S–759 Roll No. ……..

CHE–552

Synthetic Organic Chemistry

M. Sc. CHEMISTRY (MSCCH–12/13/16/17)

Second Year, Examination, 2018

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.

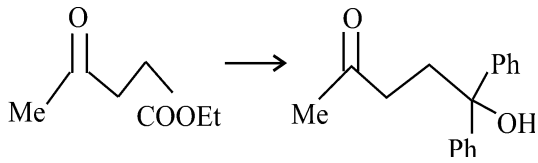
Section–A

(Long Answer Type Questions)

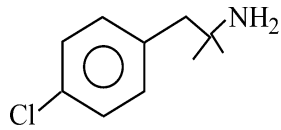
Note : Section 'A' contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. (a) Discuss the mechanism of protection and deprotection of alcohols as trimethyl ethers. $9\frac{1}{2}$

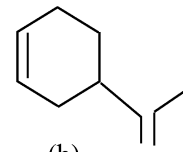
   (b) Mentioning an appropriate protecting group devise a way for the following conversion : $9\frac{1}{2}$



2. Two target molecules (TM) are shown. Performing retrosynthetic analysis, suggest routes for the synthesis of (a) and (b). 19



(a)



(b)

3. What do you understand by prochirality ? Write an explanatory note on chiral reagents and chiral catalysts. 19

4. Giving suitable example, mention the applications of organosilanes in organic synthesis. 19

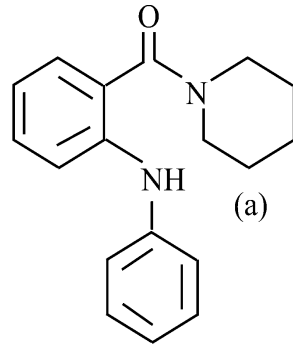
Section–B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of eight (8) marks each. Learners are required to answer *four* (04) questions only.

1. What is the principle of protection of amino groups ? Explain the use of 9-fluorenyl methyl carbonyl group for protecting amino group. 8
2. Write an explanatory not on the biological oxidation of alcohols. 8
3. How will you make a decisions about the presence of homotopic, enantiotopic, disastereotopic and constitutionally heterotropic group in a given organic molecule. Explain. 8
4. Explain the following terms with regard to retro-synthesis and synthesis : 4 each
   (a) Synthous and synthetic equivalents
   (b) Functional group interconversion

5. Examine and analyse the following target molecule retrosynthetically and suggest a way for the synthesis of target molecule : 8



(a)

TM

6. Show that the dehalogenation of 2, 3-dibromobutane by iodide ion is stereospecific by showing that the two diastereomers of the starting material give different disatereomers of the product. 8

7. Friedel Crafts reaction is an important method of the C—C bond formation. Substantiate this statement and explain the mechanism of FC alkylation and acylation. 8

8. Naphthalene can be converted to phenanthrene by Haworth synthesis. Mention various steps, reagents used and mechanism of reaction. 8

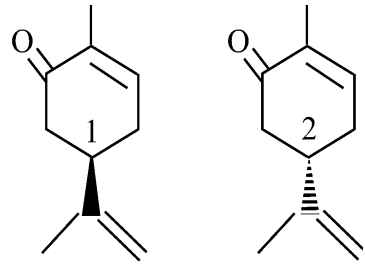
Section–C

(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.

Fill in the blanks where necessary :

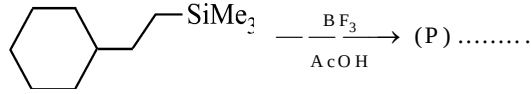
1. Carvone in spearmint and carvone in carvaway seeds are shown by structures (a) and (b), respectively.



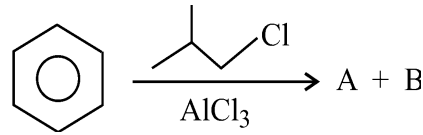
(a) (b)

Absolute configuration of 1 and 2 carbons are ..... and ..... .

2. Hydroboration is ..... .
3. The structure of the product (P) of the following reaction is :

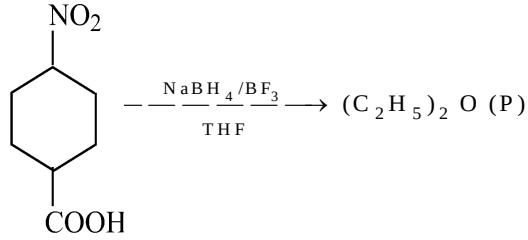


4. Cyclohexyl magnesium bromide on treatment with formaldehyde followed by acidic hydrolysis produces (P) with structure ..... .
5. C—C bond formation is the basis of the following reaction :



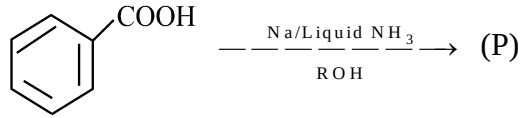
Structures of (A) and (B) are ..... and ..... .

6. Structure of the product (P) of the following reaction :



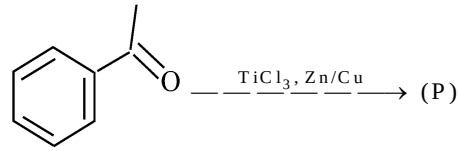
is ..... .

7. Structure of the product (P) of the following reaction :



is ..... .

8. 1-Heptanol on treatment with Pyridinium Chlorochromate (PCC) is CH_2Cl_2 produces ..... as the major product.
9. Method of synthesizing a single enantiomer using enantiomerically pure natural product as a starting material is called as ..... , ... , ...
10. Structure of the product (P) of the following reaction :



is ..... .