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Registered Number:

DATE: **9** **-04-2018 (9AM)**

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

**B.Sc., CHEMISTRY – VI SEMESTER**

**SEMESTER EXAMINATION – APRIL – 2018**

**CH – 6115 : INORGANIC CHEMISTRY**

**Time:** 2 ½ hours. **Max marks:** 70

This question paper contains TWO printed pages and three parts

**Part A**

**Answer any SIX of the following (6 x2 = 12)**

1. Define d-block elements.
2. Give any one example for ambidentate ligand and indicate the donor atoms.
3. State any two limitations of CFT.
4. Define hapticity.
5. State 18-electron rule.
6. Mention the roles of Na+ and Mg2+ ions in biological systems.
7. Write the general electronic configuration of actinides and give the common oxidation states of lanthanides.
8. What is a Pourbaix diagram? Mention any one of its applications.

**Part - B**

**Answer any EIGHT of the following (8x 6 = 48)**

1. a) Write a note on magnetic properties of first row transition metals.

b) Give the IUPAC nomenclature of

(i) [CoCl2(en)2]Cl (ii) K3[Fe(C2O4)3] (iii) [(NH3)5Co-OH-Co(NH3)4(H2O)]5+ (3+3)

1. a) By taking a suitable example, explain why transition metals exhibits variable oxidation states.

b) State the postulates of Werner’s coordination compounds. . (3+3)

1. a) Name and write all the possible geometries of complexes with CN 4 and 5.

b) Briefly explain any two factors affecting 10 Dq values. (3+3)

1. a) Draw a labeled energy level diagram to represent crystal field splitting in [Cu(NH3)4]2+, a square planar complex.

b) Give the chemical equation/s to represent the preparation of the following organometallic compounds and write their structures. (i) K[PtCl3(C2H4)] and (ii) Ni(CO)4. (3+3)

1. a) Describe the method of extraction of lanthanides from monazite.

b) Compare Lanthanides with transition metals with respect to their (i) electronic spectra and (ii) complex formation. (3+3)

1. a) What is lanthanide contraction? Mention any two of its consequences.

b) In a Pourbaix diagram what kind of chemical reaction is represented by the chemical species at the boundry of (i) a vertical line and (ii) slopped line represent. (3+3)

1. What is an Ellingham’s diagram? Explain its application for the extraction of lithium from Lepidolite. (6 marks)
2. What are metalloporphyrines? Mention any two differences in the binding characteristics of hemoglobin and myoglobin. (6 marks).
3. By taking [Co(CN)6]3- complex as an example explain how CFT is useful in predicting its magnetic property. (6 marks).
4. State the postulates of VBT and explain its application in determining the geometry and magnetic property of high spin [NiCl4]2-. (6 marks)

**Part - C**

**Answer any TWO of the following (2 x 5 = 10)**

1. 0.266 g of an octahedral Cr(III) complex of composition CrCl36H2O gave 0.2867 g of AgCl on treatment with excess AgNO3 solution. With Proper reasoning arive at the formula of the complex. (relative atomic masses of Ag = 107.87; Cr = 51.87 nad Cl = 35.45). (5 marks).
2. Give the chemical composition and name, of the organometallic catalysts as well as the name of the chemical process involved in

(a) CH3 – CH = CH2 + H2 🡪 CH3 – CH2 – CH3 and

(b) n CH2 = CH2 🡪 --(CH2 – CH2)n -- (5 marks)

1. Showing appropriate calculations, construct a Frost diagram, from the following Latimer diagram of Chlorine.



(5 marks)