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UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FIRST BPHARM PART I EXAMINATION – JULY 2018

PH 1112 PHARMACEUTICAL CHEMISTRY I (SEQ)

TIME: TWO HOURS

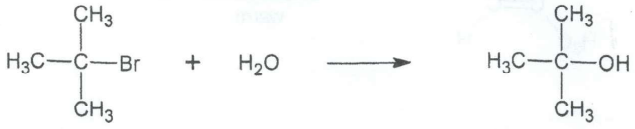
INSTRUCTIONS

- There are **four** questions in the SEQ paper.
- Answer **each** question in a separate booklet.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

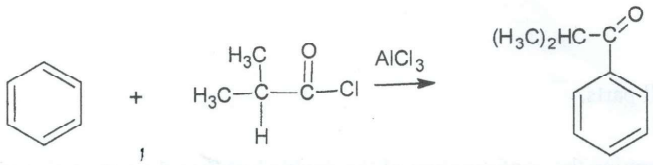
1. Answer all parts.

1.1. Consider the following chemical conversions.

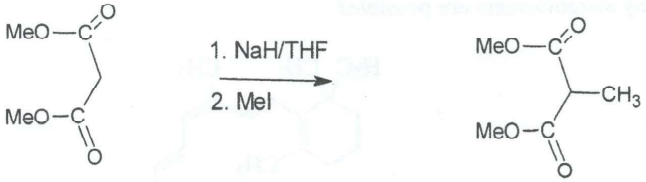
i)



ii)



iii)



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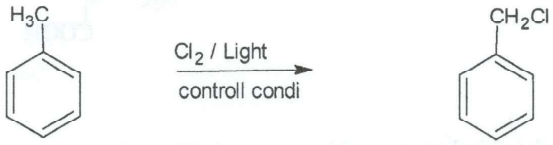
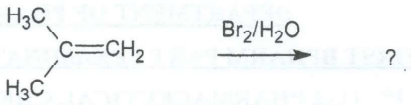


1.1.1. Draw the structure of the reactive intermediate formed in each of the above reaction. ***(20 marks)***

1.1.2. Giving appropriate structures, explain the stability of the intermediate proposed in question 1.1.1. ***(20 marks)***

1.2.Giving plausible mechanism, draw the structure of the product formed in the reaction below.

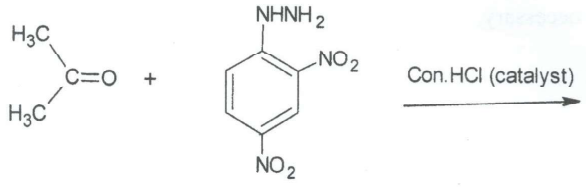


(*30 marks*)

1.3. Give the structure(s) of the product(s) formed in the following reactions.

1.3.1 $CH_3CHBrCH_2CH_3 + C_2H_5O^- \xrightarrow{C_2H_5OH}$

1.3.2

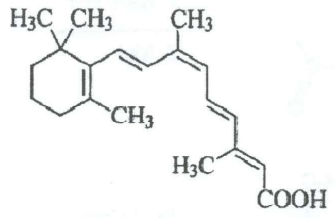


1.3.3

(*30marks*)

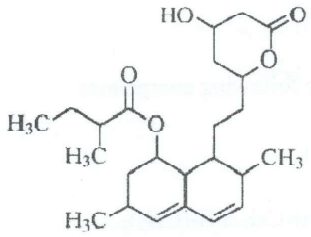
2. Answer all parts.

2.1. Determine the configuration of the double bonds in the cytostatic retinoid alitretinoin. How many stereoisomers are possible?



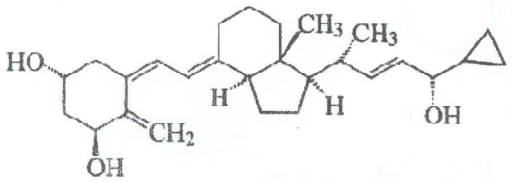
(*20 marks*)

2.2. Mark all the chiral centers with an asterisk (*) on the structure of the lipid-lowering drug, lovastatin shown below. How many total stereoisomers of lovastatin are possible?



(20 marks)

2.3. Deduce the configuration of the stereogenic units of the antipsoriaticcalcipotriol and the number of theoretically possible stereoisomers ofthis molecule.



(35 marks)

2.4. Draw the structure of *all* possible stereoisomers of 2-methylcyclohexan-1-ol.What relationship do these isomers show to one another?

(25 marks)

3. Answer all parts.

3.1.

3.1.1 List the major electrolytes present in body fluids? *(12 marks)*

3.1.2 Write down **four**functions of each of the two monovalent cationic electrolytes listed in 3.1.1. *(16 marks)*

3.1.3 Mention **four** disorders that are related to fluid and electrolyte imbalance. *(12 marks)*

3.2.

3.2.1 What is the basic objective of the replacement therapy? *(06 marks)*

3.2.2 Describe briefly the replacement therapy. *(14 marks)*

3.3.

3.3.1 List the **three** main types of topical agents and their mechanisms of actions separately. *(12 marks)*

3.3.2 Give **three** examples for each of the three types of topical agents. *(12 marks)*

3.4.

3.4.1 Selenium is found in the body as an ultra-trace element. Indicate **two** functions of Selenium. *(08 marks)*

3.4.2 What are the manifestations of Selenium deficiency? *(08 marks)*

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4. Answer **all** parts.

4.1. Give the IUPAC names of the following compounds.

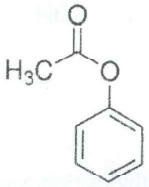
4.1.1 $CH_3CH{=}CHCOOH$

4.1.2 $CHO\text{-}CH_2\text{-}COOH$

4.1.3 $CH_3\text{-}CH(OCH_2CH_3)\text{-}CH_2\text{-}CH\text{-}(CH_3)_2$

4.1.4

4.1.5



(30 marks)

4.2. Draw the structures of the following compounds.

4.2.1. 2-phenylethanol

4.2.2. 3-chloro-2-butenal

4.2.3 3-bromo-2-pentanone

4.2.4. 2-chlorocyclopentanecarbaldehyde

4.2.5. 1-bromo-4-methylbenzene

4.2.6 2-butyl-6-heptenoic acid

(30 marks)

4.3. Write down the possible products of the reactions given below.

4.3.1 $CH_3C{\equiv}CH$ $\xrightarrow{HgSO_4\ /dil\ H_2SO_4}$

4.3.2 $CH_3C{\equiv}CN$ $\xrightarrow[2.\ H^+/H_2O]{1.\ CH_3MgBr/Dry\ ether}$

4.3.3 $CH_3CH_2CH_2OH$ $\xrightarrow{Jones\ Reagent}$

4.3.4 $C_2H_5CH{=}CH(C_6H_5)$ $\xrightarrow{O_3/CH_2Cl_2/-78^0C}$

4.3.5. CH_3COCH_3 $\xrightarrow[2.\ H_2O/H^+]{1.\ LiAlH_4}$

(40 marks)

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