RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General / Special) Degree

Third Year Semester I Examination – Oct / Nov 2015

CHE 3209 – NATURAL PRODUCTS

Answer any four questions. Time: 02 hours

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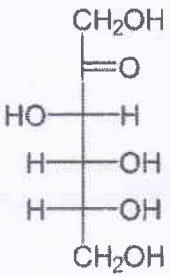
1. (a). Write a short note on "Classification of sugars"

(10 marks)

(b). Outline the reaction of formation of α and β anomers of D-fructofuranose from D-Fructose

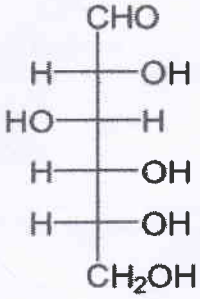


D - Fructose

(05 marks)

(c). Write the reactions when D- Glucose is treated separately with following reagents.

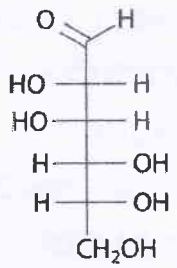
i. Br_2 water
ii. HIO_4
iii. $PhNHNH_2$
iv. C_2H_5SH / Conc. HCl
v. HNO_3 / H_2O / Δ



D- Glucose (10 marks)

2.

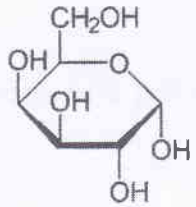
(a). When D – glucose was treated with a base, a mixture of D-Glucose, D-Mannose and D- Fructose resulted. Explain the statement.



D-Mannose

(08 marks)

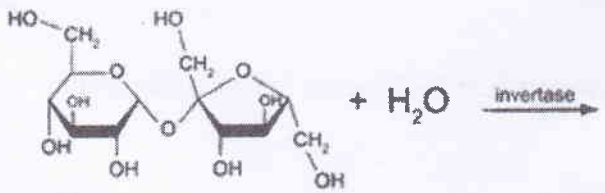
(b). Both α–D-galactopyranose and β–D-galactopyranose produces same product when treated with Acetone / Anhydrous $CuSO_4$ / Conc. H_2SO_4 . Draw all the structures and explain the statement.



α – D-galactopyranos

(07 marks)

(c). When sucrose was treated with aqueous acid or invertase enzyme, a mixture of compounds with negative rotation formed. Explain the statement.



Sucrose [α] = +66

(04 marks)

(d). Write a short note on structure and properties of Amylose

(06 marks)

3.

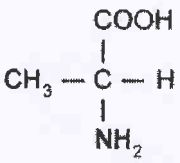
(a). Write a short note on following topics

i). Classification of Proteins

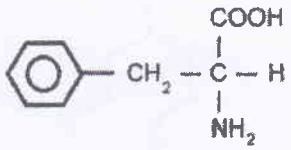
ii). Properties of Amino Acids

(07 marks)

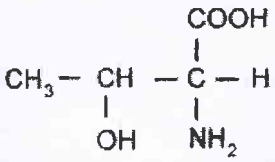
(b). Draw the structures of the tetrapeptide, Ala- Phy- Gly-Thre. Further, write down the reaction and the products of this tetrapeptide when treated with Hydrazene.



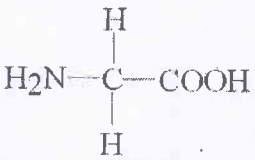
Alanine



Phenyl alanine



Threonine



Glycine

(08 marks)

(c). Describe the test method that can be used to identify amino acids using Ninhydrin

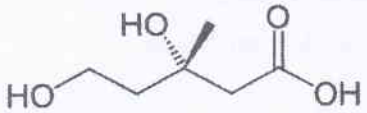
(05 marks)

(d). Write a short account on classification of terpines

(05 marks)

4.

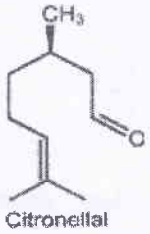
(a). Outline the biosynthesis pathway of Mevalonic acid from Glucose.



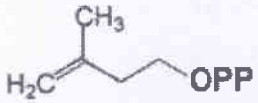
Mevalonic acid

(05 marks)

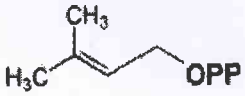
(b). Write detailed reaction mechanisms of synthesis of Citronellal, starting from Isopentenyl Diphosphate and Dimethylallyl Diphosphate



Citronellal



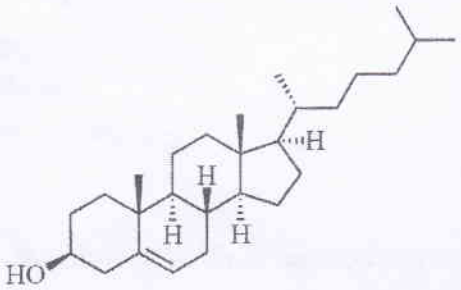
Isopentenyl Diphosphate



Dimethylallyl Diphosphate

(09 marks)

(c). Complete the following reactions



3β-cholest-5-en-3-ol

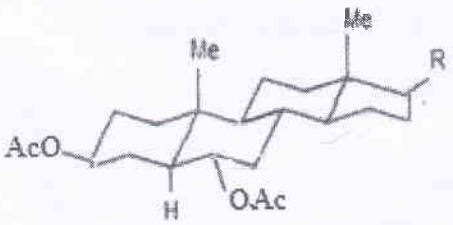
H_2O_2 →

$KMnO_4$ →

Br →

(06 marks)

(d). Discuss the following reaction giving the products



3 β, 6 β – diacetoxy-5α-cholestan

Controlled hydrolysis →

(05 marks)

5. (a). Briefly outline the classification of alkaloids

(05 marks)

(b). How would you confirm the presence of following groups in alkaloids

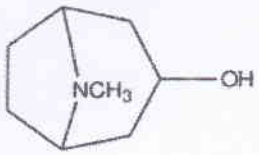
i. OH^-

ii. N compounds

iii. R-C(O)-R

(04 marks)

(c). Outline the synthesis of Tropine using butanedial, methyl amine and acetone dicarboxylic acid as raw materials

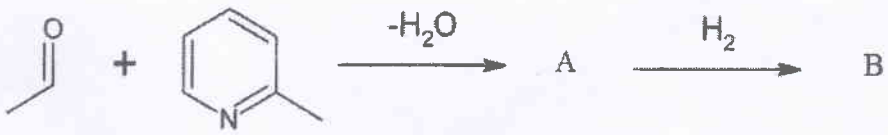


Tropine

(07 marks)

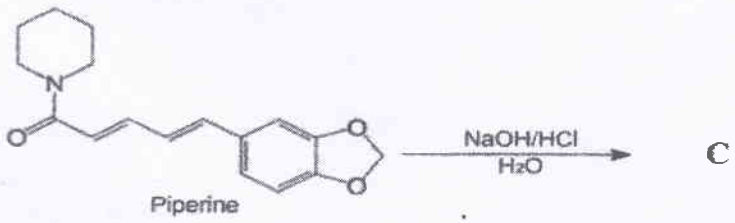
(d). Identify the structures of A, B,C, D, E and F in the following reactions.

i.



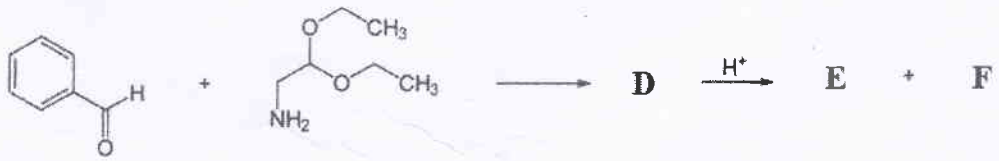
Acetaldehyde 2-Methylpyridine

ii.



Piperine

iii.



Benzaldehyde Aminoacetaldehyde diethyl acetal

(09 marks)