

Exam. Code : 103205

Subject Code : 8053

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

## CHEMISTRY

## Paper—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 are inner orbital complexes ?
2. How are  $\Delta_o$  and  $\Delta_t$  related ?
3. What is  $\mu_{spin}$  ?
4. Which of the bonds is more labile—Pt-halogen or Pt-nitrogen bond ?
5. What is Russel-Saunders's coupling ?
6. What is absorption spectrum ?
7. What are metallocenes ? Give one example.
8. What is Zeigler-Natta Catalyst ?

## 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 5 pages.

## SECTION—I

9. What is crystal field theory ? Describe the splitting of d-orbitals in square planar complexes.

10. Describe the factors in detail which affect the crystal field splitting in complexes.
11. What is origin of paramagnetism and diamagnetism in transition metal complexes ? Calculate the spin only magnetic moment in case of
  - (i)  $\text{Ni}^{+2}$
  - (ii)  $\text{Ti}^{+3}$
  - (iii)  $\text{Fe}^{+3}$ .

### SECTION—II

12. What is Trans Effect ? Discuss the various theories put forward to explain the trans effect.
13. Derive all the terms for  $[\text{V}(\text{H}_2\text{O})_6]^{3+}$  ion.
14. What are Orgel diagrams ? What information is conveyed by it ? Discuss Orgel diagram for  $d^1$  system.

### SECTION—III

15. What are metal olefin complexes ? Discuss method of preparation and bonding in these complexes.
16. Discuss the preparation, properties and structure of organolithium compounds.
17. What is EAN rule ? Which of the following species obey EAN rule and why ?
  - (i) Hexacyanoferrate (II) ion
  - (ii) Tetracarbonyl nickel (O)
  - (iii) Bis (Cyclopentadienyl) iron (II)
  - (iv) Tetracyanocuprate (I) ion.