Roll No. ……..

CHE–502

Organic Chemistry

M. Sc. CHEMISTRY (MSCCH–12/13/16)

First Year, Examination, 2017

Time : 3 Hours **Max. Marks : 70**

Note : This paper is of **seventy (70)** 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. (a) Write *five* examples of organic compounds showing optical isomerism without chirality.

   (b) What do you understand by the term Aromaticity ? Describe its important conditions.

   (c) Discuss the structural features in reducing and non-reducing sugars.

2. Write the mechanism of the following reactions :

   (a) Catalytic hydrogenation in alkene

   (b) SE_2 reaction

   (c) Michael addition

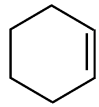
(d) Benzilic acid rearrangement

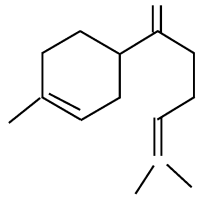
(e) Ozonolysis of alkenes

3. Predict the product of the following reactions :

(a) $3C_6H_6 + CCl_4 \xrightarrow{AlCl_3}$

(b) $CH_3COCH_3 \xrightarrow[H_2O \text{ as a catalyst}]{CH_2N_2}$

(c)  $\xrightarrow{Pb(OAC)_2}$

(d)  $\xrightarrow[(ii)\ C_2H_5OH]{(i)\ Na/CH_3}$ C_2H_5OH

(e) SNAS substitutions

4. (a) Describe the biogenetic pathway of monoterpenoids.

(b) Tropolium salt is aromatic in nature. Discuss.

(c) Describe the general methods of preparation of isoquinoline.

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 *six* (06) questions only.

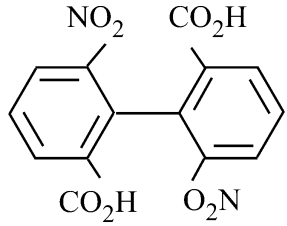
1. Write short notes on the following :

(a) Resonance

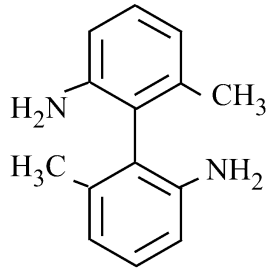
(b) Relative configuration

2. What is trapping of intermediate ? What is its importance in determining the reaction mechanism ?
3. Explain the following :
   (a) Beckmann rearrangement
   (b) Houben-Hoesch reaction
4. Explain the terms benzenoid, non-benzenoid and poly-nuclear hydrocarbons.
5. Assign R and S configuration to the following :

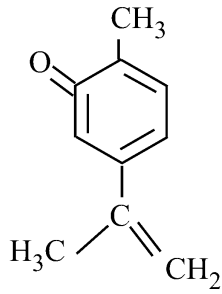
(a)

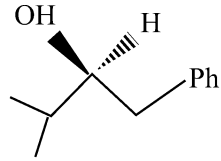


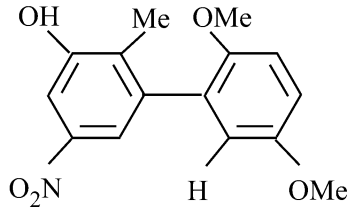
(b)



(c)



(d) 

(e) 

6. Explain the following terms :
   (a) Specific rotation
   (b) Diastereotropic ligand
7. How the branched and unsaturated sugars are synthesized ?
8. Discuss Woodward's synthesis of quinene.

Section–C

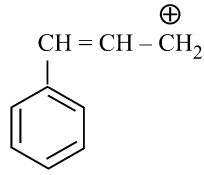
(Objective Type Questions)

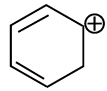
Note : Section 'C' contains ten (10) objective type questions of one and one (01) mark each. All the questions of this section are compulsory.

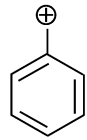
1. The two H's at C–2 and C–3 in (2R, 2S) tartaric acid :
   (a) Enantiotopic
   (b) Diastereotopic
   (c) Homotopic
   (d) Constitutionally heterotropic

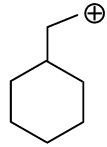
2. Which of the following reactions contains a carbene intermediate ?
   (a) Refromatsky reaction
   (b) Reimer-Tiemann reaction
   (c) Wittig reaction
   (d) Perkin reaction

3. Which of the following is example of non-classical carbonation ?

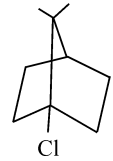
(a) 

(b) 

(c) 

(d) 

4. Which of the following statements about the reactivity of 1-chloroapocamphene towards alcoholic $AgNO_3$ is true ?



   (a) Reacts by S_{N^1} mechanism

(b) Reacts by S_{N^2} mechanism

(c) Reacts by SNi mechanism

(d) Does not react

5. Among the compounds given below high dipole moment one is :

(a) Naphthene

(b) Anthracene

(c) Phenanthrene

(d) Azulene

6. The product of Skraup synthesis is :

(a) Quinoline

(b) Isoquinoline

(c) Indole

(d) Piperidine

7. A Claisen condensation would most likely produce which of the following as a product ?

(a) β keto acid

(b) A substituted acetic acid

(c) An α-hydroxy ester

(d) A substituted acetone

8. When glucose is treated with bromine water the major product is :

(a) Glyceraldehyde

(b) Gluconic acid

(c) Galactose

(d) Saccharic acid

9. Camphor gives on distillations with I_2 :
   (a) Carvacrol
   (b) Carvalol
   (c) Camphoric aicd
   (d) Camphoronic acid

10. On treating with cold dilute $KMnO_4$ papaverine gives :
   (a) Veratric acid
   (b) Papaveraldine
   (c) Papaverinol
   (d) Papaverinic acid