

B.Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2024**SEMESTER 6 : CHEMISTRY****COURSE : 19U6CRCHE09 : INORGANIC CHEMISTRY***(For Regular - 2021 Admission and Supplementary -2020/2019 Admissions)*

Time : Three Hours

Max. Marks: 60

PART A**Answer All (1 mark each)**

1. What are super acids? Give an example.
2. What is meant by chelate? Give an example.
3. Draw the optical isomers of $[\text{Co}(\text{en})_3]^{2+}$.
4. What are closocarboranes?
5. How n-type semiconductors are formed?
6. How p-type semiconductors are formed?
7. How would you account for the following order in the acid strengths of the oxoacids of chlorine; $\text{HClO}_4 > \text{HClO}_3 > \text{HClO}_2 > \text{HClO}$.
8. Give the common oxidation state of lanthanides.

(1 x 8 = 8)**PART B****Answer any 6 (2 marks each)**

9. Give two examples of the interhalogen compounds?
10. Draw the structure of B_4H_{10}
11. Why does H_2O ligand give higher Δ value than OH^- ligand?
12. Eu^{2+} or Eu^{4+} , which is more stable and why?
13. What are interstitial defects? Give examples.
14. Calculate the number of Zinc ions and sulphide ions in a unit cell of ZnS.
15. When two isomers of $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ reacts with thiourea, one product is $[\text{Pt}(\text{tu})_4]^{2+}$ and the other is $[\text{Pt}(\text{NH}_3)_2(\text{tu})_2]^{2+}$. Identify the initial isomers and explain the results
16. Give an example each for nickel complexes having (i) square planar geometry (ii) tetrahedral geometry. Write their IUPAC names.

(2 x 6 = 12)**PART C****Answer any 4 (5 marks each)**

17. Explain the electrical conduction mechanism in silicon which is doped with a) Gallium and b) Phosphorous.
18. Why transition elements show a tendency to form a large number of complexes?
19. Discuss the various factors that affect the stability of complexes.
20. Give the postulates of Werner's theory. Illustrate the application of Werner's theory in explaining the bonding in cobalt(III) amines.
21. Discuss in detail about the separation of lanthanides by ion exchange method.
22. Explain in detail about non-stoichiometric defects in crystals.

(5 x 4 = 20)

PART D

Answer any 2 (10 marks each)

23. What are the silent features of Valence bond theory for bonding in complexes? Explain the structure and magnetic properties of (i) $[\text{Ni}(\text{CN})_4]^{2-}$ and (ii) $[\text{Cr}(\text{NH}_3)_6]^{3+}$ using valence bond theory.
24. Explain lanthanide contraction, its causes and consequences.
25. Give the structure of XeF_4 , XeOF_4 , XeO_3 and XeO_2F_2
26. What is trans effect? Describe the various applications of trans effect. Using trans effect, outline the synthesis of cis and trans isomers of $[\text{Pt}(\text{Cl})_2(\text{C}_2\text{H}_4)(\text{NH}_3)]$ starting from $[\text{PtCl}_4]^{2-}$ and other ligands.

(10 x 2 = 20)