

Register Number:

Date: XX/04/2020

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

**B.Sc. CHEMISTRY – VI SEMESTER**

**SEMESTER EXAMINATION: APRIL 2020**

**CH 6115: INORGANIC CHEMISTRY**

Time: 2 ½ hrs Max Marks:70

This paper contains **two** printed pagesand **three** parts

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Element | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn |
| At. No.  | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

**PART A**

Answer any **SIX** of the following questions. **6 x 2 = 12**

1. Calculate the magnetic moment of Cr3+.

2. What is hapticity? Give an example.

3. Calculate EAN of Ni in Ni(CO)4 complex.

4. What is Monsanto acetic acid process?

5. Explain why some lanthanides exhibit +2 or +4 oxidation states.

6. Why Lanthanides and actinides are called inner transition elements?

7. What is a Pourbiax diagram?

8. Give any two consequences of lanthanide contraction.

**PART B**

Answer any **EIGHT** of the following questions. **8 x 6 = 48**

9 a) The most common oxidation states of transition metals are + 2 and +3. Give reason.

 b) Which of the following is coloured, Ti 3+ or Ti 4+? Give reason. **(3+3)**

10 a) Give two examples each for a positive and a negative ligand.

 b) What is the difference between a tridentate ligand and a tetradentate ligand? Give an

 example each. **(3+3)**

11.a) Draw the structure of [Zn(EDTA)] 2- complex.

 b) (i) Give the IUPAC name of the following: [Cr(H2O) 6]Cl3.

 ii) Write the structural formula of the following:

 μ- amidononaammineaquadicobalt(III) chloride **(3+3)**

12.a) What is the difference between primary and secondary valencies? In the complex

 CoCl3.3NH3 identify the ligands that satisfy i) primary and ii) secondary valency.

 b) Differentiate between facial and meriodional isomers with suitable examples **(3+3)**

13. a) Write the formula of Wilkinson’s catalyst. Give an application of this catalyst.

 b) Explain cooperativity in the binding of oxygen to haemoglobin. **(3+3)**

14. a) Calculate CFSE of a weak field d7 octahedral complex.

 b) What are the factors affecting ∆o (10 Dq)? **(3+3)**

1. a) Discuss i) the method of preparation and ii) the structure of Mn2(CO)10.

 b) Explain synergic effect in metal carbonyls. **(3+3)**

1. a) Mention any one role each of Zn and Co in biological systems.

b) What are metalloporphyrins? Mention the difference in the binding of oxygen in haemoglobin and myoglobin. **(3+3)**

1. a) The **Δt** value of tetrahedral [MnCl4]2- is less than the **Δo** value of octahedral [MnCl6]4-. Why?

b) Explain how the lanthanide ions are separated by ion exchange method. **(3+3)**

1. a) Give any three salient features of Ellingham’s diagram.

b) Describe how lithium is produced by the electrolysis of LiCl. **(3+3)**

**PART C**

Answer any **TWO** of the following questions.  **2 x 5 = 10**

1. A and B are two isomers of an octahedral complex of metal ion M2+ having ‘en’ and Br - as ligands. A is found to be optically active where as B is not. Draw the structures of the optical isomers of A and the structure of B. Why is B optically inactive?

20. Ni(CO)4 is tetrahedral and diamagnetic. Explain using Valence Bond Theory.

21. Construct a Frost diagram for chromium from the Latimer diagram given below.

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