

**C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),  
MELVISHARAM - 632 509.  
SEMESTER EXAMINATIONS, NOVEMBER - 2018**

**M.Sc., CHEMISTRY  
SEMESTER I  
P18MCH101 – STEREOCHEMISTRY AND SUBSTITUTION REACTIONS**

Time: Three Hours

Maximum: 75 Marks

**SECTION - A (5 X 6 = 30 Marks)**

Answer **ALL** Questions.

1. a) (i) What is meant by chirality? How are chiral molecules classified? Give examples.  
(ii) Draw Fischer projection formula of *meso*-tartaric acid. Convert it into the Sawhorse and Newmann projection formulae  
(Or)  
b) (i) Write an account on “Helical chirality” with suitable examples.  
(ii) Discuss the optical isomerism exhibited by biphenyls.
2. a) Explain the influence of conformation on reactivity with special reference to  
(i) Esterification of cyclohexane carboxylic acid  
(ii) Reduction of cyclohexanone  
(Or)  
b) Discuss the conformation and stereochemistry of *cis*- and *trans*-decalin.
3. a) Describe the following reactions with an example.  
(i) HVZ reaction                      (ii) Halogen exchange reaction  
(Or)  
b) Explain the following reactions with an example.

- (i) Stark Enamine reaction                      (ii) Von-Braun reaction
4. a) Outline the synthesis of 2,3-dinitrotoluene and *m*-aminobenzoic acid.  
(Or)

b) Explain the following reactions with an example.

- (i) Reimer-Tiemann reaction                      (ii) Gattermann-Koch reaction
5. a) Describe the aromatic nucleophilic substitution reactions of diazonium salts and activated halides.

(Or)

b) Write Hammett equation. Describe the significance of the terms involved in it.

**SECTION - B (3 X 15 = 45 Marks)**

Answer **ANY THREE** Questions.

6. (a) Illustrate Cram's rule of asymmetric induction with an example. Mention its limitations.  
(b) Describe the geometrical and optical isomerism of disubstituted cyclopropane.
7. Discuss the conformational analysis of 1,2-, 1,3- and 1,4-dimethylcyclohexane.
8. (a) Explain the salient features of  $S_N1$  and  $S_N2$  mechanisms of aliphatic nucleophilic substitution reactions.  
(b) Discuss the effect of structural factors and solvents on  $S_N1$  and  $S_N2$  mechanisms.
9. Explain the mechanism of the following reactions aromatic compounds.  
(a) Nitration                      (b) Friedel-Craft's alkylation                      (c) Formylation.
10. Discuss any three non-kinetic methods of determining organic reaction mechanism.

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