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UNIVERSITY OF RUHUNA – FACULTY OF MEDICINE

ALLIED HEALTH SCIENCES DEGREE PROGRAMME

FIRST BPHARM PART I EXAMINATION – JULY 2016

PH 1112: PHARMACEUTICAL CHEMISTRY I (SEQ)

TIME: TWO HOURS

INSTRUCTIONS

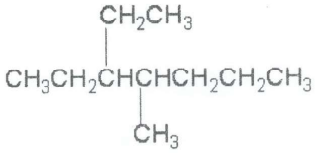
- Answer ***all*** *four (04)* questions.
- Do not use any correction fluid.
- *Answer questions in the books provided.*
- *Marks will be deducted for illegible hand writing.*

01. Answer **all** parts

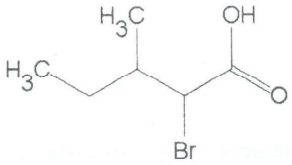
1.1. Give the IUPAC names of the following compounds.

1.1.1 CH_3- CH_2.CH_2-O-CH_3

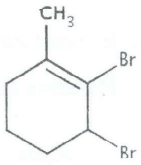
1.1.2



1.1.3



1.1.4



(28 marks)

1.2. Draw the structures for the following compounds.

1.2.1 1-chloro-4-ethyl-2-methylcyclohexane

1.2.2 1-amino-4-nitrobenzene

1.2.3 1, 3-cyclopentadiene

1.2.4 3-phenylprop-2-enal

1.2.5 methylethanoate

(40 marks)

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1.3. Give necessary reagents and reaction conditions for the following transformations.

1.3.1 cyclopentanone $\longrightarrow$ cyclopentanol

1.3.2 $CH_3CHO \longrightarrow CH_3COOH$

1.3.3 $CH_3C(CH_3)=C(CH_3)_2 \longrightarrow 2CH_3COCH_3$

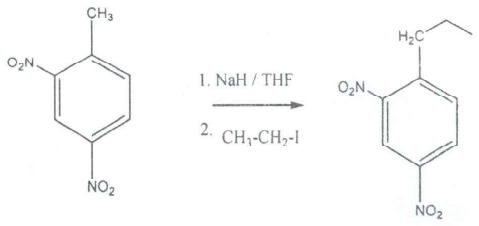
1.3.4 $CH_3C{\equiv}N \longrightarrow CH_3COCH_3$

(32 marks)

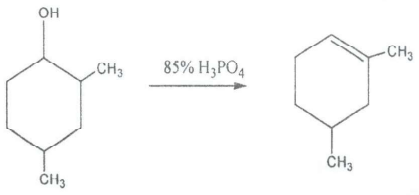
02. Answer all parts.

2.1. Consider the reactions **A** and **B** to answer the questions given below,

A



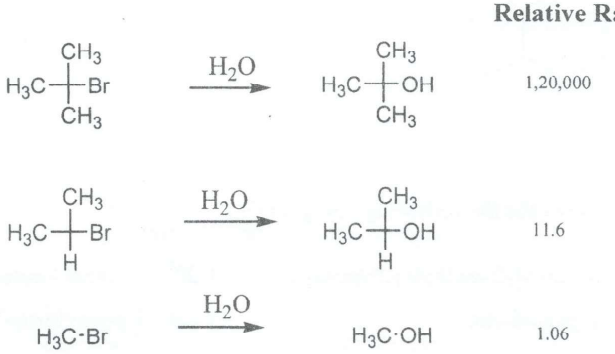
B



2.1.1. Give the structure(s) of the intermediates formed in each of the above reactions.

2.1.2. Explain the stability of the intermediates you proposed above in 2.1.1. giving appropriate structures. ***(20 marks)***

2.2. The relative rates of the reaction of different alkyl bromides with water are given below,



2.2.1. Rationalize different rates of the above reactions

2.2.2. Give an appropriate mechanism for the reaction at highest rate above.

(25 marks)

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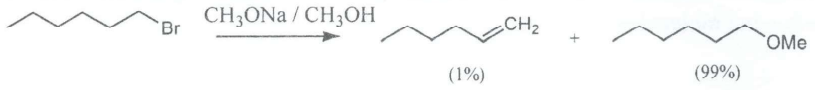
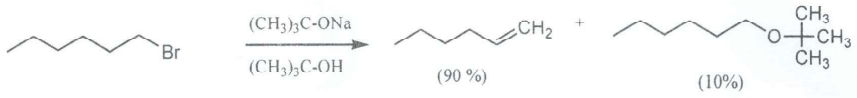
2.3. Consider two reactions **G** and **H** given below:

G



H

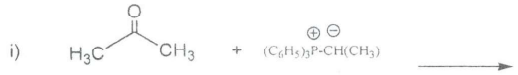


2.3.1 Explain the formation of eliminated and substituted products in different ratios in above two reactions.

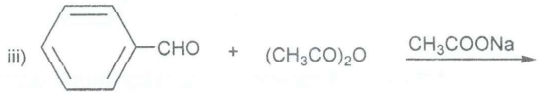
2.3.2 Propose a mechanism for the formation of products of the reaction **H** above.

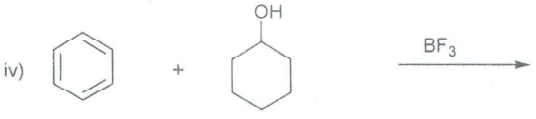
(***30 marks***)

2.4 Give the structures of the products formed in the reactions given below:

i) 

ii) 

iii) 

iv) 

v) 

(***25 marks***)

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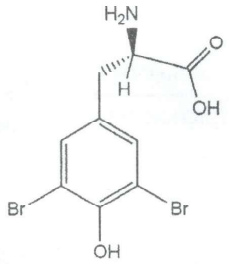
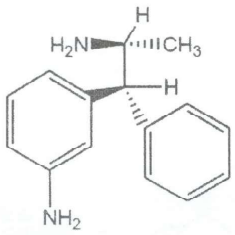
03. Answer **all** parts

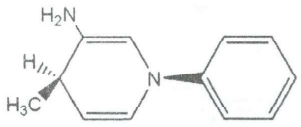
3.1 Assign the absolute configuration at each chiral center and complete the name of the following molecules.



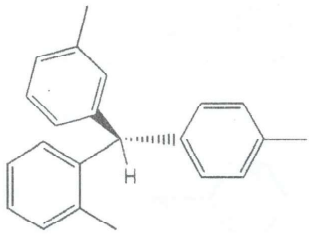
3.1.1 (.....)-2-amino-3-(3,5-dibromo-4- hydroxyphenyl)propanoic acid



3.1.2 3-((1....,2.....)-2-amino-1- phenylpropyl)benzenamine



3.1.3 (.....)-1,4-dihydro-4-methyl-1- phenylpyridin-3-amine



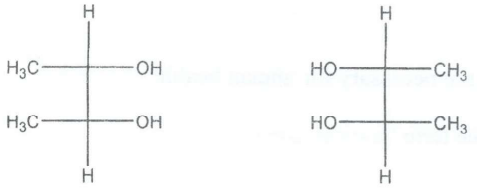
3.1.4 (.....)-m-tolyl(o-tolyl)(p-tolyl)methane

(05 x 4 marks)

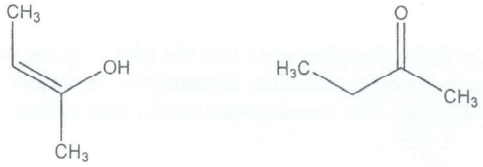
3.2. Determine whether the pairs of compounds shown below are positional, geometric, optical (enantiomers, diastereomers), or conformational isomers. Identify all chiral centers as R or S and all geometric isomers as E or Z.

3.2.1

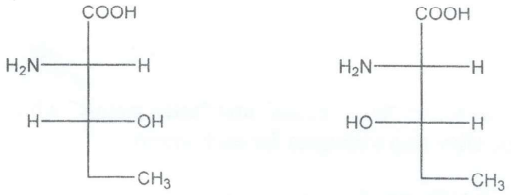
3.2.2



3.2.3

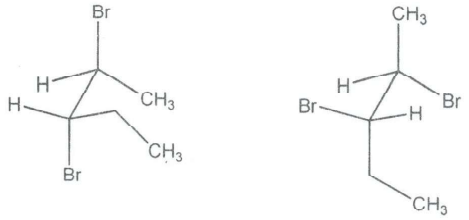


3.2.4



3.2.5

3.2.6



3.2.7

(10 x7 marks)

3.3. An optically pure compound **A** gave $[\alpha]_D + 20^0$. A mixture of **A** and its enantiomer **B** gave $[\alpha]_D - 12^0$. What is the ratio of **A** to **B** in the mixture?

(10 marks)

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3. Answer **all** parts.

4.1. Body fluids play an important role in the body.

4.1.1. Give four major functions of body fluids.

(***08 marks***)

4.1.2. Mention the functions of sodium and potassium present in the body fluids separately.

(***12 marks***)

4.1.3. Give a short account on replacement therapy.

(***10 marks***)

4.2. Topical agents are necessary for human health.

4.2.1. Define the term "topical agents".

(***05 marks***)

4.2.2. Write down three groups of topical agents and give the specific action of each group.

(***15 marks***)

4.2.3. Assign the following chemicals into the groups given in 4.2.2.
Aluminium chloride, calamine, chloramines, hydrogen peroxide, iodine, silver nitrate, titanium dioxide, zinc stearate, zinc oxide, zinc sulfate.

(***10 marks***)

4.2.4. Give few methods which help to render hydrogen peroxide more stable.

(***10 marks***)

4.3. About thirty elements are recognized as being essential to life.

4.3.1. Define the terms "bulk metals" and "trace metals" which are essential for plants and animals. Give two examples for each group.

(***10 marks***)

4.3.2. Explain briefly the physiological role of copper and selenium.

(***20 marks***)

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