A-073

Total Pages : 4 **Roll No. ----------**

MCH-608

Heterocyclic Compounds and Spectroscopy-III

M.Sc. Chemistry (MSCCH)

4th Semester, Examination 2024 (June)

Time: 2:00 hrs Max. Marks: 35

Note : This paper is of Thirty five (35) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section-A (Long-Answer-Type Questions)

Note : Section 'A' contains Five (05) long-answer-type questions of Nine and Half (9.5) marks each. Learners are required to answer any Two (02) questions only.

[2x9.5=19]

P.T.O.

Q.1. Write any two method for the preparation of each of the following Isoxazoles, pyrazoles.

Q.2. Formulate a general method of synthesis for each of 1, 2, 3 and 1, 3, 4-thiadiazoles. What are the products in the following reactions?

a. 3, 5 –Dimethyl -1, 2, 4-thiadiazole treated with n-BuLi

b. 2-phenyl-1, 3, 4-thiadiazole treated with NaOMe in EtOH.

Q.3. How are caffeine, theobromine and theophylline related to xanthine? Outline the synthesis of caffeine and the bromine from uric acid.

Q.4. Discuss the following spectra with atleast one example.

a. Proton decoupled ^{13}C NMR.

b. Off Resonance decoupled ^{13}C NMR.

c. Selective proton decoupled ^{13}C NMR.spectrum.

Q.5. Write any four chemical reactions for the synthesis of Aziridines and also explain two chemical of it?

Section-B (Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only.

[4x4=16]

Q.1. Discuss about the advantage and disadvantage of ^{13}C NMR. Spectroscopy.

Q.2. Write a short note on applications of octant rule?

Q.3. Write brief notes on the following:

a. Spin-spin coupling.

b. Coupling constant.

Q.4. Explain Briefly about the following:

a. ORD curves

b. Cotton effects (CE)

Q.5. Write a short notes on Continuous wave mode method recording of ^{13} C-NMR spectra.

Q.6. Write short notes on:

a. Sydnones

b. Dimroth Rearrangement

Q.7. Explain the chemcial properties of purine and xanthine base.

P.T.O.

Q.8. Determine the structure of the following compounds with the use of data provided:

Molecular formula is $C_4H_{10}O$ ^{13}C-NMR data,

i) δ 61.4 (triplet)

ii) δ 35 (triplet)

iii) δ 19.1 (triplet)

iv) δ 13.6 (quartet)

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