

Exam. Code : 103204

Subject Code : 1375

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

CHEMISTRY

(Inorganic Chemistry—III)

Time Allowed-3 Hours]

[Maximum Marks-3 5

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) $[\text{PtCl}(\text{NO}_2)_2(\text{NH}_4)] \text{SO}_4$
 - (b) $[\text{Co}(\text{en})_3]\text{Cl}_3$.
2. Confirm which of the following obey EAN rule :
 - (a) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
 - (b) $[\text{PtCl}_4]^{2-}$
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 4f-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 $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ and $[\text{Fe}(\text{CN})_6]^{3-}$ 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.