

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 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?

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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 × 10 = 30 Marks)

