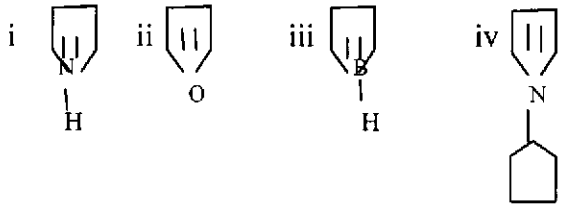
PD-163
(531) M.Sc. CHEMISTRY (FIRST SEMESTER)
Examination Dec. 2020
Compulsory/Optional
Group-
Paper-
Name/Title of Paper- ORGANIC CHEMISTRY
Time: 3:00 Hrs.] [Maximum Marks: 80
[Minimum Pass Marks: 29

नोटः दोनो खण्डों से निर्देशानुसार उत्तर दीजिए। प्रश्नों के अंक उनके दाहिनी ओर अंकित है।
Note: Answer from Both the Section as Directed. The Figures in the right-hand margin indicate marks.

Section(A)

1. Answer the following questions in brief. [1X10]
   a. How many optical isomers are possible for the following compound.
   $$CH_3 - CH(OH) - CH(OH) - CH_3$$
   b. Arrange the following carbocations in the Order of increasing stability. $2^0, 3^0, 1^0, benzyl.$
   c. Identity the compound A $\overset{R}{\underset{R}{}}> C = 0 \xrightarrow{RCO_3H} A$
   d. Give example of molecular rearrangement which occur due to the rearrangement to electron deficient Oxygen.
   e. In the following compound select the species which is not aromatic.



   f. What is pyramidal inversion? Give one example.
   g. What is the full name of HOMO and LUMO.
   h. Which of the free radicals is most stable.
   $$i.\, CH_3CH_2 \;\; ii.\, H_2C = CH - CH_2 \;\; iii.\, (CH_3)_2\, CH \;\; iv.\, (CH_3)_3C$$
   i. What is Favorskii rearrangement: In Which medium Favorskii rearrangement occurs.
   j. Stability of free radicals can be explained on the basis of _____.[Fill in the blank]
2. Answer the following question in short [2X5]
   a. Give the name and structure of two optically active compounds which has no chiral carbon atom.
   b. Cis-1,2-Dimethyl cyclohexane.
   Discuss the conformation of cis-1,2-methyl cyclohexane.
   c. What do you mean by singlet and triplet state.
   d. Explain why $[\pi^4 s + \pi^4 a]$ cycloaddition is thermally allowed and photo chemically forbidden.
   e. What do you understand by Fluxional tautomersion

Section(B)

Answer all question:

Unit-1 [8]

3. a. Discuss the methods of generation and the reactions undergone by carben? How will you distingwish between a singlet and triplet Carben.
   b. Explain the involvement of E_1 CB Mechanism in during Benzynl formation. [4]

OR

   a. Discuss aromaticity of in benzanoid and non-benzenoid Compounds. [8]
   b. What are atternate and non- alternat hydrocarbon Explain with example. [4]

Unit-2

   a. Explain the optical isomerism due to restricted rotation in biphenyls. [6]
   b. Discuss the main conformation of cyclohexane. Why boat form is less preferred than chair form. [6]

OR

   a. Draw the two diastereoisomeric forms of decalin. Explain why they cannot be interconverted. [6]
   b. Write Short notes on:- a. Three and Erythro isomer b. Optical purity. [6]

Unit-3

4. Write notes on any three of the following:- [4X3]
   a. Curtin-Hammet principle
   b. Hmmond's Postulate
   c. The effect of Solvent on rate of reaction.
   d. Kinetic isotope effect ? effect of substrate on reactivity of a reaction.

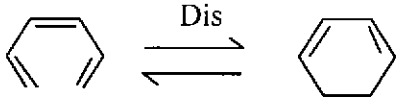
OR

   a. Draw the energy profile diagram for the following reactions and explain the reaction.
      i. A one step reaction ii. A two step reaction in which the second step is rate determining. [6+6]
   b. i. Thermodynamic requirement for reaction ii. Kinetic requirement for reaction.

Unit-4

5. a. Describe thermal and photochemical cyclobuten-1,3 diene interconversion using Frontier orbital method. [6+6]

   b. Construct a co-relation diagram (depicting the orbitals undergoing change along with their symmetries) for the following two transformations.



With the help of the diagram so constructed, prediet whether there transformation are allowed thermally or photochemically Do you arrive at the same conclusions using PMO method.

OR

a. What are suprafacial and antarafacial process in sigmatropic rearrangement; Analyse 1, 5 Sigmatropic rearrangement by FMO method. [6+6]

b. Write note on any two of the following

i. (2+2) cycloaddition reaction

ii. Fluxional tautomerism.

iii. Cheletropic rearrangement.

Unit-5

Describe the mechanism of following rearrangement. [6+6]

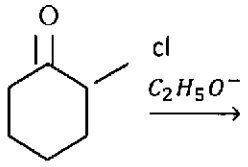
i. Favorski Rearrangement ii. Baeyer Villager Oxidation

OR

a. Write a note on Migratory aptitude and memory effect. [6+6]

b. Complete the following reactions and give their mechanism and name of the reaction.

a.



b.