

Books Recommended :

1. Principle and Applications of Organotransition Metal Chemistry, J.P. Coliman, L.S Hagsdus, J.R. Norton and R.G. Finke, University Science Books.
2. The Organometallic Chemistry of the Transition Metals, R.H. Crabtree, John Wiley.
3. Metallo-Organic Chemistry, A.J. Pearson, Wiley
4. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books
5. Bioinorganic Chemistry, I. Bertini, H.B. Gray, S.J. Lippard and J.S Valentine, University, Science Books
6. Inorganic Biochemistry Vols I and II. Ed G.L. Eichhorn, Elsevier
7. Progress in Inorganic Chemistry, Vols 18 and 38 Ed. J.J. Lippard, Wiley

**PAPER IV-A
MODERN INTERFACES OF INORGANIC
CHEMISTRY**

Time: 3 Hrs.

M.M. 100

Note: The paper will be divided into THREE sections.

Section-A : Ten questions (short type answer) two from each Unit will be asked. Each question will be of one mark and the candidates are required to attempt all questions. **Total 10 marks**

Section-B : Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 10 marks.

Total 50 marks

Section-C : Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 20 marks.

Total 40 marks

UNIT-I

Inorganic photochemistry - Ligand field excited state, charge transfer excited state, ligand to metal, metal to ligand, charge transfer to solvent, tentaligand stage, metal to metal stage, Thexi stage and OSENCO state.

Photochemical reactions - Photosubstitution reaction, photo - rearrangement reaction, redox

reactions, prompt and delayed photochemical reactions, d-d- and charge transfer reactions.

Photochemical reactions of coordination compounds

- Chromium (III) complex, cobalt (III) complexes, radium (III) complex, complexes of transition elements, complexes of lanthanides and actinides.

Applications of photochemical reactions of coordination compounds - Synthesis, catalyst, chemical actinometry, photochromism and photocalorimetry

UNIT-II

Inorganic polymers - Classification of inorganic polymers, general properties, preparation of condensation, addition and coordination polymers.

Silicone polymers - General preparation, properties and applications of silazanes, polysilazenes, organosiloxy and poly - carbosilanes.

Ferrocene - Synthesis and applications of ferrocene containing polyamide and polyurea polymers.

UNIT-III

Phosphorus-nitrogen polymers - Synthesis and important properties of organo metallic poly - phosphazene, liquid-crystalline-high refractive index polyphosphazene, polycarbo phosphazene, poly thio phosphazene and other types of phosphazenes such as organic polymer with cyclophosphazene side groups,

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cyclo linear and cyclomatrix material, inorganic ceramics derived phosphazene, applications of polyphosphazene and other related polymers such as advanced elastomers and premedical materials.

UNIT-IV

Environmental inorganic chemistry -

(i) Inorganic pollutants and monitoring -

Air pollution - Types of air pollutants, sources and control, ozone layer depletion and effect on biotic community, climate protection of ozone layer, sampling and monitoring, analysis of CO, NO_x, SO₂, H₂S, particulate matter.

Water pollution and monitoring - Inorganic chemicals, metals and minerals as pollutants, radioactive materials and their effects, sampling and monitoring of water pollutants.

UNIT-V

Industrial pollution - Cement, nuclear power plants, pollution due to metallurgy and mining activity.

Metallic medicine - Metal deficiency and disease, metals used in diagnosis and chemotherapy with particular reference to cancer drugs, tracer technique in biological systems.

Toxicology - Biochemical effects of As, Cd, Pb, Hg, Co, NO_x, SO₂, CN -