

2023
B.A./B.Sc.
Sixth Semester
CORE – 13
CHEMISTRY
Course Code: CHC 6.11
(Inorganic Chemistry - IV)

Total Mark: 70
Time: 3 hours

Pass Mark: 28

Answer five questions taking one from each unit.

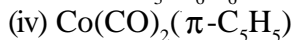
UNIT-I

1. (a) Define qualitative analysis. Discuss the theoretical principles of qualitative analysis. 1+4=5
(b) Explain the removal of fluoride ion during the group separation of the given salt mixture. 2
(c) Name the cations present and mention the group reagents of group IV. 1½+1½=3
(d) How do you confirm the presence of Mg²⁺ and Na⁺ in a given inorganic salt? 2+2=4
2. (a) Explain the removal of chromate ion during the group separation of the given salt mixture. 2
(b) Write the cations present and mention the group reagents of Gr IIIB and Gr V. 3+3=6
(c) Define sparingly soluble salt with an example. 1+3=4
(d) How precipitation occurs during group separations? 2

UNIT-II

3. (a) What are metal carbonyls? Give one method of preparation of Ni(CO)₄. Discuss its structure according to VBT. 1+1+2=4
(b) Define 18e rule. 1

(c) Explain whether the following substituted carbonyls follow 18e rule or not: 1½×4=6



(d) Define hapticity. Discuss hexahapto ligand with one example. 1+2=3

4. (a) Discuss the classification of metal carbonyl on the basis of structure of carbonyls with example. 4
- (b) Draw the structure of $\text{Co}_2(\text{CO})_8$ in the solid and liquid state. Mention their hybridization. 2+2=4
- (c) What are organometallic compounds? Explain its classification on the basis of nature of metal-carbon bond with example. 1+5=6

UNIT-III

5. (a) Discuss the evidences of synergic effect of organometallic compounds. 5
- (b) Taking a suitable example, explain about organometallic compounds exhibiting multicentre bonds. 5
- (c) Compare the aromaticity and reactivity of ferrocene with that of benzene. 4
6. (a) Discuss the structure and aromaticity in ferrocene. 5
- (b) Give the complete reaction of ferrocene with mercuric acetate. 4
- (c) Discuss the role of triethylaluminium in polymerization of ethane. 5

UNIT-IV

7. (a) Discuss the stability of complex ions in solution. 3
- (b) Explain the polarization theory of trans effect in square planar complexes. 4
- (c) What is base hydrolysis in octahedral complexes? Discuss with suitable examples. 3
- (d) Discuss the type of intermediate forms in $\text{S}_{\text{N}}1$ mechanism in octahedral complexes. 4
8. (a) Discuss the thermodynamics stability of complex ions. 3

- (b) Explain the stepwise structural arrangement observed in associative mechanism in square planar complexes. 5
- (c) Explain with suitable examples about S_N2 mechanisms in complex compounds. 3
- (d) What is chelate? Discuss with examples. 1+2=3

UNIT-V

9. (a) Give a detail account of hydrogenation of alkenes. 6
- (b) What will happen to catalytic property if PPH_3 group is replaced by Me_3P in Wilkinson catalyst? 4
- (c) Justify the name oxo process for hydroformylation reactions of olefins. 4
10. (a) Explain the product of propylene undergoing Wacker process oxidation. 6
- (b) There is a distinct role of Fischer-Tropsch reaction in industries. Explain with some examples. 5
- (c) What is synthesis gas? 3
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