

MODERN  
APPROACH TO

# norganic Chemistry

B.Sc. PART-II  
(SEMESTER III & IV)  
K.U./M.D.U.

Dr. S. P. Jauhar

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# Syllabus

B.Sc. Second Year (IIIrd Semester)

Paper VIII (Theory)

## INORGANIC CHEMISTRY

Time : 3 Hrs.

Max. Marks : 33

Note : Eight questions will be set, four questions from each section. The candidate will be required to attempt five questions in all, selecting at least two questions from each section. As far as possible questions will be short answer type and not essay type.

### SECTION—A

23 Periods

- **Chemistry of *d*-Block Elements**

0.5 ← Definition of transition elements, position in the periodic table. General characteristics and properties of *d*-block elements. Comparison of properties of *3d* elements with *4d* and *5d* elements with reference to only ionic radii, oxidation state, magnetic and spectral properties and stereochemistry. Structures and properties of some compounds of transition elements —  $\text{TiO}_2$ ,  $\text{VOCl}_2$ ,  $\text{FeCl}_3$ ,  $\text{CuCl}_2$  and  $\text{Ni}(\text{CO})_4$ .

### SECTION—B

22 Periods

- **Coordination Compounds**

Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes.

- **Non-aqueous Solvents**

Physical properties of a solvent, type of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid  $\text{NH}_3$  and liquid  $\text{SO}_2$ .

## B.Sc. Second Year (IVth Semester)

Paper XI (Theory)

### SECTION—A

22 Periods

- **Chemistry of *f*-block elements**

- **Lanthanides**

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

- **Actinides**

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U. Comparison of properties of lanthanides and actinides with transition elements.

### SECTION—B

23 Periods

- **Theory of Qualitative and Quantitative Inorganic Analysis**

Chemistry of analysis of various groups of basic and acidic radicals. Chemistry of identification of acid radicals in typical combinations. Chemistry of interference of acid radicals including their removal in the analysis of basic radicals. Theory of precipitation. co-precipitation, post-precipitation, purification of precipitates.

# CONTENTS

## Semester - III

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| 1. Chemistry of <i>d</i> -Block Elements | 3 - 51    |
| 2. Coordination Compounds                | 52 - 119  |
| 3. Non-Aqueous Solvents                  | 120 - 150 |

## Semester - IV

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| 4. Chemistry of <i>f</i> -Block Elements : Lanthanides | 153 - 178 |
| 5. Chemistry of <i>f</i> -Block Elements : Actinides   | 179 - 204 |
| 6. Theory of Qualitative & Quantitative Analysis       | 205 - 246 |

6 Explain why  $\text{NH}_4\text{OH}$  and not  $\text{NaOH}$  is used as a precipitant in qualitative analysis of  $\text{III}^{\text{rd}}$  group  
Appendices 247 - 252

Group question of chapter - 6

① Discuss the Imp. of  $\text{pH}$  value in qualitative analysis of  $\text{III}^{\text{rd}}$  groups

② Explain 1) Significance of digestion  
2) App. of idea of solubility product of quantitative analysis

③ Describe the essential conditions for the formation of pure precipitation (Digestion Bhi Include kar sakte H)

④ What is co-precipitation? How can it be minimized  
Diff<sup>n</sup> it from post-precipitation

⑤ Describe the briefly the theory of precipitation

# SEMESTER – III

## SECTION – A

1. CHEMISTRY OF *d*-BLOCK ELEMENTS

## SECTION – B

2. COORDINATION COMPOUNDS

3. NON-AQUEOUS SOLVENTS