

Exam. Code : 103205

Subject Code : 8052

B.A./B.Sc. 5<sup>th</sup> Semester (Old Syllb 2017)

CHEMISTRY (Inorganic Chemistry-IV)

Time Allowed—3 Hours] [Maximum Marks—35

**PART-A**

**Note :—** All questions are compulsory. Each question carries 1 mark. The maximum length of answer can be **ONE-THIRD** of a page.

1. What is pairing energy ?
2. What is crystal field splitting ?
3. What is  $\mu$  orbital ?
4. What is an associative mechanism ?
5. What are term symbols ?
6. What is Beer's law ?
7. What is  $\pi$ -acid ligand ? Give one example.
8. What happens when benzene reacts with n-butyl Lithium ?

**PART-B**

**Note** :— Attempt any **TWO** questions from each Section.  
Each question carries 4.5 marks. The maximum length of the answer can be upto **FIVE** pages.

**SECTION-I**

9. What is CFSE ? Explain why the CFSE in case of  $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$  is smaller than in case of  $[\text{Rh}(\text{H}_2\text{O})_6]^{3+}$  which in turn is smaller than in case of  $[\text{Ir}(\text{H}_2\text{O})_6]^{3+}$  ?
10. Give a neat diagram and explain the splitting of d-orbitals in tetrahedral complexes. Why nearly all the tetrahedral complexes are high spin ?
11. What is orbital contribution ? Discuss in detail. Give the electronic configurations in which orbital contribution is quenched in case of a tetrahedral complex.

**SECTION-II**

12. What are nucleophilic substitution reaction ? Discuss the mechanism of nucleophilic substitution reactions in square planar complexes.
13. Discuss selection rules for d-d transitions in transition metal complexes. Why do tetrahedral complexes give much more intense d-d spectra than octahedral complexes?

14. Discuss the Orgel diagram and absorption spectra for  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  complex.

### SECTION-III

15. Define organometallic compound. What are octahapto ligands? Give structures of complexes in which these ligands behave as 4-electron donor, 6-electron donor and 8-electron donor.
16. What is Zeise salt? Draw its structure and discuss main features of its bonding.
17. Define EAN rule. Which of the following species obey EAN rule and why?
- (i)  $\text{Co}(\pi\text{-C}_3\text{H}_5)(\text{CH}_3)_2$
  - (ii)  $\text{H}_3\text{C Mn}(\text{CO})_5$
  - (iii)  $\text{Fe}(\pi\text{-C}_5\text{H}_5)_2$
  - (iv)  $[\text{Cu}(\text{CN})_4]^{3-}$ .