C095

Total Pages : 6 Roll No. .....

CHE-552

Synthetic Organic Chemistry

M.Sc. Chemistry (MSCCH)

2nd Year Examination, 2022 (June)

Time : 2 Hours] **Max. Marks : 80**

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. (a) (i) What are organosilicones reagent. Give the synthesis of trimethylsilylazide and trimethyl iodide.

(ii) Explain briefly the use of fragmentation reactions in carbon - carbon double bond formation with an example. (2×5=10)

(b) Write detailed notes on following :

(i) Cope elimination.

(ii) Knovenagel condensation.

(iii) Rabinson Annulation.

(iv) Aldole reaction.

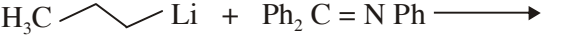
(v) A catalytic hydrogenation of alkenes. (5×2= 10)

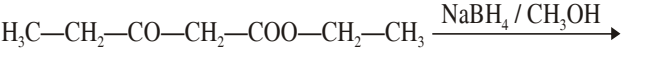
2. (a) Explain the term C-X disconnection. Write briefly the retetrosynthetic and synthesis method for alcohols and carbonyl compounds. (1×10=10)

(b) (i) Explain 1,4 -asymmetric induction with a suitable example.

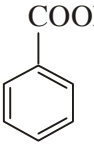
(ii) Outline the synthesis of enantiomeric -2-methylbutanoic acids. (2×5=10)

3. (a) Complete the following reactions :

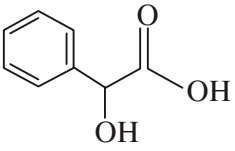
(i) 

(ii) 

(iii) 

(iv) 

$\xrightarrow[\varepsilon tOH]{Na,\ NH_3}$

(v) 

$\xrightarrow{H_2 / Pd–C}$ (5×2=10)

(b) Discuss the method of synthesis of epoxide from alkenes. Explain the mechanism of

(i) Sharpless asymmetric epoxidation.

(ii) Shi epoxidation. (2×5=10)

4. (a) (i) Discuss nucleophilic substitution reactions at Sp^2 hybrid carbon and saturated with organomagnesium halides.

(ii) Outline the retrosynthetic analysis and synthesis of Cortisone.

(b) Explain one-group C-X disconnection with suitable examples.

(i) Discuss Wacker process.

(ii) What is Etard reaction? Which reagent is used in this reaction and why? (4×5=20)

5. (a) Write explanatory notes on the following :

(i) Homotopic faces.

(ii) Convergent Synthesis.

(iii) Allylic oxidation.

(iv) Felkin-Anh Model.

(v) Reversal of Polarity. (3×5=15)

(b) What is umpolung? Give any two organic synthesis using umpolung reagents (1×5=5)

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only. (4×10=40)

1. Write the mechanism of the following reactions :

(a) Witting reaction.

(b) Meerwain-ponndorf- verley reduction.

(c) Wolff-Kishner reduction.

(d) Simmons Smith reaction.

(e) Michael Addition. (5×2=10)

2. Define the following terms :

(a) Synthone.

(b) Transform.

(c) Retron.

(d) Target Molecules. (4×5/2=10)

3. Write an essay on the applications of the metal and non-metal based oxidations of alcohols and alkenes in organic synthesis. Illustrate with examples. (1×10=10)

4. Write short notes on following :

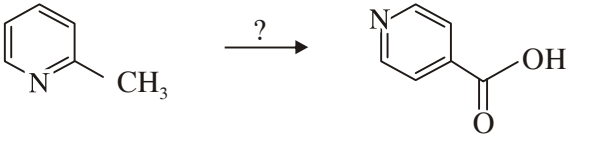
(a) Prevost hydooxylation.

(b) Grignard reagent.

(c) Enantiotopic ligants.

(d) Wilkinson catalyst.

5. Complete the following reactions and give suitable reagent wherever require :

(a) 

(b) ROH $\xrightarrow{?}$ ROCOPh

(c) $RNH_2 \xrightarrow{?} RNHAC$

(d) $Ph_3CH \xrightarrow{?} Ph_3COH\cdot$ (4×5/2=10)

6. Explain the following :

(a) Oxidative cleavage of alkenes and dioles.

(b) Hydrogenation of nitrites and oxime . (2×5=10)

7. (a) What is Oxidation? Explain two Oxidation using suitable example.

(b) What >s reduction? Explain two reduction using suitable example. (2×5=10)

8. Define the following terms and give one example in each case?

(a) Transform based Strategies.

(b) Stereochemical Strategies. (2×5=10)