R – 7474

Reg. No. : ....

Name : ....

Second Semester M.Sc. Degree Examination, November 2023

Chemistry / Analytical Chemistry / Polymer Chemistry

CH/ CL/ PC 221 : 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 is the difference between d-d transition and CT transition?

    (b) What is Orgel diagram? What is its limitation?

    (c) What is the difference between ferromagnetism and anti ferromagnetism?

2. (a) Distinguish between point groups and space groups.

    (b) What do we mean by Voids in Solid State?

    (c) What is Bragg's equation? What is its application?

3. (a) What is mean by Brillouin zones?

    (b) Describe the free electron theory of solids

    (c) Distinguish between super conductivity and photoconductivity.

4. (a) Discuss the properties of tetrasulfur tetranitride

    (b) What is Wade's rule?

    (c) What are metallo-carboranes? Where do you find applications for metallo-carboranes?

5. (a) Discuss the oxidation states of lanthanides.

    (b) Discuss the applications of actinide compounds.

    (c) What are trans-Uranium elements? Discuss their stabilities.

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) Discuss the selection rule for electronic transition of metal complexes.

    (b) Discuss the applications of magnetic measurements of metal complexes.

7. (a) Describe the powder X-ray diffraction method? Discuss its limitations.

    (b) With suitable examples, briefly explain the BCC and FCC close packed Structures.

8. (a) Discuss the band structure of conductors.

    (b) Describe the carrier mobility in semiconductors.

9. (a) What is borazine? Discuss its properties and any one of its methods of synthesis.

    (b) Discuss the Closo and Nido structures of boranes.

10. (a) Discuss the importance of beach sands of Kerala.

    (b) Briefly explain the spectral and magnetic properties of actinides.

(5 × 5 = 25 Marks)

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SECTION C

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

11. With suitable example, explain the electronic spectra of metal complexes.

12. Explain the different types of crystal defects. What are the impacts of crystal defects?

13. What is ferroelectricity? How is it differing from pyroelectricity? Discuss the applications of ferroelectrics and pyroelectrics.

14. Explain the preparation, structure boding and properties of polyhedral boranes.

15. Explain the occurrence, extraction and characteristic properties of lanthanides.

$$(3 \times 10 = 30 \text{ Marks})$$

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