2021
M.Sc.
First Semester
CORE – 02
CHEMISTRY
Course Code: MCHC 1.21
(Organic Chemistry - I)

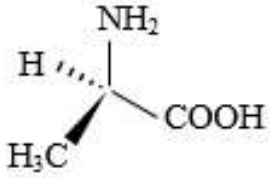
Total Mark: 70 *Pass Mark: 28*
Time: 3 hours
Answer five *questions taking* one *from each Unit.*

UNIT–I

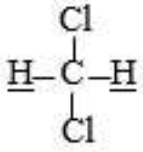
1. (a) What is stereogenicity and chirotopicity? Differentiate stereogenic and chirotopic centre by taking the reference of C_2, C_3 and C_4 of 2,3,4-tri hydroxy glutaric acid. 5

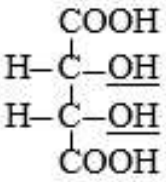
   (b) Convert the following flying wedge projection into Fischer projection. 1½×2=3

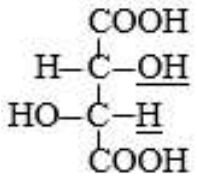
   (i) 

   (ii) 

   (c) What is topicity? Identify the underline atom and groups as homotopic and hetrotopic ligand. 1+1+1+1=4

   (i) 

   (ii) 

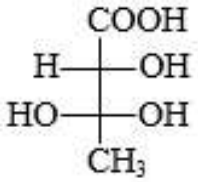
(iii) 

(d) Explain the term regioselectivity and stereoselectivity. 2

2. (a) What do you understand by prochirality? Explain by taking a suitable example. 3

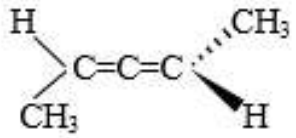
(b) Give one example of a molecule having sterogenic but achirotopic centre. 2

(c) Convert the following Fischer projection into Saw-horse and flying wedge projection. 2



(d) Describe Pro-R and Pro-S descriptors of a ligand on pseudoasymmetric centre by taking a suitable example. 4

(e) What is meant by atropisomerism? Assign P and M configuration of the molecule. 3



UNIT–II

3. (a) Discuss Taft equation in brief. 4

(b) What is anchimeric assistance? Discuss C–C bond as neighbouring group. 5

(c) Give the synthetic application of amine. 2

(d) What is S_RN^1– mechanism? Explain with an example. 3

4. (a) Discuss the application of acid-base to accelerate nucleophilic substitution reaction. 5

(b) Discuss the following terms. 2½×2=5

(i) Substituent constant(σ_*)

(ii) Reaction constant (ρ)

(c) Discuss nucleophilic substitution reaction mechanism via benzyne formation. 4

UNIT–III

5. (a) What is elimination reaction? Discuss its type. 3

(b) What is E_1CB-elimination? Give its mechanism. 3

(c) Discuss the stereochemistry of elimination reaction of 2-bromobutane. 5

(d) Discuss the effect of substrate structure on reactivity. 3

6. (a) Discuss E_1- mechanism with an example and compare the conditions favouring E_1 mechanism. 5

(b) Discuss the stereochemistry of E_2 reactions of erythro diastereomeric form of 1-chloro-1,2-diphenyl propane. 6

(c) Discuss the elimination reactions in cyclic compounds. 3

UNIT–IV

7. (a) Explain Norrish type-I and II with suitable example. 7

(b) Explain cis-trans isomerism of stilbene. 4

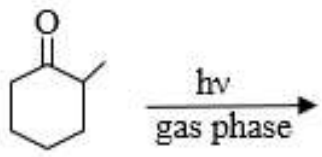
(c) Explain the mechanism of photosensitization. 3

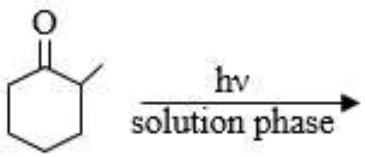
8. (a) Explain the following reactions. 4+4=8

(i) Photoreduction of benzophenone to benzopinacol

(ii) Hoffmann-Loeffler-Freytag reaction

(b) Complete the following reactions and give mechanism. 2+2=4

(i) 

(ii) 

(c) Write the conditions for donor-acceptor relationship to function. 2

UNIT–V

9. (a) Explain electrocyclic reaction of 1,4-dimethyl-1,3-butadiene by F.M.O. approach. 5

(b) Explain cycloaddition reaction of ethylene and butadiene and indicate the mode of reaction. 4

(c) Explain [1,3]-sigmatropic hydrogen shift by F.M.O. taking a suitable example. 5

10. (a) Explain the following reactions with suitable example. 4+4=8

(i) Sommelet-Hauser rearrangements

(ii) Claisen rearrangements

(b) Explain cheletropic reaction of 1,3-butadiene with SO_2. 4

(c) Explain the main features of Pericyclic reactions. 2