THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF BASIC SCIENCES

BACHELOR OF PHARMACY HONOURS - LEVEL 04 - 2018/19
BPU1213- PHARMACEUTICAL ORGANIC CHEMISTRY
FINAL EXAMINATION

DATE: 07th MARCH 2019 **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 TO CANDIDATES

- Write your Registration Number in the space provided.
- Answer **ALL questions**.
- **Multiple Choice Questions (Part A):** Indicate answers in the answer sheet provided by placing a cross (X) in **INK** in the relevant cage.
- Answers in pencil will **NOT** be marked.
- **Short Answer Questions (Part B):** Write answers within the space provided.
- Do not remove any page/part of this question paper from the examination hall.
- Mobile phones are **NOT** allowed. Leave them outside.
- **Calculators** are allowed.

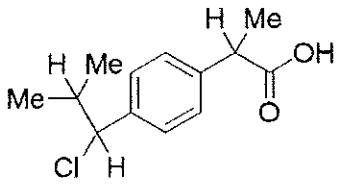
BACHELOR OF PHARMACY HONOURS - LEVEL 04 - 2018/19
BPU1213- PHARMACEUTICAL ORGANIC CHEMISTRY
FINAL EXAMINATION

INDEX NO: .....

Part A –Answer all questions

(40 marks)

1. Consider the following chloro derivative of Ibuprofen (**X**).



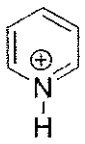
X

a) How many stereo isomers are possible for this molecule? (01 marks)

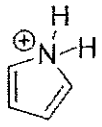
b) Draw structures of a pair of enantiomers of **X**. (04 marks)

c) Draw structures of a pair of diastereomers of **X**. (04 marks)

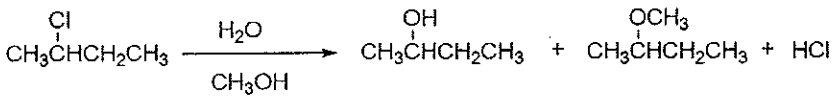
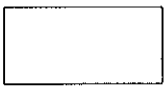
1. a) Deduce whether each of the following compounds is aromatic, anti-aromatic or non-aromatic by applying Huckel's rule. Indicate the reason for your choice. Assume all the molecules given here are planar. (06 marks)

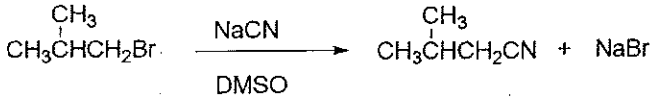
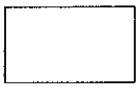
i.  ----------

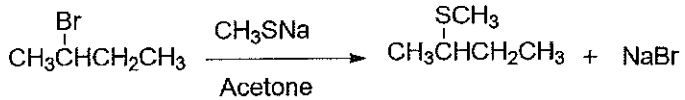
ii.  ----------

iii.  ----------

b) State whether each of the following reactions follow through S_N1 or S_N2 mechanism. (03 marks)

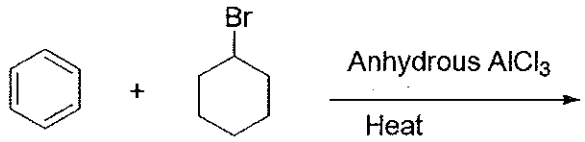
i.  

ii.  

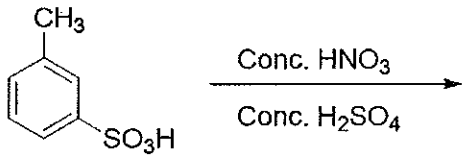
iii.  

3. Give the structures of the major product(s) of the following reactions. (10 marks)

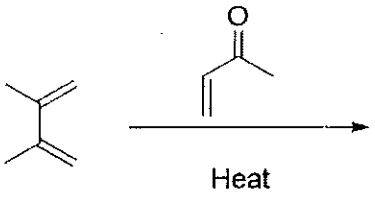
a)



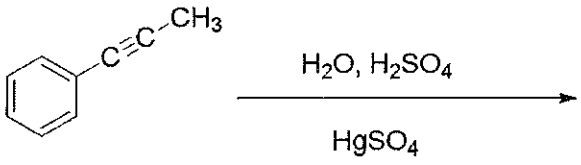
b)



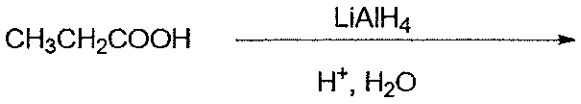
c)



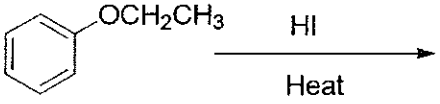
d)

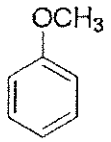


e)

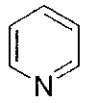


f)

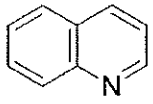


g) 

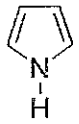
excess Br_2 water ⟶

h) 

CH_3I ⟶

i) 

Br_2/ CCl_4 ⟶ Pyridine

j) 

AC_2O ⟶

4. (R)-2-bromobutane has a specific rotation of -23.1°.

   a). What is the specific rotation of (S)-2-bromobutane? (02 marks)

   b). Specific rotation observed for a mixture of 2-bromobutane enantiomers is +18.5°. Calculate the percent optical purity of the mixture. (04 marks)

c). Calculate the enantiomeric excess (**ee**) of the mixture. (02 marks)

d). Calculate the percent (R)-2-bromobutane and (S)-2-bromobutane in the mixture. (04 marks)

BACHELOR OF PHARMACY HONOURS - LEVEL 04 - 2018/19
BSU4340- PHARMACEUTICAL ORGANIC CHEMISTRY
FINAL EXAMINATION

INDEX NO: .....

Part B: Four (04) Questions (Write answers in separate sheets)

(60 marks)

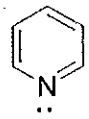
1. Explain the following statements giving reasons.

   a) Benzene easily undergoes electrophilic substitution reactions but rarely nucleophilic substitution reactions. (05 marks)

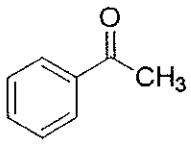
   b) *p*-nitrophenol is more water soluble than *o*-nitrophenol. Explain. (05 marks)

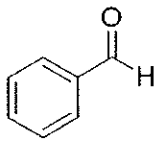
   c) Pyrrole is a weaker base than pyridine? (05 marks)

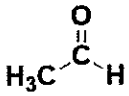

pyrrole


pyridine

2. Consider the following compounds labelled as **Q**, **S** and **T**.


Q


S


T

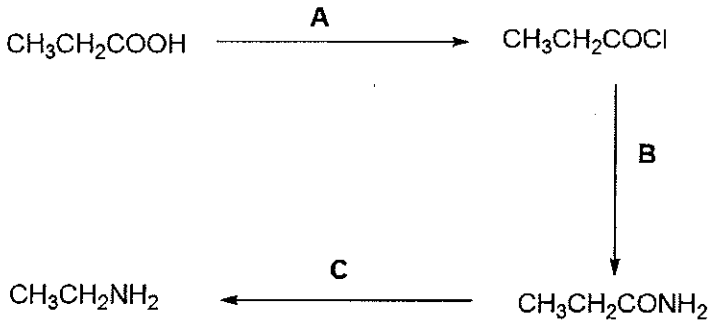
   a) Select one compound which can undergo base-catalysed self-aldol condensation. (02 marks)

   b) Select one compound which cannot undergo base-catalysed self-aldol condensation. (02 marks)

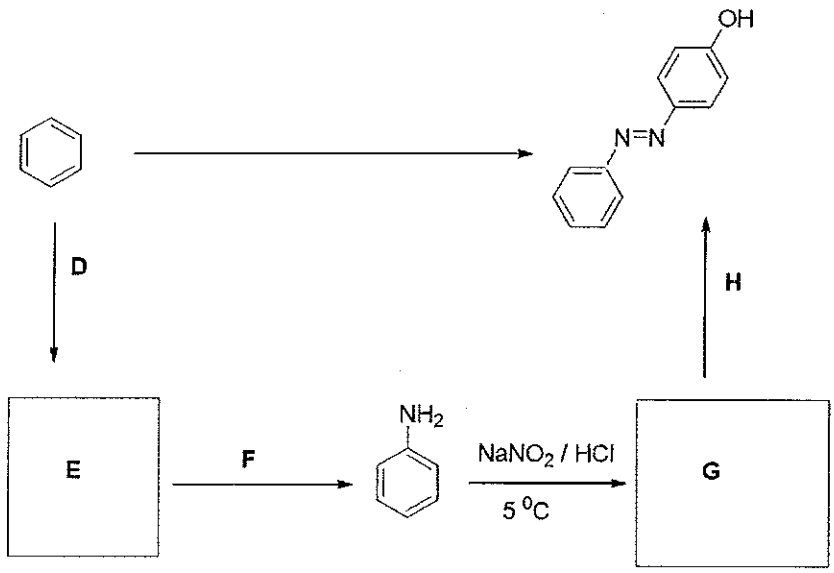
   c) Write mechanism for the formation of base-catalyzed crossed aldol condensation product between the two compounds you have chosen in a) and b). (06 marks)

3. Complete the following reaction sequences giving structures of missing products, reagents and conditions. (12 marks)

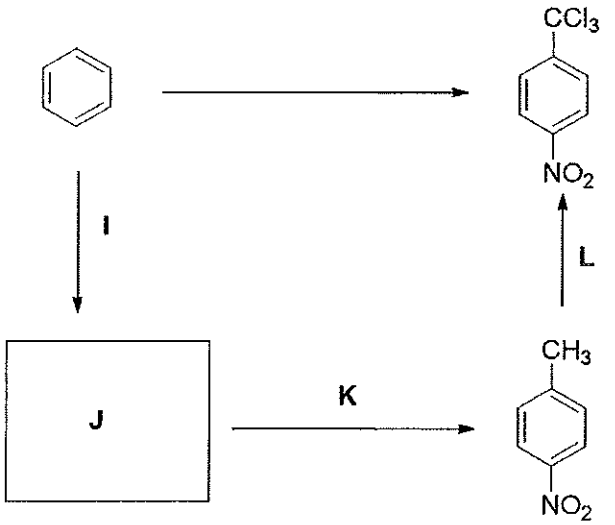
a)



b)

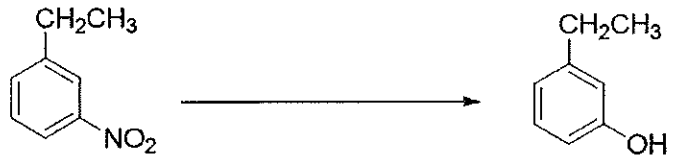


c)

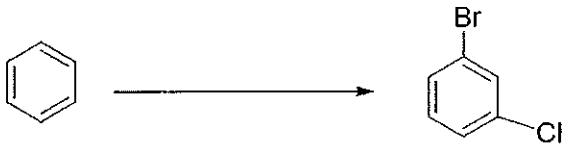


4. Giving necessary reagents and conditions, show how you would carry out the following multistep transformations. (23 marks)

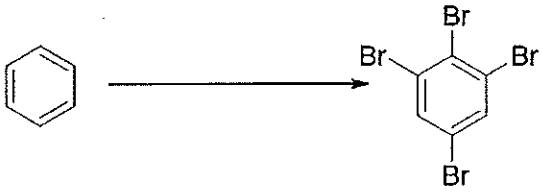
a)



b)



c)



END