WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Supplementary Examination, 2021

CEMACOR07T-CHEMISTRY (CC7)

Time Allotted: 2 Hours | Full Marks: 40

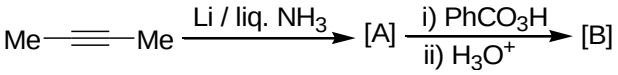
The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

Answer any *four* questions taking *one* from each unit

UNIT-I

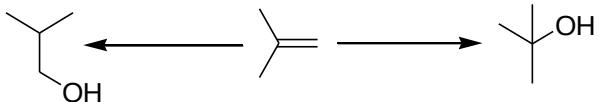
1. (a) Explain why alkynes are less reactive towards electrophilic addition than alkenes. 2

   (b) Identify the products [A] and [B] in the following sequence of reactions: 2



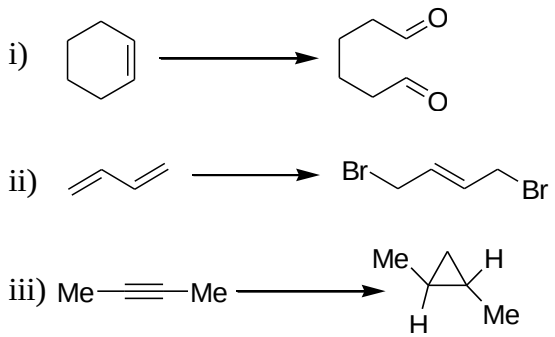
   (c) Predict the product with proper mechanism of the radical addition of HBr to propene. Why peroxide effect is only shown by HBr? 2

   (d) Give suitable reagents for the following conversions: 2



   (e) Write down the products with stereochemistry in each case when *cis* and *trans*-2-butene is treated separately with alkaline $KMnO_4$. 2

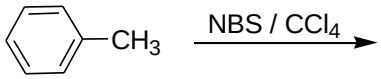
2. (a) Complete following conversions indicating the mechanisms. (any ***two***) 2×2 = 4



   (b) How many ozonides can be formed from $CH_3CH{=}CHCHMe_2$? Explain with mechanism. 2

(c) Identify the products and explain their formation: 2+2

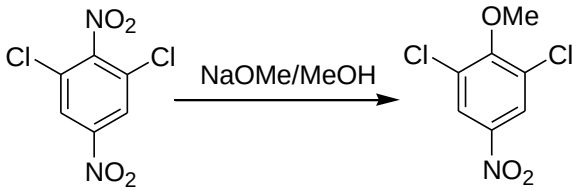
i) $CH_2=CHCH_2CH_2CH_2COOH \xrightarrow{I_2 / NaHCO_3}$

ii) 

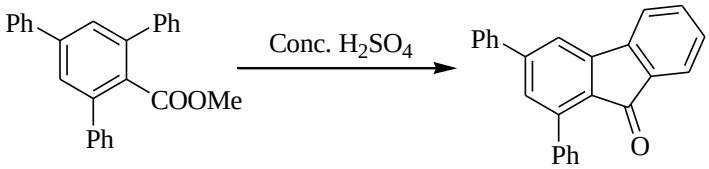
UNIT-II

3. (a) Reaction of *p*-cresol with $CHCl_3$/NaOH gives 2-hydroxy-4-methyl benzaldehyde along with a second product of MF $C_7H_6OCl_2$ (A). Identify (A) and explain its formation as one of the products. 2

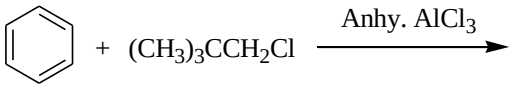
(b) Rationalize the formation of the product in the following reaction. 2



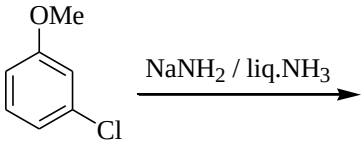
(c) Explain the following conversion with proper mechanism. Indicate the mechanistic classification of the first step of reaction. 2



4. (a) Predict the product of following reaction and justify formation. 2



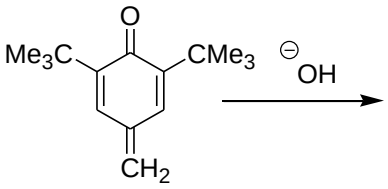
(b) Give the possible products form in the reaction and indicate with reasoning the major one. 3

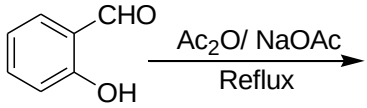


(c) For the synthesis of salicylic acid using Kolbe-Schmidt reaction sodium phenate is most useful not potassium phenate- Explain. 1

UNIT-III

5. (a) Predict the products of the following reaction with plausible mechanism: 2×4 = 8

i) 

ii) 

iii) $Ph_3CCO_2H + MeOH \xrightarrow{Conc.\ H_2SO_4}$

iv) $^{t}Bu\text{-}O\text{-}\overset{\overset{O}{\|}}{C}\text{-}CH_3 \xrightarrow{H_2O^{18}\ /\ H^+}$

(b) When a benzoin $Ar^1CHOHCOAr^2$ is treated with an aldehyde ArCHO in the presence of KCN, a mixed benzoin $ArCHOHCOAr^2$ is obtained.-Explain. 4

(c) Among *p*-dimethylaminobenzaldehyde and $Me_2N(CH_2)_6CHO$ which one will respond to Fehling's Test and why? 2

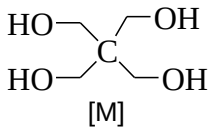
(d) Cyclopropanone forms hydrate faster than propanone-Explain. 2

(e) What is the role of Li in reduction of carbonyl with $LiAlH_4$? 2

6. (a) Indicate the product [A] to [D] in the following reaction sequence. Give the mechanism of conversion of [B] to [C]: 2+2

$$MeOCH_2Cl \xrightarrow{PPh_3} [A] \xrightarrow{LDA\ /THF} [B] \xrightarrow{ArCHO} [C] \xrightarrow{H^+\ /\ H_2O} [D] + MeOH$$

(b) Design synthesis of [M] from HCHO: 2



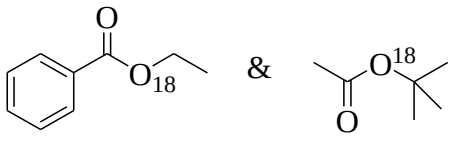
[M]

(c) In case of nucleophilic addition to α,β–unsaturated carbonyl, 1, 4-addition is generally preferred over 1,2-addition.-Explain with example. 3

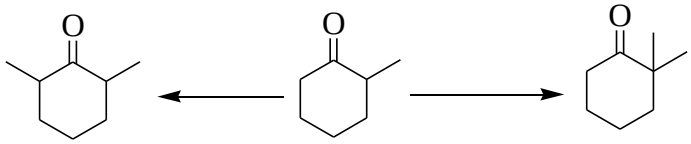
(d) Chloral forms stable *gem*-diol whereas trimethylacetaldehyde does not. Explain. 1

(e) Thioacetals and thioketals cannot easily hydrolyse in dilute acid; but they can be easily hydrolysed by heating with aqueous $HgCl_2$. Explain the role of Hg^{+2}. 2

(f) Explain the mechanism of base catalysed hydrolysis of the following O^{18} labelled esters in the presence of ordinary water (H_2O^{16}) and explain the isotopic distribution in the products. 2+2



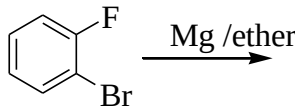
(g) Convert [A] to [B] and [C] with justification. 2



[B] [A] [C]

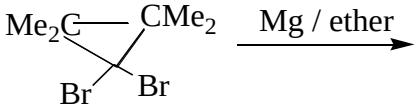
UNIT-IV

7. (a) Write down the product of the reaction with mechanism. 2

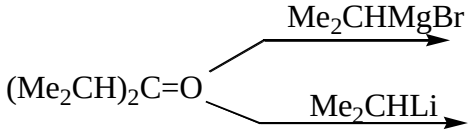


(b) Design a suitable synthesis 2,2-dimethylpentane with the help of Carey-House synthesis. 2

(c) Predict the product of the reaction with mechanism: 2



8. (a) Predict the products of the following reaction with mechanism: 2+2



(b) Synthesize $PhCH(OH)CH_2COOCH_2CH_3$ with the help of Reformatsky reaction. 2

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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