



UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FIRST BPHARM PART I EXAMINATION – NOVEMBER 2020

PH 1112 PHARMACEUTICAL CHEMISTRY I (SEQ) – REVISED SYLLABUS

TIME: TWO HOURS

INSTRUCTIONS

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

PART A

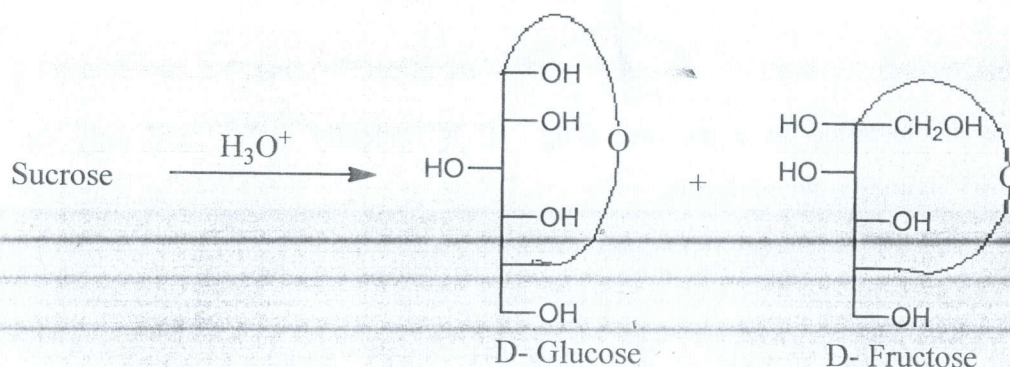
01.

- 1.1 Rank the following carbocations in descending order of relative stability. Explain your choices in terms of the factors contributing to stabilization in each case. (15 marks)

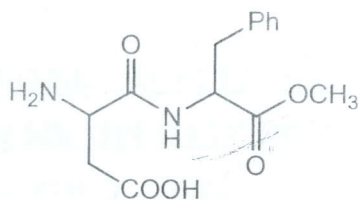


- 1.2 Write down the structures of possible isomers of dichloroethene. Which of them will have zero dipole moment (μ)? (15 marks)

- 1.3 Acid hydrolysis of sucrose gives the following products.



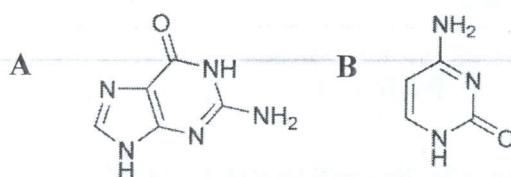
- 1.3.1 Draw Haworth formulae of α/β -glucopyranose and α/β -fructofuranose forms for the two products. (15 marks)
- 1.3.2 Draw chair conformations of α and β -glucopyranose. (10 marks)
- 1.4 Aspartame which is an artificial sweetener, is a dipeptide and has the following structure:



- 1.4.1 Draw the zwitterionic structure of it. (05 marks)
- 1.4.2 Draw the structures of the amino acids obtained from the hydrolysis of it. (10 marks)
- 1.4.3 Give their names, three letter and one letter codes. (10 marks)
- 1.4.4 Which of the two amino acids named in part 1.4.3 is more hydrophobic? Give reasons. (05 marks)

1.5

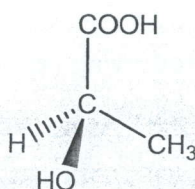
- 1.5.1 Give trivial names the following two molecules, A and B. (05 marks)



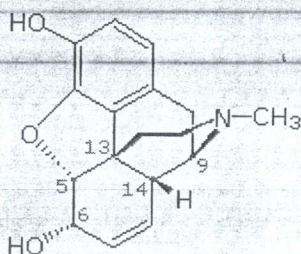
- 1.5.2 Show how pairing occurs between these two molecules A and B in a DNA double helix. (05 marks)
- 1.5.3 Draw the structures for any ω -3 or ω -6 fatty acid. (05 marks)

02.

- 2.1 Draw the Fischer projection of the following compound and name the compound giving (R) / (S) designation. (15 marks)



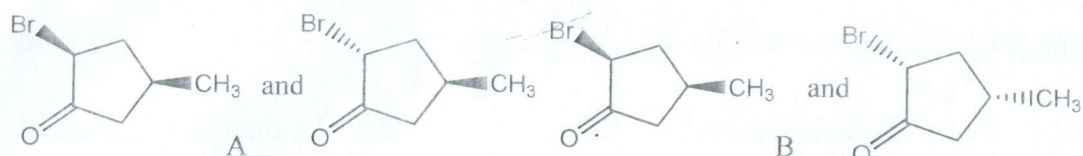
- 2.2 Morphine is classified as a narcotic drug. It is optically active, and only the levorotatory isomer is an analgesic.



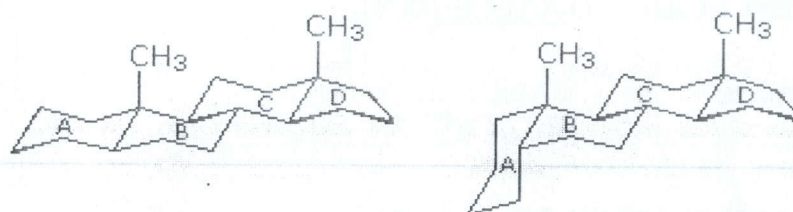
morphine

- 2.2.1 Label all the chiral centers in morphine with an asterisk (*). (10 marks)
- 2.2.2 How many stereoisomers are possible for morphine? (05 marks)
- 2.2.3 Assign (R) or (S) to each chiral center. (20 marks)

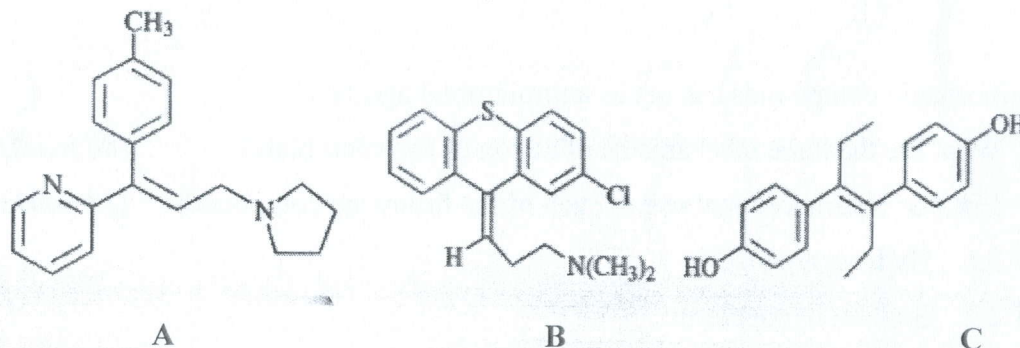
- 2.3 One of the following pairs (A and B) of stereoisomers can be separated by simple distillation. Identify that pair giving reasons. (10-marks)



- 2.4 Two steroid skeleton are shown along with the labelling of the rings in this class of compounds. Specify in each steroid whether the ring fusions are cis or trans. (15 marks)



- 2.5 Assign E/Z designation for the each double bond in the following potent isomers of three drugs triprolidine, A (cold remedy), chlorprothixene, B (antipsychotic), and diethylstilbestrol, C (anticancer). (25 marks)



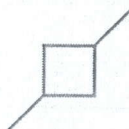
PART B

03.

- 3.1 Give the IUPAC names of the following compounds. (25 marks)



3.1.3





3.2 Draw the structures for the following compounds.

(35 marks)

3.2.1 3-ethyl-3-methylhexane

3.2.2 4,4-dimethyl-2-pentanol

3.2.3 4-chloro-1-ethyl-2-methylcyclohexane

3.2.4 3,5-dimethylcyclohexene

3.2.5 2,4-diaminobenzoic acid

3.3 Write down the possible products of the following reactions.

(40 marks)**PART C****04.**

4.1 Many inorganic compounds can act as antimicrobial agents.

4.1.1 What are the three mechanisms of action of antimicrobials? *(06 marks)*4.1.2 List one pharmaceutical use of each of the following compounds. *(18 marks)*

4.1.2.1 Hydrogen peroxide

4.1.2.2 Sodium hypochlorite

4.1.2.3 Iodine

4.1.2.4 Silver nitrate

4.1.2.5 Ammoniated mercury

4.1.2.6 Sulfur

4.2 Astringents exert their activity by protein precipitation. List the medicinal application of the following compounds which act as astringents. *(06 marks)*

4.2.1 Zinc chloride

4.2.2 Zinc sulfate

4.2.3 Aluminum chloride

4.3 About 50-60% of the adult human body is fluid which composed of water electrolytes.

4.3.1 Fill in the blanks of the following paragraph based on your knowledge of body fluids. (30 marks)

The body fluids are solutions of inorganic and organic solutes. The body fluid composition of tissue varies by^A.....,^B....., and^C..... The body fluid is divided into three compartments as^D.....,^E....., and^F..... . These compartments are separated from each other by membranes which are permeable to water and many organic and inorganic solutes. Extracellular fluid contains large amounts of^G.....,^H..... and^I..... ions and intracellular fluid contains large amounts of^J.....,^K..... and^L..... ions.

4.3.2 List five major functions of body fluids. (15 marks)

4.4 Calcium is the most predominant metal in the human body. Briefly discuss the importance of calcium to human life. (25 marks)

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