**Exam. Code : 103204**
**Subject Code : 1375**

**B.A./B.Sc. 4th Semester**

**CHEMISTRY**

**(Inorganic Chemistry—III)**

Time Allowed—3 Hours] [Maximum Marks—35

**PART—A**

**Note :**— All the questions are compulsory. Each question carries **1** mark. The maximum length of answer can be **1/3rd** of a page.

1. Write the name of the following complexes according to IUPAC system :
   (a) $[PtCl(NO_2)_2 (NH)_4] SO_4$
   (b) $[Co(en)_3]Cl_3$.
2. Confirm which of the following obey EAN rule :
   (a) $[Co(NH_3)_6]Cl_3$
   (b) $[PtCl_4]^{2-}$
3. What do you understand by ionizing and non ionizing solvents ? Give examples.
4. Actinides have greater tendency to form complexes than lanthanides. Explain.

5. Why $Fe^{3+}$ is most common form of iron present in Earth's crust ?

6. Filling of 4*f*-sublevel is not regular in the lanthanide series. Explain.

7. What are trace elements in biological processes ?

8. The +3 oxidation state is the characteristic oxidation state of lanthanides, though their atoms contain only 2 outermost electrons ($6s^2$).

## PART—B

**Note :**— Attempt any **TWO** questions from each section. Each question carries **4.5** marks. The maximum length of answer can be up to **5** pages.

## SECTION—I

9. Describe the bonding in $[Fe(H_2O)_6]^{3+}$ and $[Fe(CN_6)^{3-}$ in terms of Valence bond theory.

10. What are the advantages and disadvantages of liquid ammonia as solvent ?

11. Discuss the chemistry of liquid sulphur dioxide, $SO_2$ as a solvent.

## SECTION—II

12. What is Pourbaix diagram ? To what use are they put ? Explain giving examples.

13. (a) What is lanthanide contraction ? Discuss the cause of lanthanide contraction and its effects.

    (b) Zr and Hf have almost similar properties, why ?

14. Explain the Frost diagram of Manganese in acidic medium.

## SECTION—III

15. Compare the following properties between the actinides and lanthanides :

    (a) Oxidation State.

    (b) Magnetic properties.

    (c) Radioactive nature.

16. Define oxy and deoxyhemoglobin. What are the effects on geometry of heme group during oxy and deoxyhemoglobin ?

17. Discuss the role of alkali and alkaline earth metal ion in biological system.