



UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES
DEPARTMENT OF PHARMACY
FIRST BPHARM PART I EXAMINATION - JANUARY/FEBRUARY 2023
PH1112 PHARMACEUTICAL CHEMISTRY I – SEQ

TIME: TWO HOURS

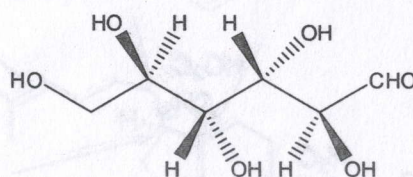
INSTRUCTIONS

- There are **four** questions in part A, B and C in this SEQ paper.
- Answer all questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

PART A

01.

1.1 α -D-mannose is a sweet-tasting sugar. β -D-mannose, on the other hand, tastes bitter. A pure solution of α -D-mannose loses its sweet taste with time as it is converted into the β -anomer. Mannose has the following wedge-dash structure.

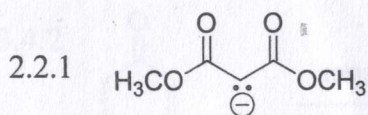


- 1.1.1 Draw the structures of α and β anomers of D-mannose. (10 marks)
- 1.1.2 Explain with structures how the α -anomer is converted to the β -anomer. (10 marks)
- 1.1.3 Draw the Fisher projection of C-4 epimer of mannose. (05 marks)
- 1.2 Draw the dipeptide that results when a peptide bond is formed between the amino acids alanine (N-terminal) and glycine (C-terminal). (10 marks)
- 1.3 Consider the octapeptide, LCYAFGMH.
- 1.3.1 Write the sequence of amino acids in the above peptide in three letter code. (10 marks)
- 1.3.2 Draw the structures of aromatic amino acids present in the above peptide. (10 marks)
- 1.4
- 1.4.1 Draw the structures of the following compounds and give their trivial names.
- a) 1,3,7-trimethylpurine-2,6-dione (05 marks)
- b) 3,7-dimethylpurine-2,6-dione (05 marks)
- c) 2,4-dioxypyrimidine (05 marks)
- 1.4.2 Draw the three tautomeric forms of uracil. (10 marks)
- 1.5 A triglyceride is composed of stearic acid (octadecenoic acid), 9-cis-(or 9- ω) octadecenoic acid and myristic (tetradecenoic acid). Draw the structure of the triglyceride. (20 marks)

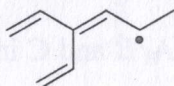
02.

2.1 Explain what is meant by hyperconjugation and draw hyperconjugation structures in ethyl carbocation. (15 marks)

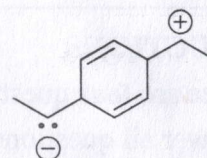
2.2 Draw the resonance structures for the following anion, radical and the zwitterion (if any). Show the electron shift using appropriate electron pushing arrows. (20 marks)



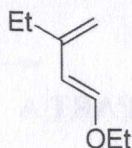
2.2.2



2.2.3



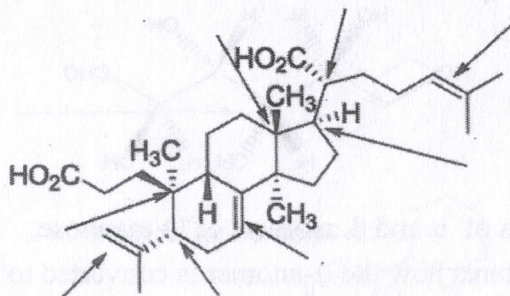
2.3 Which carbons of the following vinyl ether bear partial negative charge? Justify with resonance structures. (10 marks)



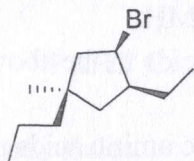
2.4 What are the conditions for cycloalkenes to show geometrical isomerism? (10 marks)

2.5 Lepaleric acid is a natural product. Its structure is shown below:

Assign the stereochemical configuration for the selected chiral centers and the alkenes that are indicated by the arrows. (30 marks)



2.6 Giving stereochemical descriptors complete the IUPAC name of the following compound. (15 marks)

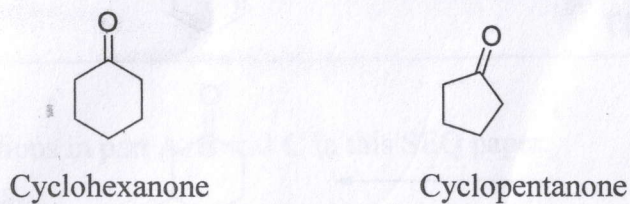


(1..., 3..., 4...)-3-Bromo-4-ethyl-1-methyl-1-propylcyclopentene

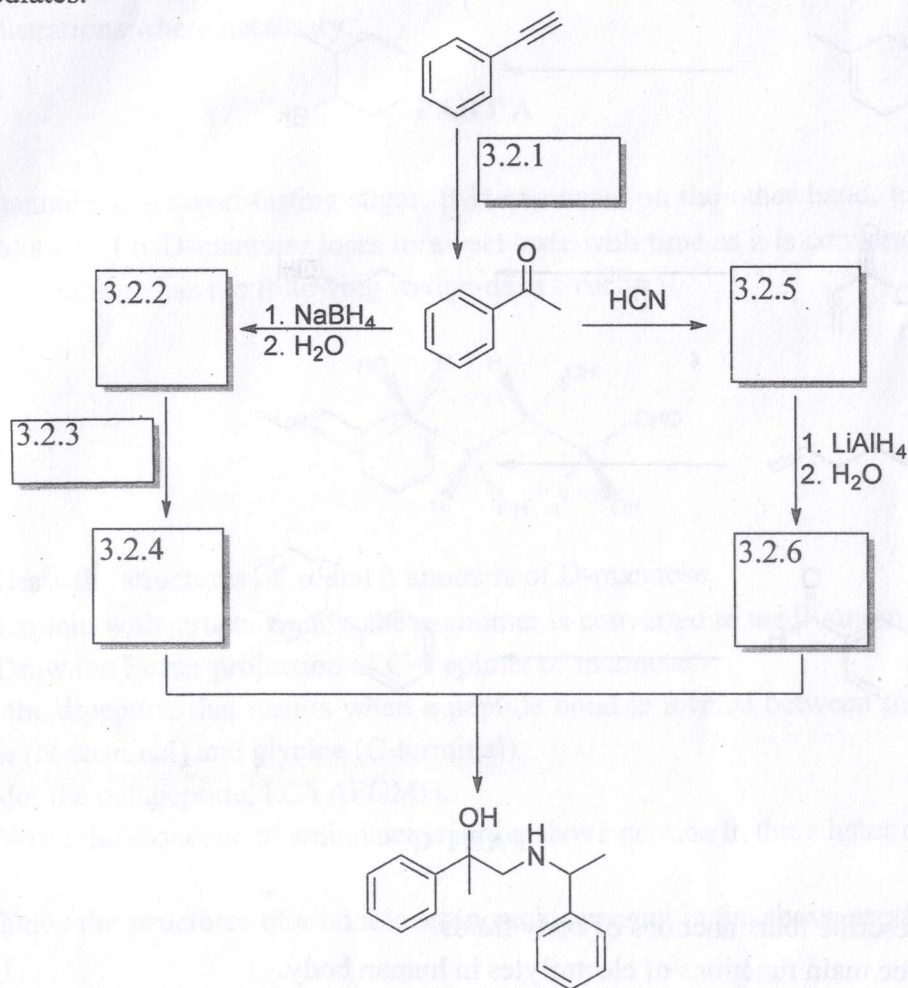
PART B

03.

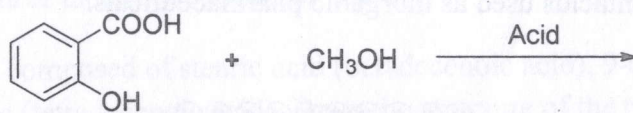
3.1 Draw all the possible products obtained from aldol condensation between cyclohexanone and cyclopentanone. (20 marks)



3.2 Fill in the blanks of the following reaction scheme using reasonable reagents and intermediates. (30 marks)

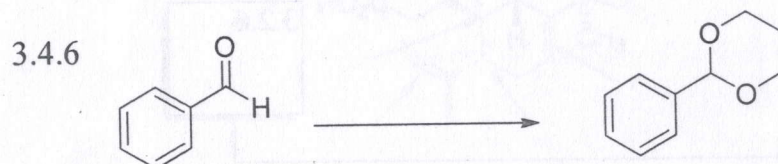
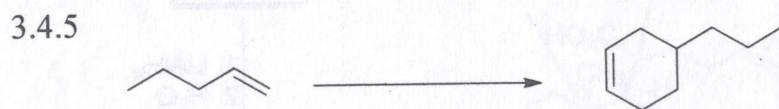
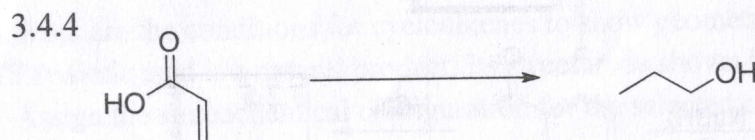
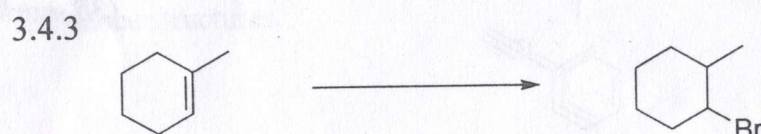
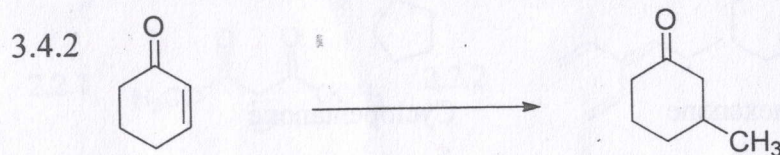
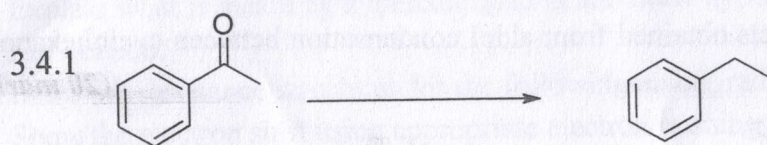


3.3 Write down the mechanism and the major product of acid catalyzed esterification reaction between salicylic acid and methanol. (20 marks)



3.4 What are the reagents required for following transformations?

(30 marks)



PART C

04.

4.1 Briefly describe four functions of body fluids. (20 marks)

4.2 Write three main functions of electrolytes in human body. (15 marks)

4.3 List three disorders related to fluid and electrolyte imbalance. (15 marks)

4.4 What is an 'essential element' in human body? (15 marks)

4.5 Essential elements can be divided into two groups as 'bulk metals' and 'trace metals'. Differentiate bulk metals and trace metals giving two examples for each group. (20 marks)

4.6 Write down three antacids used as inorganic pharmaceuticals. (15 marks)

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