



RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. in Applied Sciences

Third Year Semester I Examination – July / August 2023

CHE 3209 – NATURAL PRODUCTS CHEMISTRY

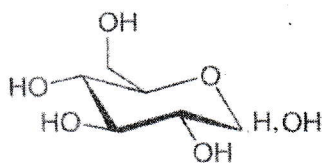
Answer all questions.

Time: 02 hours

1. (a). Briefly describe the importance of natural products in drug discovery.

(05 marks)

- (b). Discuss the anomeric effect using D-Glucopyranose.



D - Glucopyranose

(05 marks)

- (c). Describe how the enediol rearrangement pathways convert D - glucose to D - fructose.

(05 marks)

- (d). Write the reactions when D - glucose is treated with following reagents.

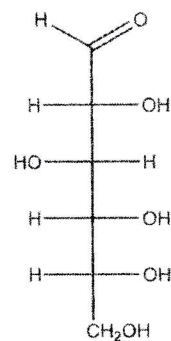
i.  $\text{HNO}_3$

ii.  $\text{HIO}_4$

iii.  $\text{PhNHNH}_2 / \text{H}^+$

iv.  $\text{CH}_3\text{I} / \text{Ag}_2\text{O} / \text{H}^+$

v.  $(\text{Ag}(\text{NH}_3)_2)\text{NO}_3 / \text{OH}^-$

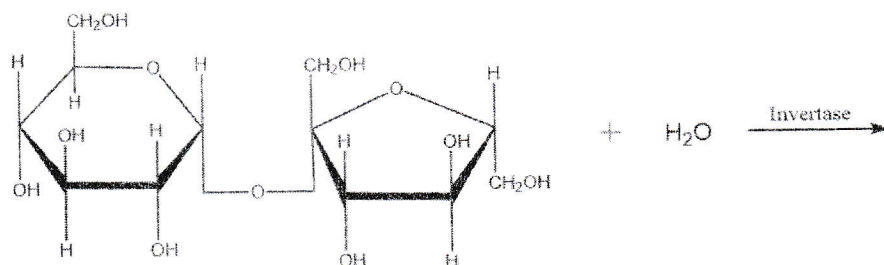


D - Glucose

(10 marks)

2.

- (a). In the presence of aqueous acid or the enzyme invertase, sucrose was converted into a mixture of negatively rotating molecules. Explain this statement.



(03 marks)

- (b). Discuss the difference between cellulose and amylopectin.

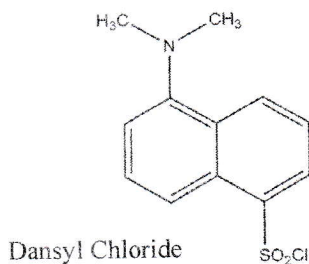
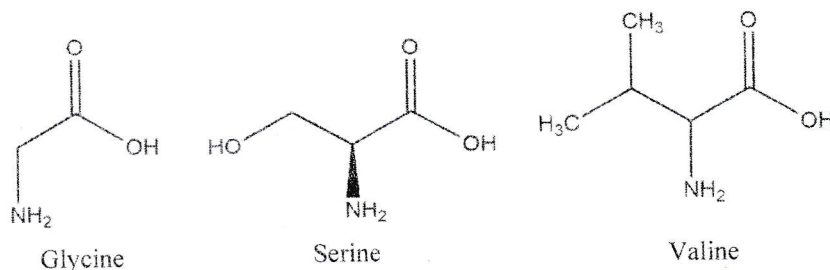
(04 marks)

- (c). Describe the following terms regarding amino acids:

- i. Zwitterion
- ii. Isoelectric point

(04 marks)

- (d). Write down the structures of the tripeptide, Gly-Ser-Val. Identify the reactions and the structures of all products when the tripeptide is treated with the chemical Dansyl Chloride during the structure determination process.



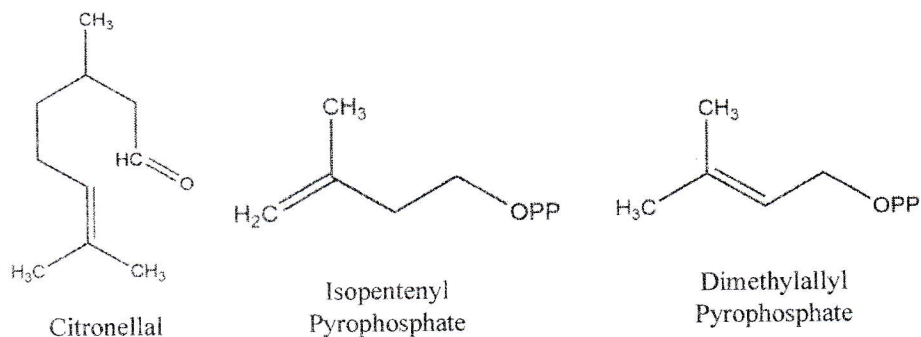
(10 marks)

- (e). Describe in detail the test method that is used to determine the amino acids.

(04 marks)

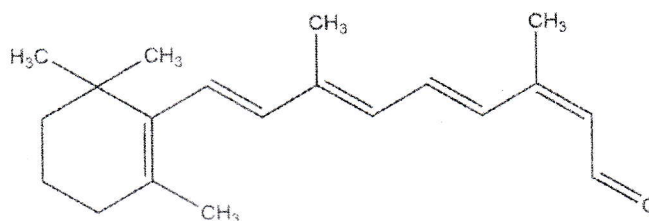
3.

- (a) Outline the biosynthesis pathway of Isopentenyl Pyrophosphate from Acetyl-CoA. (05 marks)
- (b) Write out the precise chemical reactions that lead to the creation of Citronellal, beginning with Isopentenyl Pyrophosphate and Dimethylallyl Pyrophosphate.



(06 marks)

- (c) Describe the importance of cis-retinal and its transformation to trans-retinal for the vision in human beings.

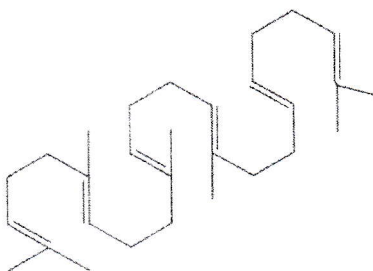


(06 marks)

- (d) Write a short account of the types of steroids.

(03 marks)

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



Squalene

(05 marks)

4.

(a). Write a short account on traditional classification of alkaloids.

(04 marks)

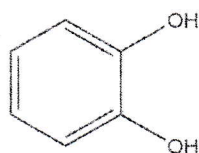
(b). Briefly describe the extraction process of alkaloids from natural sources.

(04 marks)

(c). How would you confirm the presence of phenolic group in alkaloids?

(03 marks)

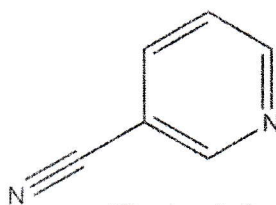
(d). Describe the process for synthesizing piperine using 2-hydroxyphenol as the starting material.



2-hydroxyphenol

(06 marks)

(e). Describe the synthetic pathway of Nicotine considering Nicotinonitrile as the starting material.



Nicotinonitrile

(08 marks)

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