0042

THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF BASIC SCIENCES
ACADEMIC YEAR 2019/2020 – SEMESTER 01

BACHELOR OF PHARMACY HONOURS
BPU1213-PHARMACEUTICAL ORGANIC CHEMISTRY -LEVEL 4
FINAL EXAMINATION
DURATION: 3 HOURS

DATE: 25th SEPTEMBER 2020 DURATION: 3 HOURS
TIME: 09.30 a.m. – 12.30 p.m.

INDEX NO: .....

This question paper consists of 09 pages with 04 Short Answer Questions (Part A) and 04 Essay Questions (Part B).

IMPORTANT INSTRUCTIONS / INFORMATION TO CANDIDATES

- This question paper consists of **09 pages** with **2 Parts:**

  PART A: SHORT ANSWER Questions (SAQs) (40 marks): There are 4 questions. Write answers for **all** questions in space provided.

  PART B: ESSAY Questions (EQs) (60 marks): There are 4 questions. Write answers for **all** questions in booklets provided.

- Write your **Index Number** in the space provided.
- Do NOT bring in on person or have in possession unauthorized materials, including mobile phones and other electronic devices, or violate any other examination rules.
- Do NOT remove any page/part of this question paper from the examination hall.

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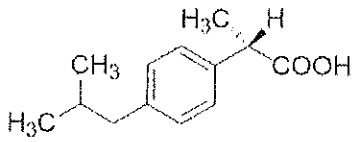
Part A (Write answers within the space provided)

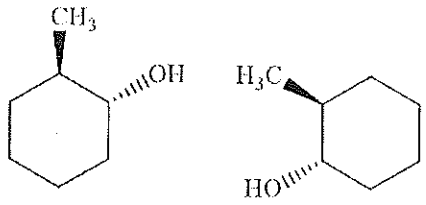
(40 marks)

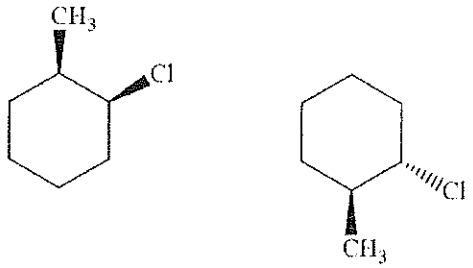
1. a) The structure shown below is a stereoisomer of ibuprofen (A). Draw the structure of its enantiomer in the box below. (04 marks)

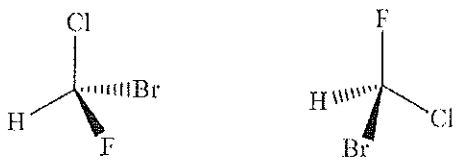


A

b) Which of the following terms best describes the pair of compounds shown below: enantiomers, diastereomers, or the same compound? (03 marks)







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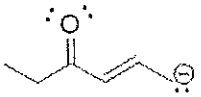
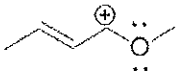
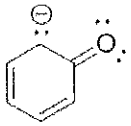
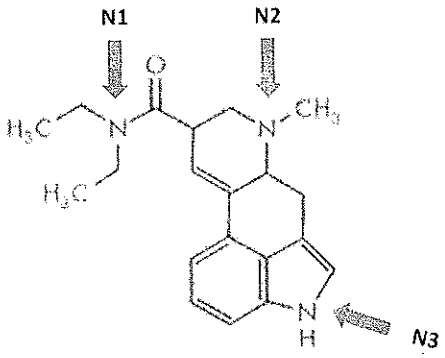
2. a) Draw all major resonance structures for the species given below. Use curved-arrows to indicate the movement of electrons from one resonance structure to the next. (10 marks)



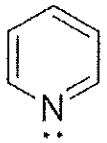


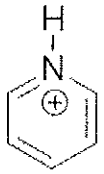


b) The structure of Lysergic acid diethylamide (LSD), a potent hallucinogen is given below. Rank the nitrogen atoms in LSD in the order of increasing basicity. Briefly explain your answer. (05 marks)

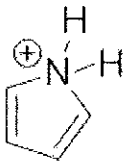


3. Deduce whether each of the following compounds is aromatic, anti-aromatic or non-aromatic by applying Huckel's rule. Provide reasons. (08 marks)

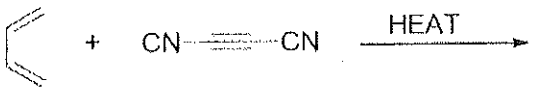
a) 

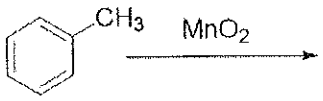
b) 

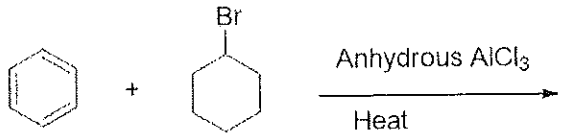
c) 

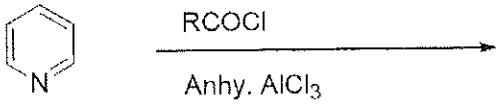
d) 

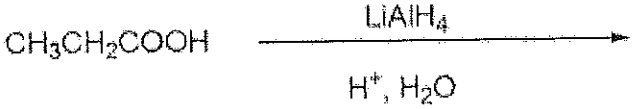
4. Give the structures of the major products of the following reactions. (10 marks)

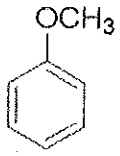
a) 

b) 

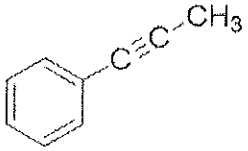
c) 

d) 

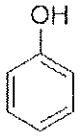
e) 

f) 

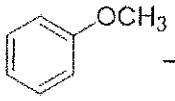
excess Br_2 water →

g) 

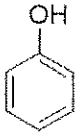
H_2O, H_2SO_4 / $HgSO_4$ →

h) 

Br_2, 5 ^0C / CH_2Cl_2 →

i) 

Li, Liq.NH_3, EtOH / H^+/H_2O →

j) 

1) NaOH / 2) Br-CH_2CH=CD_2 →

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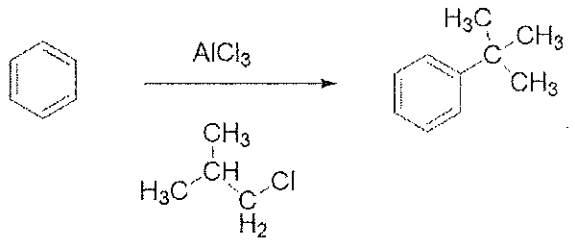
Part B (Write answers in booklet provided)

(60 marks)

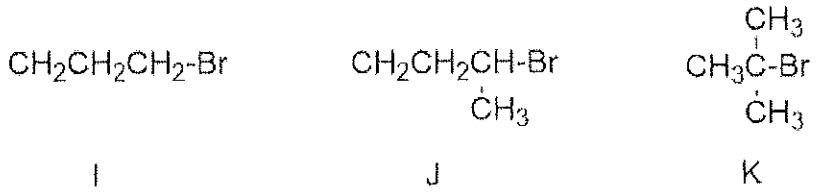
1.a) Why does an electrophilic substitution in pyrrole occur at 2nd position not at 3rd position? Explain your answer by providing the necessary resonance structures. (06 marks)

b) Aniline doesn't undergo Friedel-Craft acylation. Explain. (04 marks)

c) Provide a complete mechanism for the following reaction. (05 marks)



2. a) Consider three alkyl halides given below (I, J, and K).

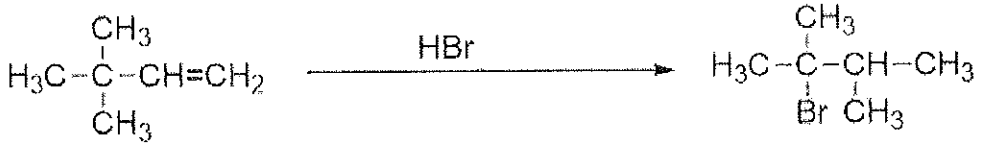


I J K

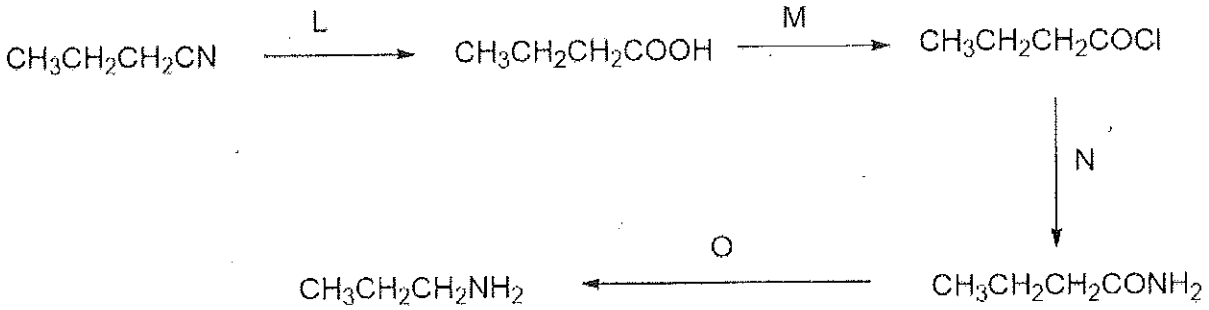
i) Which alkyl halide would undergo S_N1 reaction most rapidly? Provide reasons. (03 marks)

ii) Which alkyl halide would undergo S_N2 reaction most rapidly? Provide reasons. (03 marks)

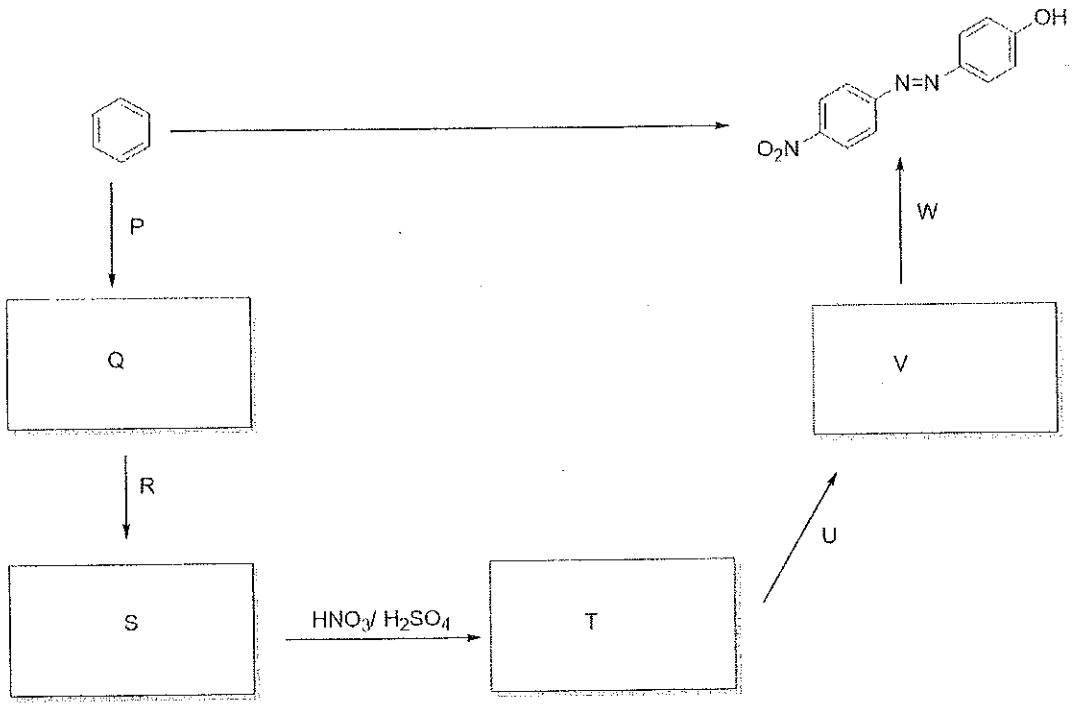
b) Provide a detailed, step-by-step mechanism for the reaction shown below. (05 marks)



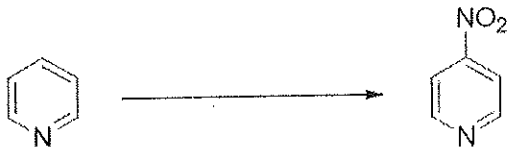
3. a) Complete the following reaction sequence giving missing reagents and conditions (L, M, N, O). (04 marks)

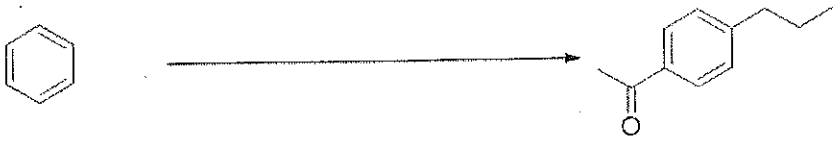


b) Complete the following reaction sequence giving structures of missing products, reagents, and conditions (P, Q, R, S, T, U, V, W). (08 marks)



4. Giving necessary reagents and conditions, show how you would carry out the following multistep transformations. (22 marks)

a) 

b) 

c) 

END