

Reg. No

Name

MSc DEGREE END SEMESTER EXAMINATION - MARCH 2020
SEMESTER 4 : CHEMISTRY
COURSE : 16P4CHET13EL : ADVANCED INORGANIC CHEMISTRY
(For Regular - 2018 Admission and Supplementary - 2017, 2016 Admissions)

Time : Three Hours

Max. Marks: 75

Section A
Answer any 10 (2 Marks each)

1. What happens to the C=N stretching frequency in N-salicylidine aniline on complexation with metal ion? Give reasons.
2. Explain photo induced electron collection.
3. What are the important properties of fullerenes?
4. Suggest a method to synthesis precipitated nano silica.
5. Find out the number of microstates for p^2 configuration.
6. Find the direct product of t_{2g}^2 configuration in octahedral symmetry.
7. Which is more basic PH_3 or NH_3 ? Why?
8. How the toxicity of Mercury is related to HSAB theory?
9. Give the all possible geometries for Tetrachloroiodate(III) anion. Which is the stable structure? Why?
10. The bond angles in PF_3 , PCl_3 , PBr_3 and PI_3 are 97.7° , 100.3° , 101.0° and 102° respectively. Explain the reason.
11. Compare geometry and bond angles in Nitrogen dioxide, nitrite ion and nitryl ion. Explain the reason for the differences.
12. What is affinity chromatography?
13. What is chiral chromatography?

(2 x 10 = 20)

Section B
Answer any 5 (5 Marks each)

14. Discuss on the working of ferrioxalate actinometers with suitable examples.
15. Explain the mechanism of photochemical reduction of carbon dioxide.
16. What are the different steps in lithographic process?
17. Find out the most suitable atomic orbitals for σ - hybridisation in a $[PtCl_4]^{2-}$ ion by Group Theoretical method.
18. Determine the contribution of various atomic orbitals of boron atom to the hybridisation in BF_3 molecule.
19. Illustrate HSAB theory with suitable examples. Explain its application in Coordination Chemistry.
20. Discuss on the chromatographic separation of fullerenes.
21. Discuss the procedure involved in the spectrophotometric determination of only nitrite present in a given sample of water.

(5 x 5 = 25)

Section C**Answer any 2 (15 Marks each)**

22. Explain the principle of Mossbauer spectroscopy. How is it helpful in the study of Fe(III) and Fe(II) complexes? Explain with suitable examples.
23. Discuss the structure, mechanism, kinetics and phase transition in SAM's of alkyl thiols on a gold surface.
24. Using Group theory, formulate various Molecular orbitals and construct the Molecular Orbital Energy level diagram of σ and π bonding for the complex $K_3[CoF_6]$.
25. Discuss on a) Cyclodextrins, b) calixarenes and c) calixpyrrole. (15 x 2 = 30)