2020

CHEMISTRY (Honours)

Paper : CEMH-DC-T7

(Organic)

(CBCS)

Full Marks : 25 Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

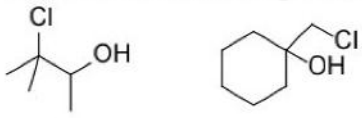
1. Answer any *five* questions from the following : 1×5=5

(a) Consider the following reaction

Which of the following reactions you will employ to get the desired product?

(i) Wittig Reaction
(ii) Knoevenagel Reaction
(iii) Stobe Condensation
(iv) Perkin Condensation

(b) Which of the following chlorohydrins could be formed by addition of Cl_2 in water?



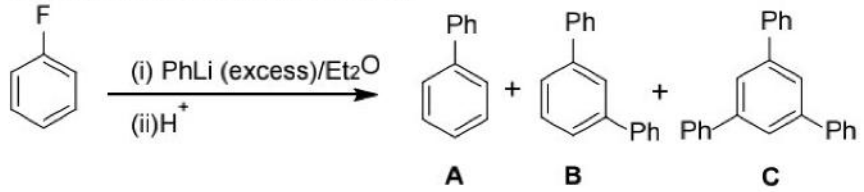
A **B**

(i) Only **A**
(ii) Only **B**
(iii) Both **A** & **B**
(iv) None of them

(c) 1-Hexene on reaction with NBS in CCl_4 in the presence of peroxides yields a stereoisomeric products. The gross composition of this isomeric mixture is as follows:

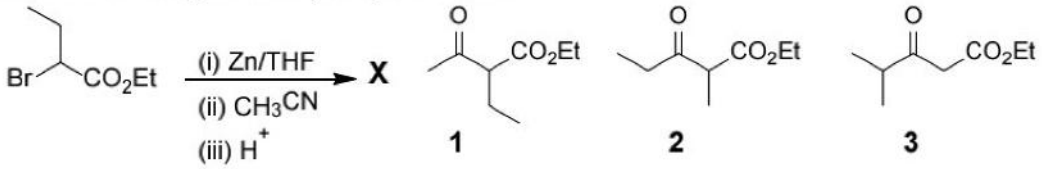
(i) Two Optical isomers + Two Geometrical Isomers
(ii) One Optical isomer + Three Geometrical Isomers
(iii) Four Geometric Isomers
(iv) Four Optical Isomers

(d) Consider the following reaction:



(i) Only **A** is Formed
(ii) Only **B** is Formed
(iii) Only **C** is Formed
(iv) All are formed

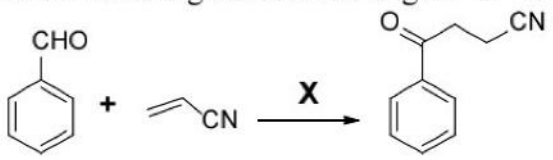
(e) In the following reaction, the product **X** is:



(i) 1
(ii) 2
(iii) 3
(iv) None of them

(f) Aza-enolate is produced by reaction between
(i) α-azo ketone and LDA
(ii) α-amino ketone and LDA
(iii) Enamine and LDA
(iv) Imine and LDA

(g) In the following reaction the reagent "**X**" is



(i) NaOEt in EtOH
(ii) NaCN in DMF
(iii) NaOH in Water
(iv) NaCl in DMF

(h) Esterification of 2,6-dimethyl benzoic acid by ethanol in presence of c.H_2SO_4 follows the mechanism
(i) $A_{AL}1$
(ii) $A_{AL}2$
(iii) $A_{AC}1$
(iv) $A_{AC}2$

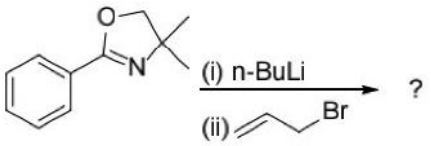
2. Answer any *four* questions : 2×4=8

(a) Acid catalyzed reaction between acetone and glycerol, in principle, can produce two constitutional isomers **M** & **N.** However, only one of these compounds (**M**) is actually formed which can be resolved into enantiomers. Write down the structure of these two compounds.

(b) Reaction of benzene with methylenedibromide in presence of potassium *tert*-butoxide produces a colored salt which is exceptionally stable. Justify the observation.

(c) When PhCOCOPh is subjected to Wolf-Kishner reduction it produces an alkyne – Explain mechanistically.

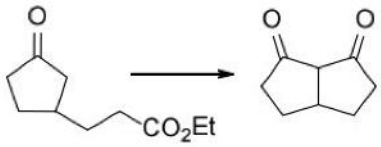
(d) Point out the site-selectivity in the following reaction & explain.



(e) Convert *trans*-2-butene to *cis*-2-butene.

(f) How will you prepare methyl vinyl ketone from acetone?

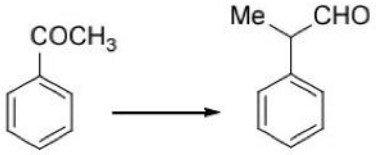
(g) How will you carry out the following transformation?



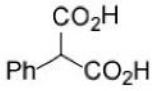
(h) How will you prepare *p*-methoxystilbene using Wittig reaction? Explain the choice of substrates based on structure-reactivity principle.

3. Answer any *two* questions : 2×4=8

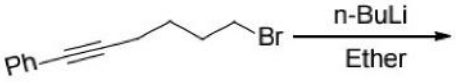
(a) (i) Using Corey-Chaykovsky reagent at any step how will you accomplish the following conversion? Explain all steps mechanistically. 3



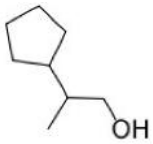
(ii) Starting from 2-Phenyl acetic acid how you may synthesize the following molecule? 2



(iii) Predict the product from the following reaction: 1

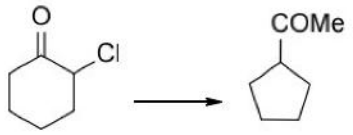


(b) (i) Synthesize the following molecule starting from cyclopentyl bromide & 2-bromo-propene: 3

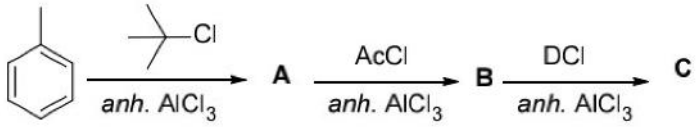


(ii) Ethyl acetate does undergo Claisen condensation in presence of NaOEt but ethyl isobutyrate does not respond to the reaction under the same reaction condition – why? 3

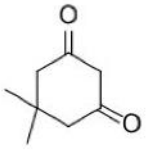
(c) (i) How you will carry out the following transformation? 2



(ii) Write down the structures of **A**, **B** and **C** 2

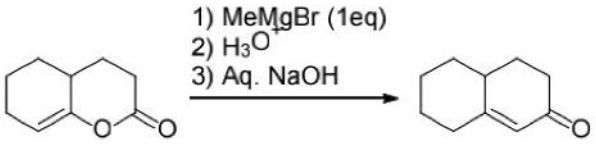


(iii) How will you prepare the following molecule from diethyl malonate? 2



(d) (i) Treatment of 1,3-butadiene with bromine yields always *trans*-product but not any *cis*-product. Based on this experimental observation offer the corresponding mechanistic pathways & justify the involvement of correct intermediate. 2

(ii) Explain the following reaction: 3



(iii) What happens when cyclohexene is treated with methylene diiodide in presence of Z(Cu) couple? 1