

PS1GPHC550

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St Aloysius (Deemed to be University), Mangaluru

Semester II – P.G. Examination – M.Sc. Chemistry

April - 2025

ADVANCED INORGANIC CHEMISTRY

Time: 2 ½ Hours

Max. Marks: 60

PART - A

ST.ALOYSIUS COLLEGE

PG Library

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(5x2=10)

Answer any **FIVE** of the following:

1. Outline the key steps involved in the extraction and separation of lanthanides from their ores.
2. Mention the spectral properties exhibited by lanthanide and actinide complexes.
3. Mention any 2 limitations of Valence Bond Theory.
4. What is Nephelauxetic effect.
5. What are metal carbonylates? Give an example.
6. How does the presence of pi acceptor ligands influence the bonding in metal carbonyls?
7. State Curie- Weiss law.
8. What is quenching of magnetic moment.

PART - B

Answer any **FIVE** of the following

(5x10=50)

- 9.a) Explain Significance of Lanthanide contraction. (5)
- b) With the help of Ellingham diagram, discuss the relative merits of C and CO as reducing agents in the extraction of metals. (5)
- 10.a) Describe the methods involved in the reduction of oxide ores. (5)
- b) Explain Pourbaix diagram of water (5)
- 11.a) Explain the sigma bonding in tetrahedral complexes based on MO theory. (5)
- b) Explain the splitting of d-orbitals in square planar crystal field. (5)
- 12.a) How is the stability constant of metal complex determined by Job's method? (5)
- b) Explain the possible geometries of Coordination number 2, 4 and 6? Give an example for each. (5)
- 13.a) Discuss the chemistry of metal nitrosyls. (5)
- b) With an example, explain the structure and bonding of metal carbonyls. (5)
- 14.a) Enumerate the factors favouring M-M bond formation in metal carbonyls in metal clusters. (5)
- b) With 2 reactions each explain the preparation of metal carbonylates & metal carbonyl halides. (5)

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