

Reg. No:

The Open University of Sri Lanka
B. Sc Degree / Stand Alone Programme 2006/2007
Chemistry of Amino acids, Sugars and Related Compounds
CHU 3131 / CHE 5131
Level 5 - Assignment II - Test
Duration 1 1/2 hours



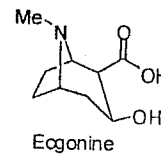
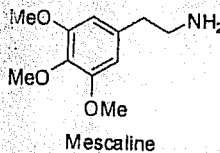
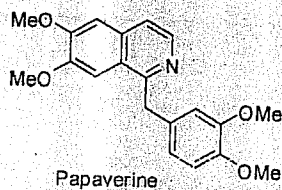
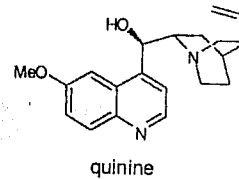
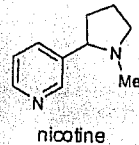
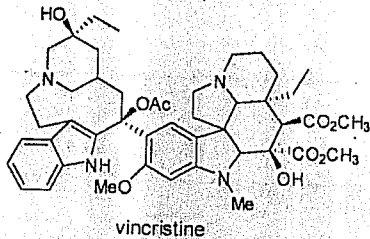
Q	Marks	
	Max	Awarded
1	24	
2	24	
3	32	
4	20	
Total		

Tuesday, 06th February 2007

3.30 - 5.00 p.m.

Answer all questions.

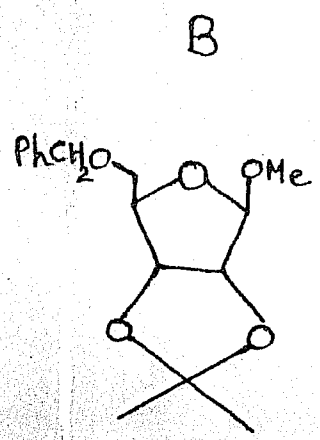
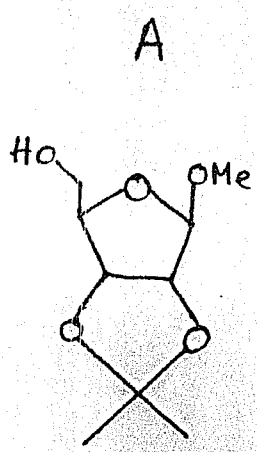
1. (a) Classify the following alkaloids in their groups according to the nucleus present.



(b) Explain briefly, giving relevant Chemistry, how you would separate the alkaloid fraction from a plant. (12 Marks)

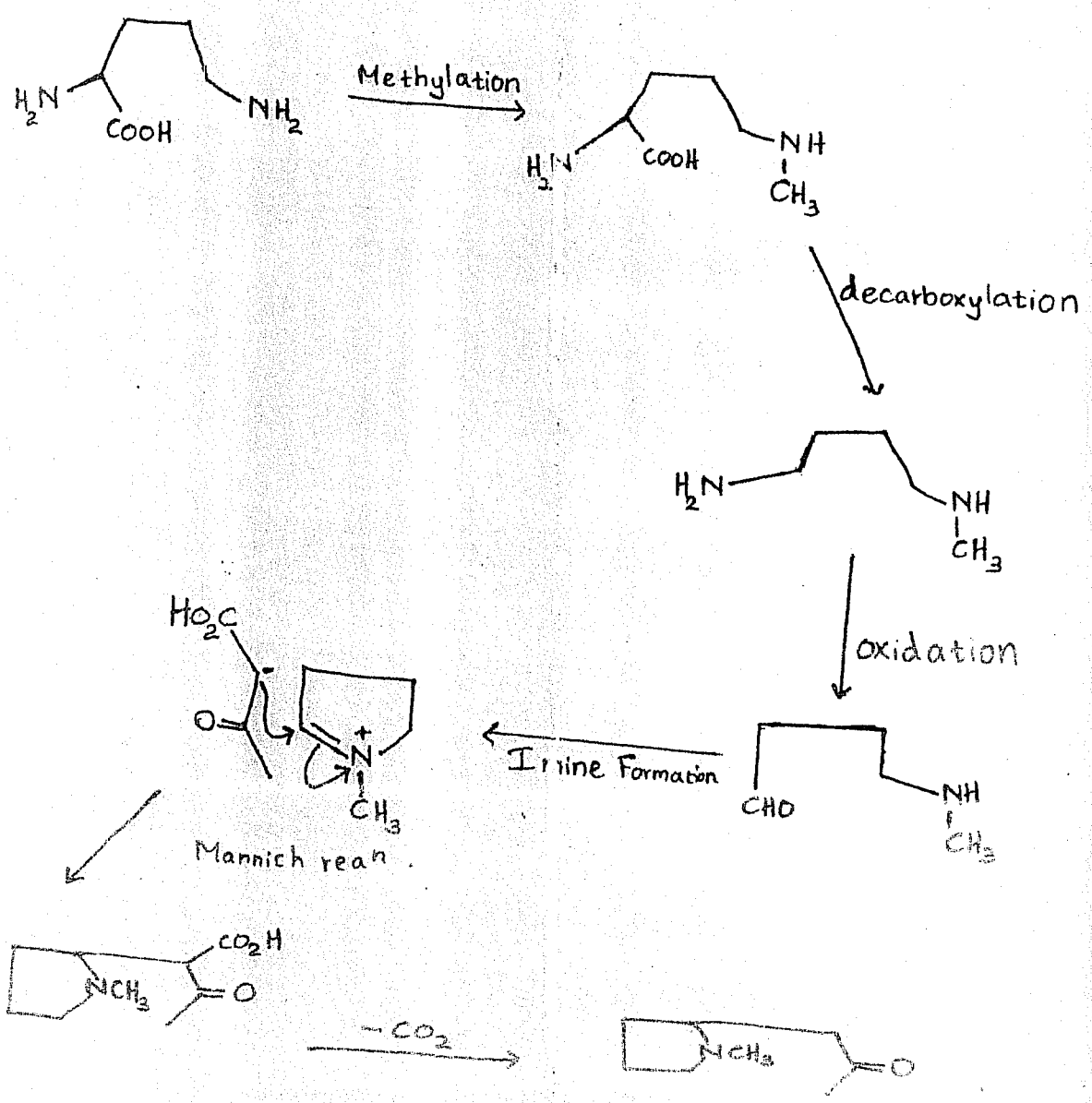
(12 Marks)

3. a)



- b) Structures C & D - refer unit IV Page 16
c) Structures F & G - refer unit III Page 17

4.



2. Reg. No:

2. Following tests / reactions were performed on the disaccharide A ($C_{12}H_{22}O_{11}$) during its structure elucidation. What would you infer from each of them? Explain giving relevant structures where necessary.

(24 Marks)

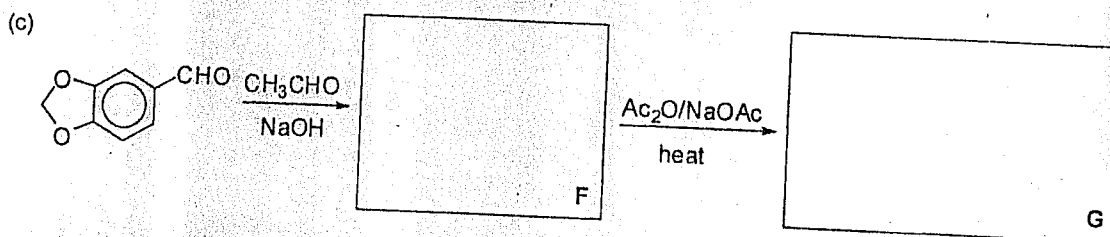
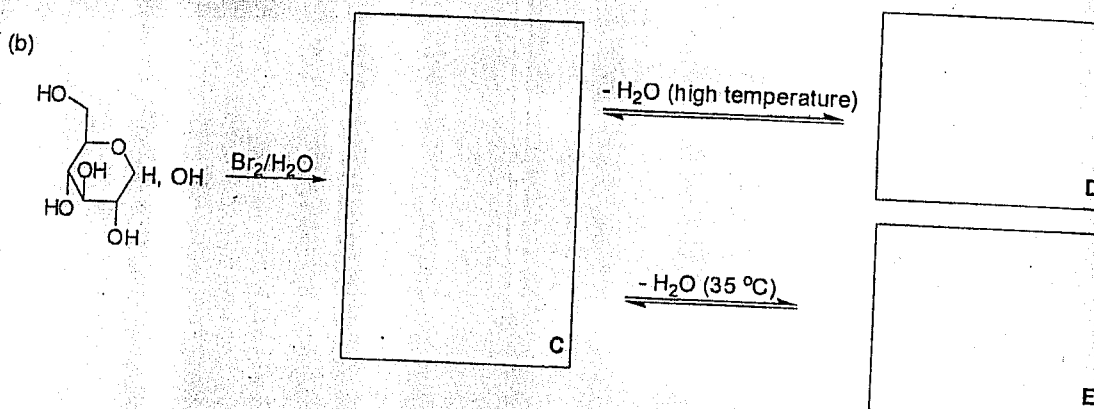
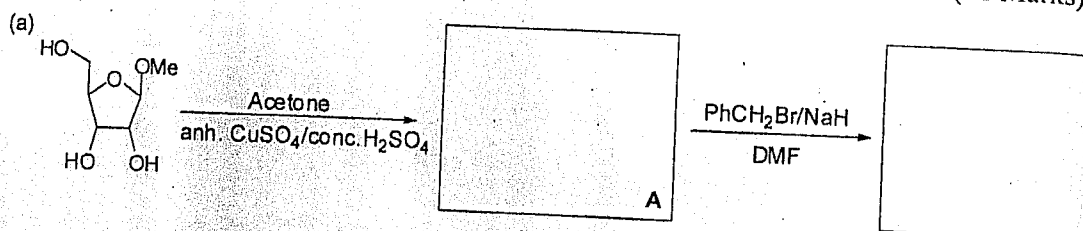
Test / Reaction with the Observation	Inference(s) with explanations Give relevant structures where necessary
A ($C_{12}H_{22}O_{11}$) gave a brick red precipitate when treated with Benedict's reagent.	
A was subjected to acid hydrolysis followed by reduction with $NaBH_4$.	
GLC analysis of the above product mixture showed the presence of hexa- <i>O</i> -acetyl mannose and hexa- <i>O</i> -acetyl glucose.	
Treatment of A with MeI in the presence of dimethyl anion gave the product B.	
B gave 2,3,4,6-tetra- <i>O</i> -methyl-D-glucopyranose and 2,3,4-tri- <i>O</i> -methyl-D-mannopyranose on acid hydrolysis.	
1H NMR spectrum of B showed a doublet at δ 5.2 ($J = 2.4Hz$) which was assigned to the anomeric proton of the glucopyranose moiety.	

What is the structure of B?

What is the structure of A?

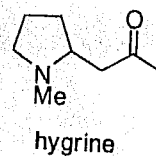
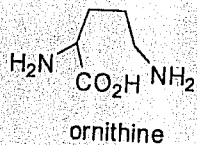
3 Reg. No:

3. Give the structures of the compounds, A – G of the following reaction schemes. (32 Marks)



4. Outline the biosynthetic pathway to hygrine starting from ornithine.

(20 Marks)



Answer guide for Assessment Test II

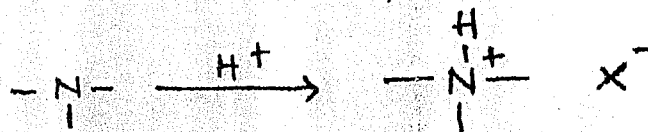
- a) i) Indole ii) pyridine & Pyrrolidine iii) Quinoline

- iv) Isoquinoline v) Phenylethylamine vi) Pyrrolidine

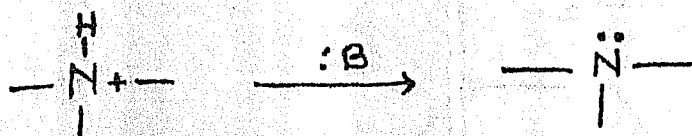
b)

1) Plant material is dried, powdered and extracted with boiling methanol.

2) Distill off methanol, the residue is treated with an inorganic acid (dil HCl/dil H₂SO₄), then alkaloids which are bases, converted to salts which are soluble in water.



3) These salts in aqueous layer is treated with a base (Na₂CO₃/NH₄OH), then free base can be liberated.



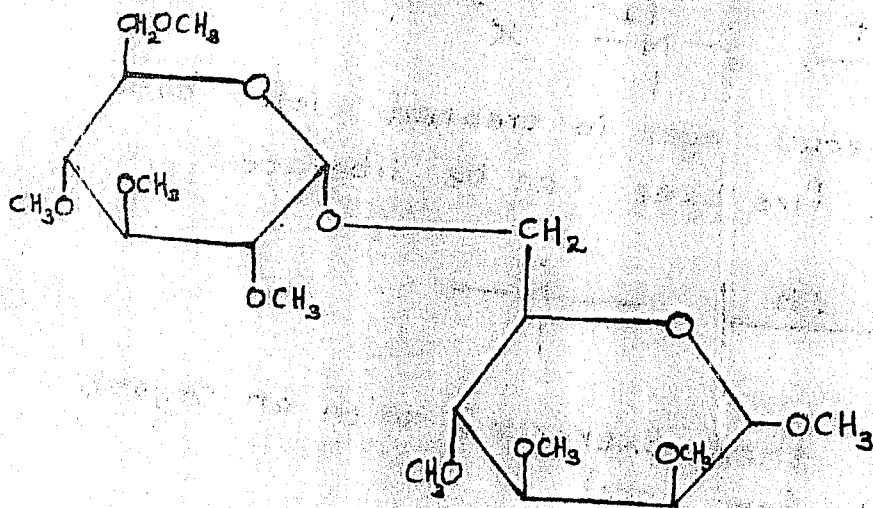
4) These bases are then extracted with an organic solvent (ether/chloroform ... etc)

5) Then alkaloids will come into the organic layer, distill off the solvent and alkaloid ^{Fraction} is separated.

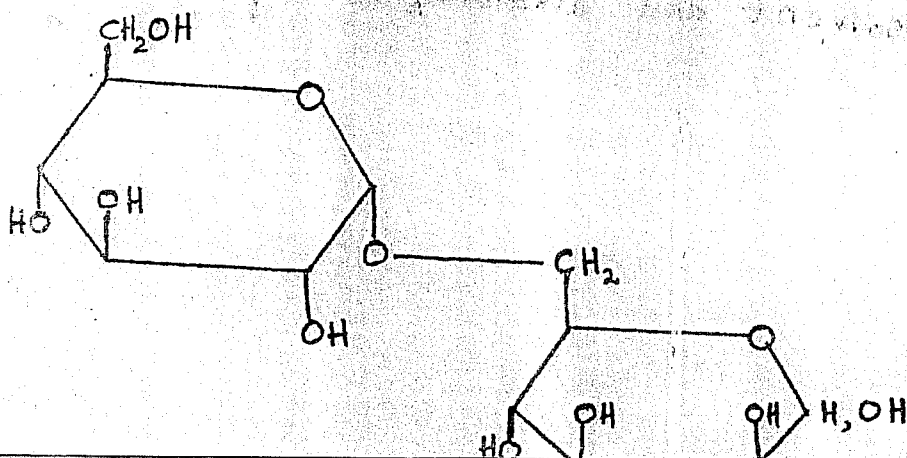
2. Observations from top to bottom :-

- a) Contain a reducing sugar unit/free anomeric OH
- b) A is hydrolysed to 2 monosaccharides and aldehyde groups are reduced to CH_2OH groups/aldetols.
- c) Disaccharide contain 2 monosaccharide units - glucose & mannose
- d) All OH groups get methylated.
- e) Linkage is between C_1 with respect to glucose and C_6 w.r.t mannose.
- f) Anomeric H of glucose is situated at β -position, therefore glycosidic linkage is α .

g) Structure of B :-

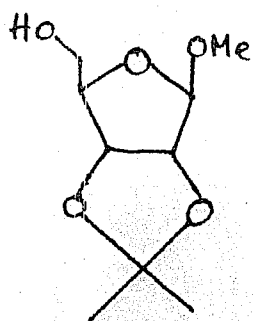


Structure of A :-

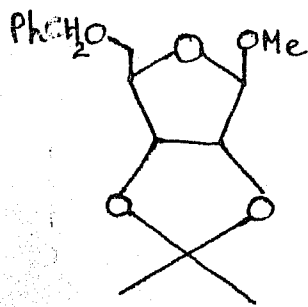


3. a)

A



B



b) Structures C & d - refer unit IV Page 16

c) Structures F & G - refer unit III Page 17

4.

