A–886

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CHE–553

M.Sc. CHEMISTRY (MSCCH)

(Natural Product, Heterocyclic and Spectroscopy)

2nd Year Examination, 2024 (June)

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections '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 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. What is Porphyrin ring ? Discuss its synthesis and applications.

2. What do you understand by ORD ? How is it different from CD ? Discuss analytical application of ORD technique.

3. Discuss the reaction mechanism of the following :

   (a) Paterno-Buchi reaction

   (b) Dimiroth rearrangement

4. Discuss the synthesis of reserpine. Give the application of reserpine.

5. (a) What are Co-factors and Co-enzymes ? Describe in brief.

   (b) Explain the key and lock model and induced fit model for the mechanism of enzymes.

Section–B

Short Answer Type Questions 4×8=32

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

1. What are three, four and five membered heterocyclic compounds ? Write the structures of each group of compounds and discuss their basic characters.

2. Describe the steps involved in Krebs cycle.

3. (a) Describe the basicity order of furan, thiophene and pyrrole.

   (b) Describe why loan pair of electrons on nitrogen of pyridine do not take part in resonance.

4. What are vitamins ? Discuss the classification of vitamins by giving suitable example.

5. What are Prostaglandins ? What is their biological significance ? Discuss with examples.

6. Write a short note on the any *two* following:

   (a) ^{19}F–NMR

   (b) Octane rule

   (c) Chemical shift

   (d) ^{31}P–NMR

7. What are alkaloids ? Discuss their classifications and uses.

8. Explain the factors affecting the chemical shift of 13C NMR.

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