

Reg. No. :

Name :

Second Semester M.Sc. Degree Examination, September 2024

**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.

- What is the effect of spin orbit coupling?
 - What is Tanabe Sugano diagram? How is it differing from the Orgel diagram?
 - What is meant by spin state crossover?
- What is a transmission grating?
 - Differentiate between perfect and imperfect crystals.
 - Discuss the close packing structure of BCC lattice.
- What is a Brillouin zone in crystallography?
 - What is the significance of carrier mobility in semiconductors?
 - Why are inorganic solids coloured?
- Discuss the structure and properties of S_4N_4 .
 - Discuss the methods of synthesis of Borazine.
 - What is the Wade's rule for B_5H_9 ?

P.T.O.

5. (a) Suggest a few applications for lanthanides.
(b) Discuss the methods of extraction of thorium.
(c) What are the trans-uranium elements and their uses?

(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 octahedral fields.
(b) Discuss the splitting of terms in weak and strong octahedral fields.
7. (a) Describe the thermodynamics of Schottky defects.
(b) Discuss the use of powder diffraction methods in crystal lattice studies.
8. (a) Discuss the conduction mechanism of semi-conductors.
(b) What is ferroelectricity? Discuss the applications of ferroelectric materials.
9. (a) Discuss the methods of synthesis and applications of P_4S_3 .
(b) Discuss the methods of preparation and reactions of Carboranes.
10. (a) Discuss the various methods used for the separation of lanthanides.
(b) Explain the importances of beach sands of Kerala.

(5 × 5 = 25 Marks)

SECTION – C

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

11. Explain the theory and applications of antiferromagnetism.
12. (a) Explain the structure of Zinc blende.
(b) Discuss the colour centers in alkali halide crystals.
13. (a) Explain the free electron theory of solids.
(b) Explain the applications of insulators and semi-conductors.
14. Explain the structure, bonding and reactions of Diborane.
15. Explain the spectral and magnetic properties of lanthanides.

(3 × 10 = 30 Marks)