of an amino acid (15 marks)

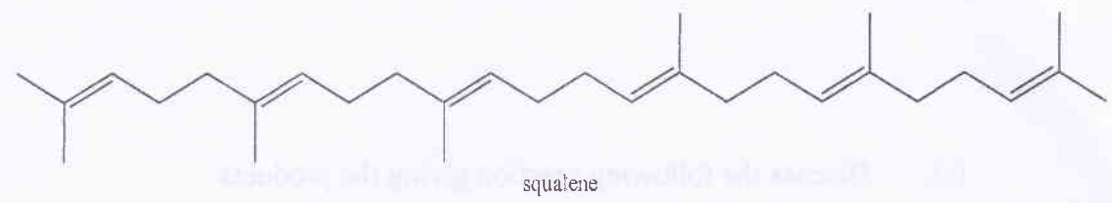
- (d). Describe Edman degradation giving a suitable example for it's mechanism (25 marks)

- (e). Write down the structures of the tripeptide, Ala-Thre-Phe (15 marks)



3. (a). What are the two main precursors used in biosynthesis of terpene / terpenoids?
(10 marks)

(b). Explain how triterpene named "squalene" is formed from isoprene units

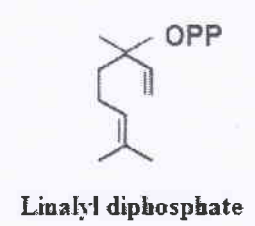
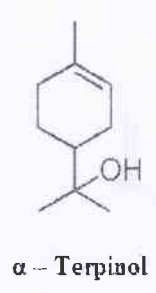


(10 marks)

(c). Outline the biosynthesis pathway of mevalonic acid from glucose
(30 marks)

(d). Propose a mechanistic pathway for the biosynthesis of α -terpineol from isopentenyl diphosphate
(30 marks)

(e). Write all the reactions and mechanisms of synthesis of α -terpinol starting from isopentenyl diphosphate and dimethylallyl diphosphate via linalyl diphosphate



(20 marks)

4.

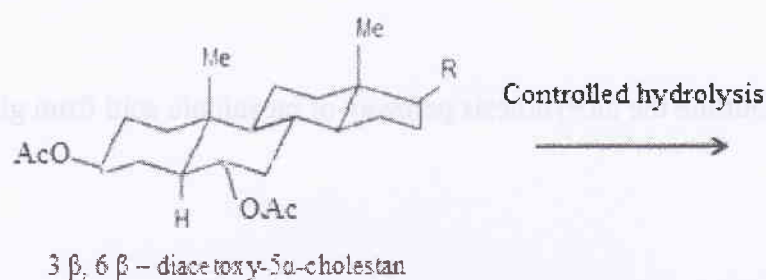
(a). What are the types of steroids and briefly explain them

(20 marks)

(b). Outline the biosynthetic pathway of cholesterol starting from squalene

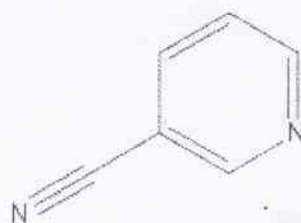
(30 marks)

(c). Discuss the following reaction giving the products



(20 marks)

(d). Describe the synthetic pathway of nicotine considering the nicotinonitrile as the starting material



nicotinonitrile

(30 marks)

5.

Select only two sections from each part and write short notes on selected topics.

Part I

- i Anomeric effect
- ii Properties of amino acids
- iii Describe extraction, purification and isolation of alkaloids from a powdered plant material

(30 marks)

Part II

- i Polysaccharides
- ii Essential amino acids
- iii Classification of alkaloids

(30 marks)

Part III

- i Ruff degradation
- ii Levels of protein structure
- iii Stereochemistry of steroids

(40 marks)

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