C107

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

MCH-602

Synthetic Organic Chemistry

M.Sc. Chemistry (MSCCH-20)

3rd Semester Examination, 2022 (June)

Time : 2 Hours] **Max. Marks : 40**

Note : This paper is of Forty (40) 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 Ten (10) marks each. Learners are required to answer any Two (02) questions only.

(2×10=20)

1. (a) What is oxidation ? Explain different types of oxidation using atleast one example. (1×10=10)

(b) Discuss the mechanism of

(i) Hetrogenous catalytic hydrogenation of alkenes.

(ii) Homogenous catalytic hydrogenation of alkenes. (2×5=10)

2. Write down the mechanism of the following reactions :

(a) Michael addition.

(b) Knovenagel condensation.

(c) The Aldole condensation.

(d) Meerven-Pondroff-Verley reduction. (4×5=20)

3. What is protecting group? Write the most important characteristics of a good protecting group. Give two examples each for protection of alcohols and amines. (1×20=20)

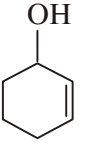
4. (a) Complete the following reactions :

(i) $CH_3CH_2CH_2COOCH_2CH_3 + \xrightarrow{?} CH_3CH_2CH_2\,C\,(CH_3)_2OH$

(ii) $PhLi + PhCOOLi \longrightarrow$

(iii) $RMgX + O = C = O \longrightarrow$

(iv)  $+ \xrightarrow{CH_2Cl_2,\ Zn\ /\ Cu}$

(v)  $+ \xrightarrow{CF_2CO_3H}$ (5×2=10)

(b) Write short notes on following :

(i) Pyrolytic eliminations of suphoxides.

(ii) Hydrogenation of nitriles and oximes. (2×5=10)

5. Write explainatory notes on following :

(i) PCC reagent.

(ii) Grignard reagent.

(iii) Nazarov cyclisation.

(iv) Decarboxylation of β-Lactones.

(v) DIBAL. (5×4=20)

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Five (05) marks each. Learners are required to answer any Four (04) questions only. (4×5=20)

1. (a) What are Ketene acetals ? How they can be used for the preparation of 1,5-dicarbonyl compounds.

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

2. Write short notes on :

(a) Epoxidation of alkenes.

(b) 1,2 Dihydroxilation by O_5O_4. (2×5=10)

3. Formulate the step involved along with reagent within the conversion of phenol to :

(a) 2-amino and 4-amino phenol.

(b) 4-methoxy benzaidehyde.

(c) 4- methoxyaniline.

(d) 4-Nitrophenol propionate. (4×5/2=10)

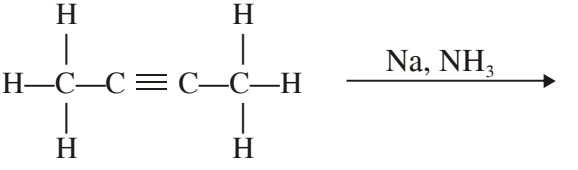
4. (a) Write the structures of DDQ and Chloranil. Discuss dehydrogenation reaction with these reagent by taking an example.

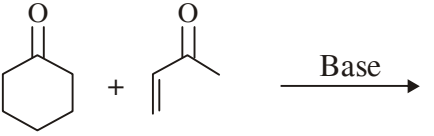
(b) Discuss the reduction of benzoic acid with sodium in ammonia in presence of ethanol. (2×5=10)

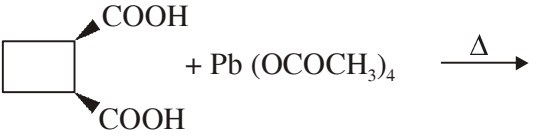
5. Complete the following reactions :

(a) $H_3C - (CH_2)_7 - OH \xrightarrow{DMSO/DCC}$

(b) $PhCHO + CH_2(COOEt)_2 \xrightarrow{Piperidine}$

(c) 

(d) 

(e) 

(5×2=10)

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

(a) $RCH_2–X \xrightarrow{?} RCH_3$

(b) $ArNH_2 \xrightarrow{?} ArNH_2\ X \xrightarrow{?} ArI$

(c) $B(OR_1) + R_2X \xrightarrow{?} R_1 — R_2$

(d) $(CH_3)_3SiCl + CH_3CONH_2 \xrightarrow{?} (CH_3)_3SiNHCOCH_3$

(e) $R–OH + CH_3COCL \xrightarrow{?} ROCOCH_3$

(5×2=10)

7. Define the following term :

(a) 9BBN.

(b) Bouveault-blanc reduction.

(c) Reduction of Conjugated system.

(d) Oxidative decarboxylation of carboxylic acid.

(4×5/2=10)

8. Explain briefly the formation of alcohols, aldehydesand ketones by Carbonylation? (1×10=10)