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K – 4913

Reg. No. :

Name :

Third Semester M.Sc. Degree Examination, February 2021

Polymer Chemistry

PC 232 : ORGANIC CHEMISTRY II

(2014 to 2017 Admission)

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any two** among (a), (b) and (c) from each question. **Each** sub question carries **2** marks.

- Explain "antiaromaticity" with examples.
 - Explain very briefly the stereo-aspects of Diels-Alder reaction.
 - Cyclopropenone and cycloheptatrienone are relatively stable compounds whereas, cyclopentadienone is unstable. Why?
- What is Barton reaction? Give an example.
 - Write any two applications of photoreactions in industrial synthesis.
 - What are Norrish reactions? Give one example each.
- How is enamine prepared? Show one of its applications in organic synthesis.
 - As a reducing agent, what are the advantages of sodium borohydride over lithium aluminium hydride?
 - Explain the stereo selective hydroxylation of an alkene with OsO_4 .

P.T.O.



4. (a) Explain hydrogen bonding stretching frequency and how will you differentiate inter and intra molecular hydrogen bonding in IR spectra.
- (b) Give the structure of the compound C_3H_9N with one 1H and one ^{13}C -NMR peaks.
- (c) How can you confirm the presence of bromine in an organic compound using mass spectroscopy?
5. (a) Write down the structure of the product/s in the reaction of 2-cyclohexanone with $(CH_3)_2CuLi$ and then with H_3O^+ .
- (b) Write the structure of any one nucleotide with proper numbering to different positions.
- (c) Explain very briefly the role of protecting groups in nucleotide synthesis by giving suitable examples.

(10 × 2 = 20 Marks)

SECTION – B

Answer **either (a) or (b)** from each question. **Each** sub question carries **5** marks.

6. (a) Write short notes on the aromaticity of
- (i) fullerenes and
 - (ii) metallocenes
- (b) Illustrate the stereochemical aspects and the mechanism of Diels Alder reaction and Cope rearrangement
7. (a) Discuss the photoreactions of vitamin D.
- (b) Write notes on:
- (i) di-pi methane rearrangement.
 - (ii) Singlet and triplet state reactivities in photoreactions.



8. (a) What is Mannich base? How it is prepared? Give two applications of Mannich reaction in organic synthesis.
- (b) Illustrate that Peterson olefination reaction can be used for preparing either *cis* or *trans* alkenes from the same β - hydroxysilane.
9. (a) Explain the changes produced in the auxochromic red shift of the following:
- (i) basifying C_6H_5COOH
- (ii) acidifying $C_6H_5NH_2$
- (b) Explain the following in NMR spectra.
- (i) acetylenic H's are at a higher field than vinylic H's
- (ii) the δ value of an aromatic H (6- 8.5 ppm) is higher than a vinylic H (4.6-5.9)
10. (a) Describe the synthesis of any two nucleic acid bases.
- (b) Explain the automated oligonucleotide synthesis by phosphoramidite method.

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions. **Each** question carries **10** marks.

11. What are pericyclic reactions? Discuss the classification of pericyclic reactions giving suitable examples.
12. Write a detailed note on synthetically useful photoreactions of carbonyl compounds, enes and dienes.
13. Write short notes on the following name reactions (including mechanism) in organic synthesis with two applications each.
- (a) Mc Murray reaction
- (b) Robinson ring annulation
- (c) Shapiro reaction
- (d) Reformatsky reaction



14. Discuss the basic fragmentation types and factors influencing fragmentation pattern in carbonyl compounds using appropriate examples.

15. Discuss the applications of the following reagents in organic synthesis

(a) SeO_2

(b) DDQ

(c) DIBAL

(d) $(n\text{-C}_4\text{H}_9)_3\text{SnH}$

(3 × 10 = 30 Marks)

