FD-306

M.Sc. 1st Semester
Examination, Dec.-Jan., 2021-22

CHEMISTRY

Paper - II

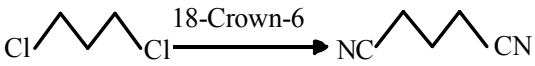
Concepts in Organic Chemistry

Time : Three Hours] [*Maximum Marks* : 80

Note : Answer **all** questions. The figures in the right-hand margin indicate marks.

Unit-I

1. (*a*) Define crown ethers with suitable example. Explain the role of 18-crown-6 in conversion of 1, 3-dichloro propane to 1, 3-dinitrile propane (Glutaronitrile) 10



(*b*) Discuss bonding in Fullerenes. 5

(*c*) Explain the criterion for Homoaromaticity in Tropylium cation $(C_8H_9)+$. 5

OR

(*a*) Explain in detail Aromaticity and Antiaromaticity on the basis of perturbation molecular orbital theory. 12

(*b*) Give brief account on the following : 4×2

(*i*) Cyclodextrins

(*ii*) Catenanes

Unit-II

2. (*a*) What are stereospecific and stereo selective reactions ? Explain them with the help of two examples of each. 8

(*b*) Discuss conformational analysis of 1, 4-disubstituted cyclohexane. Comment on their stability on the basis their energy. 8

(*c*) Explain with suitable example Threo and Erythro isomers. 4

OR

(*a*) Write a Fisher projection, staggered sawhorse and Newmann formulae of threo-2, 3-dichloro-3-phenyl-propanoic acid (Ph — CH — Cl — CH — Cl — COOH). 10

(*b*) Explain asymmetric synthesis with example. 5

(*c*) Discuss the optical activity of biphenyles and allenes. 5

Unit-III

3. (*a*) Discuss the structure and generation of carbocation. Give the order of stability of the following carbocation Ethyl, Benzyl, Tert-butyl, Allyl. 10

(*b*) Explain E2 elimination reaction with suitable example. Discuss effect of substrate and leaving group on E2 elimination. 6

(*c*) Explain Hunsdiecker reaction. 4

OR

(*a*) Why are carbanions considered as reactive intermediates ? Discuss their generation, stability and reactions. 10

(*b*) Explain why singlet carbenes are electrophilic and triplet carbenes are diradical in nature. 6

(*c*) Explain E1cB reaction with mechanism. 4

Unit-IV

4. (*a*) Explain thermal and photo induced [4+2] cyclo-addition reaction. State which is symmetry allowed and which is symmetry forbidden. 8

(*b*) Write notes on the following : 4×3

(*i*) Ene reaction

(*ii*) Suprafacial and Antarafacial shifts

(*iii*) Aza-Cope rearrangement

OR

(*a*) Explain why cis-3, 4-dimethyl cyclo-butene on heating gives cis-trans-2, 4-hexadiene, while on photochemical reaction the product is trans-trans-2, 4-hexadiene. 10

(*b*) Explain the following with suitable example : 5×2

(*i*) Sigmatropic rearrangement

(*ii*) Electrocyclic reaction

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