



QP CODE: 21000881



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Reg No :

Name :

M Sc DEGREE (CSS) EXAMINATION, JULY 2021

Fourth Semester

Faculty of Science

M Sc CHEMISTRY

Elective - CH800401 - ADVANCED INORGANIC CHEMISTRY

2019 Admission Onwards

1B761363

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

Answer any **eight** questions.

Weight **1** each.

1. Determine the IR and Raman active vibrations using character tables in octahedral complexes.
2. Explain how the isomer shift values in Mossbauer spectra gives an idea about the oxidation states of Fe in Iron complexes.
3. Describe the process of Nitrogen fixation.
4. Explain the phase transition in gold-growth process.
5. What is i-DEP?
6. Discuss the various classifications of clay products.
7. Which are the various fillers used in elastomers?
8. Write a short note on porous coordination polymers.
9. List important applications of metal organic frameworks in pharmaceutical industry.
10. What is meant by the diamondoid network in supramolecular chemistry?

(8×1=8 weightage)

Part B (Short Essay/Problems)

Answer any **six** questions.

Weight **2** each.

11. Discuss the hybridisation for σ bonding in square planar complexes.
12. How do the d orbitals split under the influence of different crystal field - tetrahedral, octahedral and square planar? Depict each case with a diagram.



13. Explain the influence of electron-electron interactions in the ESR spectra of metal complexes.
14. Explain the significance and application of photochromism.
15. Differentiate SEM and TEM for characterization of nanomaterials.
16. Explain direct combination in synthetic strategies.
17. Write a note on post-synthetic modification.
18. Using suitable examples, explain about molecular polygons and tubes in inorganic supramolecular chemistry.

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight **5** each.

19. With reference to molecular orbital theory, discuss the π bonding in tetrahedral complexes and construct the MOED for π bonding only.
20. Infrared and Raman spectroscopy plays an important role in the structural elucidation of complexes. Explain using the spectral details of complexes of CO, CN, NH_3 and H_2O .
21. Discuss the photochemical reactions of Cr(III), Rh(III) and Ru (II) complexes.
22. Explain synthesis, properties and applications of nanomaterials.

(2×5=10 weightage)