WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Examination, 2021-22

CEMACOR07T-CHEMISTRY (CC7)

ORGANIC CHEMISTRY-III

Time Allotted: 2 Hours | Full Marks: 40

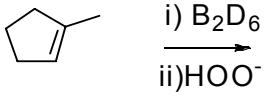
The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

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

UNIT-I

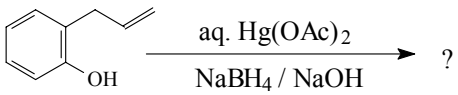
1. (a) Explain showing the mechanism why methyl vinyl ketone readily epoxidizes in presence of alkaline hydrogen peroxide than in presence of a peroxy acid? 2

   (b) Predict the product and explain mechanistically 2

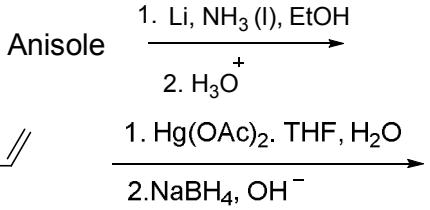


   (c) Starting from *E*-butene, discuss the method of preparation of *meso*-butane-2,3-diol and *dl*-butane-2,3-diol separately? Mention the reagents and stereochemistry of the reactions in each case. 3

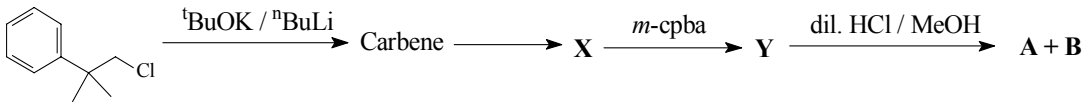
   (d) Predict the product with mechanism indicating the major one in the following reaction: 3



2. (a) Predict the product (with mechanism) of the following reactions 2+2



   (b) Complete the reaction sequences and write down the proper structures of **X, Y, A** and **B.** 4

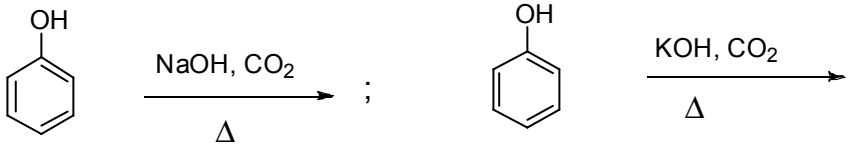


(c) Treatment of $Me_3C\text{-}CH{=}CH_2$ and $Me_3C\text{-}CH(OH)CH_3$ with conc. HCl gives the same two isomeric alkyl chloride. Explain. 2

UNIT-II

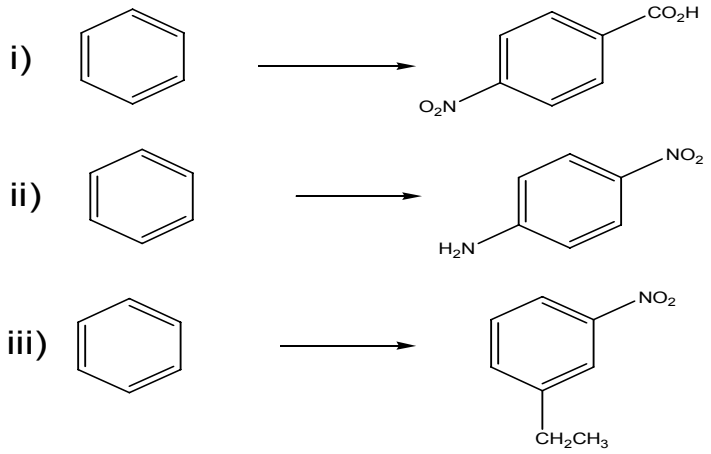
3. (a) Both phenol and aniline give very poor yield in Friedel-Crafts reaction though OH and NH_2 both are activating groups. 2

(b) Predict the product(s) of the following reactions with explanation 2



(c) Both *o*-bromoanisole and *m*-bromoanisole give same product when treated with Na / liq. NH_3. Give reason for this observation. 2

4. (a) Carry out the following conversions: (any ***two***) 2+2



(b) Chlorobenzene on heating with aq. NH_3 at 200°C in presence of catalyst results in formation of aniline. Whereas the same on reaction with $NaNH_2$, NH_3 (l) even at (– 33°C) gives the aniline. Explain mechanistically. 2

UNIT-III

5. (a) It is often necessary to adjust the reaction medium to the right pH in nucleophilic addition to C=O. Explain. 2

(b) Acetylation with acetylchloride requires dry condition but benzoylation is carried out in aq. alkaline solution. Explain. 2

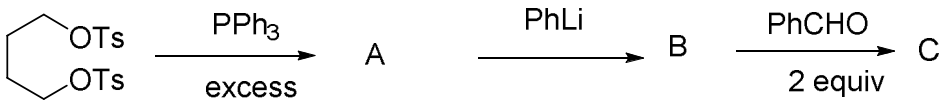
(c) Draw the mechanism of Claisen condensation reaction taking the example of ethylacetate. Between Claisen condensation and aldol condensation which one 3

requires larger amount of base? Explain.

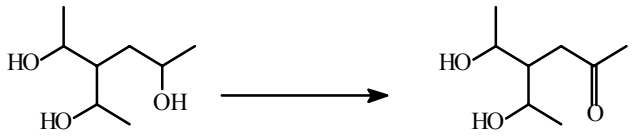
(d) Arrange the following substrates according to their reactivity towards nucleophiles: 2
Me-CO-NMe_2, Me-CO-Cl, Me-CO-SMe, Me-CO-OMe.

(e) Cyclopropanone gives stable hydrate but propanone does not — Why? 2

(f) Identify A, B, and C in the following reaction with mechanism 3

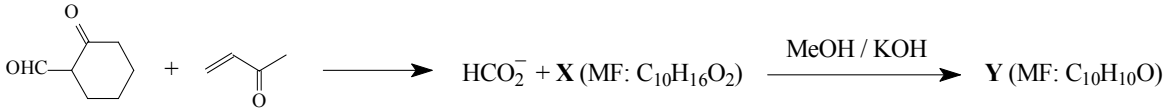


(g) Mention two criteria for a good protecting group. Using protecting / deprotecting group technique outline the following conversion: 2+2



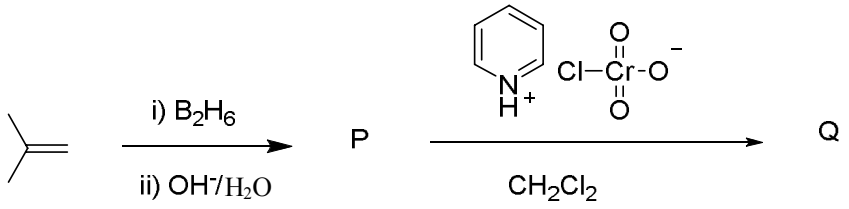
6. (a) Rate of reduction of a ketone by $LiAlH_4$ decreases when crown ether (12-Crown-4) is added to the reaction mixture — Explain. 2

(b) Identify **X** and **Y** in the following reaction sequence and offer mechanistic explanation in support of your answer: 4

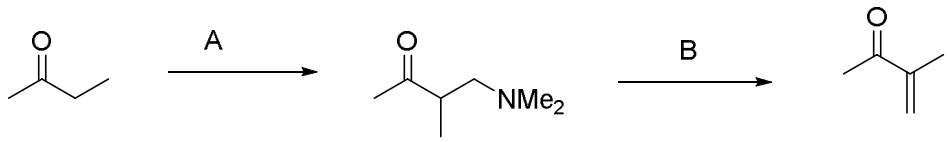


(c) Optically active PhCOCH(Et)Me is racemised on base treatment but $PhCOCH_2CH(Et)Me$ does not — Explain. 2

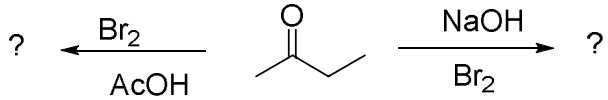
(d) Write down the products P and Q of the following reactions 2



(e) Mention the reagent A and B of the following reaction 2



(f) Predict the products in the following. 2



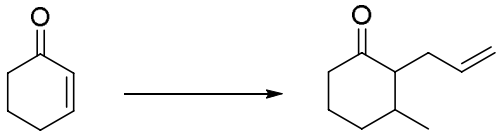
(g) A solution of Ph_3CCO_2H in cold conc. H_2SO_4 affords $MeOCPh_3$ when poured in methanol — Explain. 2

(h) Which of the following compound undergoes decarboxylation reaction more readily? Explain. 2

UNIT-IV

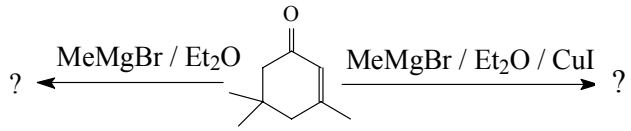
7. (a) How would you prepare ethane utilizing Corey house reagent? 2

(b) Outline the scheme for the following transformation using appropriate organometallic reagent 2



(c) How could you prepare the acid $R_3C\text{-}CO_2H$ from R_3COH? 2

8. (a) Give the products with proper explanations: 2



(b) Mention one synthetic application of TMSCN in organic synthesis. 2

(c) Outline the steps involved for the synthesis of β-phenylethyl alcohol starting from phenyl magnesiumbromide. 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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