Roll No. ……..

CHE–552

Synthetic Organic Chemistry

M. Sc. Chemistry (MSCCH–12/13/16)

Second Year, Examination, 2017

Time : 3 Hours **Max. Marks : 60**

Note : This paper is of **sixty (60)** marks containing **three (03)** sections A, B and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

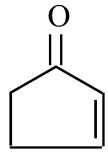
Section–A

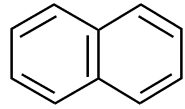
(Long Answer Type Questions)

Note : Section 'A' contains four (04) long answer type questions of fifteen (15) marks each. Learners are required to answer *two* (02) questions only.

1. Explain the following reactions :
   (i) Ozonolysis of alkenes
   (ii) Wittig reaction
   (iii) Hydroboration of alkenes

2. Complete the following reactions and explain the mechanism :

(i)  $\xrightarrow[(ii)\ H_3O^+]{(i)\ NaBH_4}$? + ?

(ii)  $\xrightarrow{Na - C_2H_5OH}$? + ?

(iii) $RCOCl \xrightarrow[\text{quinoline, xylene}]{H_2, Pd/BaSO_4}$?

3. Giving suitable examples and mechanisms, explain the following reaction in alkenes :

   (i) Epoxidation

   (ii) Perhydroxylation with O_5O_4

4. What do you understand by asymmetric synthesis ? What is meant by chiral auxiliary strategy in asymmetric synthesis ?

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 *four* (04) questions only.

1. Giving examples explain donor and acceptor synthons.
2. Comment on the protection and deprotection of carbonyl group in acidic and basic medium.
3. Discuss the oxidative coupling of phenols using potassium ferricyanide.
4. Explain what do you understand by umpolung or reversal of polarity.
5. Discuss the use of Wilkinson's catalyst in homogeneous hydrogenation.
6. Giving suitable example, explain Robinson annelation.

7. Discuss the mechanism of oxidation of 1, 2-diols using periodate. Comment on the stereochemistry of the product.
8. What do you understand by topicity ? Explain homo- and enantio-topicity.

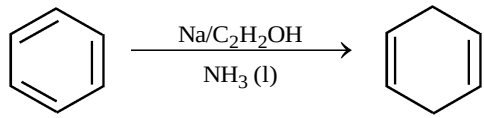
Section–C

(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.

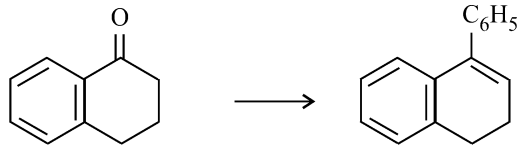
Choose the correct option :

1. The lowest bond energy is of :
   (a) Si–C
   (b) Si–Br
   (c) Si–F
   (d) Si–O
2. The following reaction :



   is called as :
   (a) Wolf reduction
   (b) Clemmensen's reduction
   (c) Birch reduction
   (d) None of the above

3. In the following conversion :



the other reactant will be :

(a) Phenyl bromide

(b) Phenyl magnesium bromide

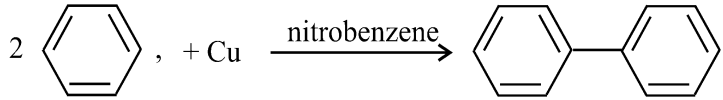
(c) Phenyl iodide

(d) Phenyl chloride

Fill in the blanks :

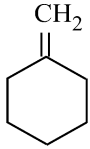
4. Trimethyl silyl group can be used as the protective group for .....

5. The following reaction :



is an example of ..... reaction.

6. Suzuki coupling reaction leads to ..... bond formation.

7. The reactants (structures) for getting 

as the Wittig product are ..... and ..... .

8. The structure of the product of the following reaction :

$$RCH = CH_2 + CO + H_2O \xrightarrow{Ni(CO)_4}$$

is ..... .

9. $LiAlH_4$ reduction product of $HOOC - (CH_2)_4 - COOH$ is .....

10. The structure of the product of the following reactions :

$$CH_2 = \underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}} - CH = CH_2 \xrightarrow[(ii)\ H_3O^+]{(i)\ Na/NH_3}$$

is ..... .