(Pages : 4) **V – 5931**

Reg. No. : .....

Name : .....

Second Semester M.Sc. Degree Examination, August 2025

Chemistry/Analytical Chemistry/Polymer Chemistry/Chemistry With Specialisation in Drug Design and Development

CH 222/CL 222/PC 222/ CHDD 522 : ORGANIC CHEMISTRY – II

(2020 Admission Onwards)

Time : 3 Hours Max. Marks : 75

SECTION – A

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

1. (a) What is chromatography?

   (b) What is meant by the term R_f value?

   (c) What are the moving and stationary phases in paper chromatography?

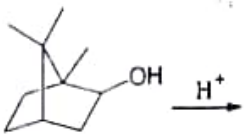
2. (a) What is F-strain? Explain.

   (b) Distinguish between transition state and intermediates.

   (c) State and explain the principle of microscopic reversibility.

3. (a) Describe Rupe rearrangement.

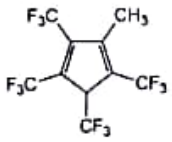
(b) Write the mechanism of Lossen rearrangement.



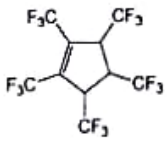
(c) Complete the following reaction:

4. (a) Explain the diamagnetic anisotropy in paracyclophane

(b) Among the following which is more acidic? Justify.



(i)



(ii)

(c) Define 1 ,3-dipolar cycloaddition.

5. (a) What is photosensitization?

(b) Explain di-π methane rearrangement.

(c) What is chemiluminescence?

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) What are the common techniques used for detecting colourless spots in TLC? Explain.

(b) Which type of GC detector is most commonly used? Explain its working principle and what are its limitations?

7. (a) Write a brief note on Curtin -Hammett principle

   (b) Explain the Taft equation and its significance in the study of organic reactivity.

8. (a) Discuss the mechanism with evidence of Favorskii rearrangement.

   (b) Write the mechanism of pinacol rearrangement. Justify.

9. (a) Explain the regioselectivity of Diels-Alder reaction.

   (b) Discuss the aromaticity of non-benzenoid aromatic systems.

10. (a) Explain the methods of generation and reactions of singlet oxygen.

    (b) Explain the photochemistry of conjugated dienes.

(5 × 5 = 25 Marks)

SECTION – C

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

11. (a) Explain the concept of theoretical plates and plate height in chromatography.

    (b) Write a short note on principle. instrumentation and applications of GC- MS.

12. Discuss about the various methods of determining reaction mechanisms.

13. Describe with evidences the mechanism of

    (a) Orton rearrangement

    (b) Dienone-phenol rearrangement

    (c) Curtius rearrangement

    (d) Stevens rearrangement

14. Derive the selection rules for thermal and photochemical 4n and 4n+2 eletrocyclisation reactions using correlation diagram method

15. (a) Discuss the photochemistry of vision.

    (b) Describe Jablonski diagram.

(3 × 10 = 30 Marks)

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Second Semester M.Sc. Degree Examination, August 2025

Chemistry/ Analytical chemistry/ Polymer Chemistry/ Chemistry With Specialisation In Drug Design And Development

CH 221/ CL 221/ PC 221/ CHDD 521 : INORGANIC CHEMISTRY II

(2020 Admission Onwards)

Time : 3 Hours Max. Marks : 75

SECTION – A

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

1 (a) What are the effects of vibronic coupling?

(b) What is orgel diagram? How is it differing from the Tanabe Sugano diagram?

(c) What is meant by spin only magnetic moment?

2. (a) What is a reflection grating?

(b) Differentiate between point and line defects

(c) Discuss the close packing structure of FCC lattice

3. (a) How do you determine Brillouin zone?

(b) What is the importance of carrier density?

(c) What is the reason for the color of inorganic solids?

4 (a) Discuss the methods of preparations of S_4N_4

(b) Discuss the structure and properties of Borazine

(c) What is the Styx rule?

P.T.O.

5. (a) Suggest a few applications for actinides

(b) Discuss the methods of extraction of uranium

(c) Discuss the practical applications of trans-uranium isotopes

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) Illustrate the correlation diagram for d^n ions in tetrahedral fields

(b) Discuss the splitting of terms in weak and strong tetrahedral fields

7. (a) Describe the thermodynamics of Frenkel defects

(b) Discuss the use of rotating crystal methods in crystal lattice studies

8. (a) Distinguish between intrinsic and extrinsic semiconductors

(b) What is piezoelectricity? Discuss the applications of piezoelectric materials?

9. (a) Discuss the structure and bonding of diborane

(b) Discuss the methods of preparation and reactions of metallocarboranes

10. (a) Discuss the splitting of *'f'* orbital in cubic ligand field

(b) Explain the various components of the beach sands of Kerala

(5 × 5 = 25 Marks)

SECTION – C

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

11. Explain the applications of magnetic measurements of crystals

12. (a) Explain the structure of Nickel arsenide

(b) Discuss the crystallographic shear structure and shear properties

13. (a) Explain the band theory of solids

    (b) Explain the applications of conductors and semi-conductors

14. Explain the structure, bonding and reactions of Phosphazines

15. Compare the properties of lanthanides and actinides

($3 \times 10 = 30$ Marks)
