

**CHE-552****Synthetic Organic Chemistry**

M. Sc. CHEMISTRY (MSCCH-12/13/16)

Second Year, Examination, 2017

**Time : 3 Hours****Max. Marks : 80**

**Note :** This paper is of **eighty (80)** marks containing **three (03)** Sections A, B and C. Attempt the questions contained in these Sections according to the detailed instructions given therein.

**Section-A****(Long Answer Type Questions)**

**Note :** Section 'A' contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. Mention the requirements for a protecting group. Give the use of the following protecting groups in organic synthesis :
  - (a) BOC group
  - (b) Trityl group
  - (c) CBZ group
2. Discuss the mechanism of Diel's-Alder reaction with reference to C-C disconnection. Write a note on its stereospecificity and stereoselectivity.

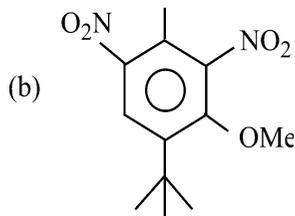
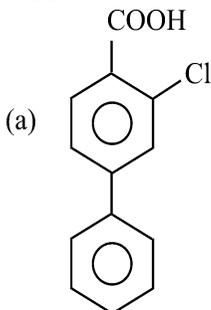
- Giving suitable examples, discuss asymmetric synthesis. What do you understand by chiral auxiliaries ?
- Offering suitable examples write the use of organoboranes in organic synthesis.

### Section-B

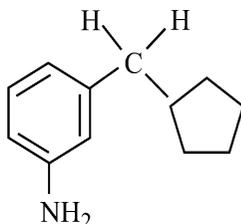
#### (Short Answer Type Questions)

**Note :** Section 'B' contains eight (08) short answer type questions of eight (08) marks each. Learners are required to answer *four* (04) questions only.

- Mention the use of esters (methyl ester and tetrahydropyranyl ester) as the protecting groups of carboxylic acids. Also give the methods of cleavages of protected compounds.
- List the names and structure of reagents used to oxidize secondary alcohols. Illustrate the probable mechanism of chromic acid oxidation of secondary alcohols.
- Analyse the following molecules retrosynthetically and suggest suitable way/ways of their synthesis :

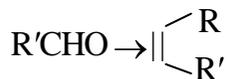


4. What do you understand by topicity of atoms, groups or faces ? Draw a schematic diagram to determine the various types of topicity.
5. Explain optical purity or enantiomeric excess of a mixture of enantiomers.
6. Illustrate the mechanism of acid catalyzed dehydration of 2-butanol.
7. Starting from benzene how will you prepare the following molecule :



Suggested reactions to use are :

- (a) F. C. reaction
  - (b) Clemmensen's reduction
  - (c) Nitration en
8. The following conversion can be brought about by Wittig reaction :



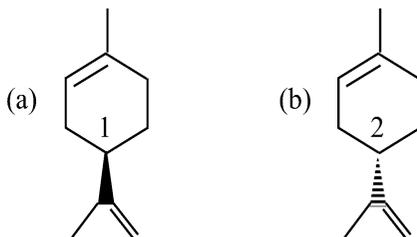
Suggesting the reagents used, explain its mechanism in detail and comment upon the stereoselectivity of Wittig reaction.

## Section-C

## (Objective Type Questions)

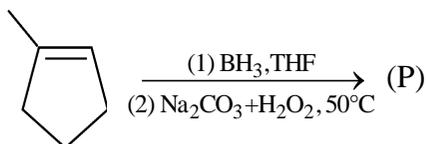
**Note :** Section 'C' contains ten (10) objective type questions of one (01) mark each. All the questions of this Section are compulsory.

1. Structures of limonene from oranges and lemon, respectively are :

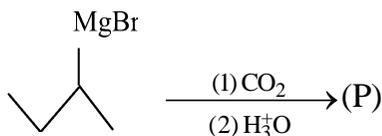


Absolute configuration of carbons marked as 1 and 2 are ..... and ..... respectively.

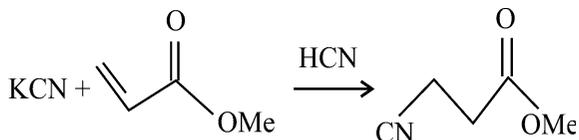
2. Draw the structure of the product (P) of the following reaction :



3. Allyl silanes are more reactive than ..... silanes.
4. Draw the structure of the product (P) of the following reaction :

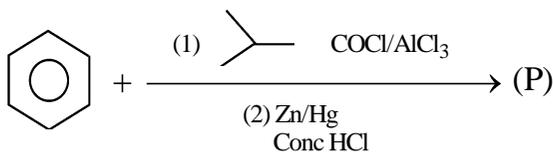


5. Consider the following reaction :

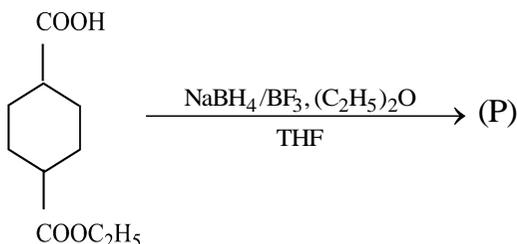


This reaction is an example of .....

6. Draw the structure of the product (P) of the following reaction :



7. Structure of the product (P) in the following reaction will be .....



8. Reaction of  $\text{RCH}=\text{CH}_2$  by sodium and liquid ammonia to  $\text{RCH}_2\text{CH}_3$  is believed to proceed stepwise via .....
9. Full form of PCC, an oxidising agent is .....
10. A reaction in which one functional group within the molecule reacts leaving the other reactive group unaltered is called ..... reaction.

