QP CODE: 22001949

22001949

Reg No : .....

Name : .....

M Sc DEGREE (CSS) EXAMINATION, AUGUST 2022

Fourth Semester

M Sc CHEMISTRY

Elective - CH800401 - ADVANCED INORGANIC CHEMISTRY

2019 ADMISSION ONWARDS

84CAFADF

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Draw the energy level diagram showing the d orbital split for square planar complexes.
2. Calculate the ESR frequency when the magnetic field is 25000 Gauss , g = 2 and Bohr magneton = 2.71×10^{-24} J/T.
3. Briefly explain the photolysis of water.
4. What are the potential applications of gold nanoparticles in medicine?
5. Explain any two methods for the characterization of nanomaterials.
6. What are the characteristics of refractories?
7. What is meant by combinatorial synthesis ?
8. What are soft porous crystals? Give examples.
9. Write a short note on the pharmaceutical applications of MOFs.
10. Give a brief explanation about any one inorganic supermolecule.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Discuss the hybridisation for σ bonding in octahedral complexes.
12. The electronic spectrum of $[V(H_2O)_6]^{3+}$exhibits absorption bands at 17800 cm^{-1} and at 25700 cm^{-1}. Assign these bands to various d-d transitions in the complex.
13. How does IR spectroscopy help in determining the denticities of SO_4^{2-} ligand? Cite a few examples.
14. Discuss about photo chemical reactions in Rh(III) complexes.
15. Write a short note on polymer nanocomposites.
16. Write a note on the applications of metals and alloys in hydrogen storage.
17. Discuss any three methods used for the synthesis of metal organic frameworks.
18. What is crystal engineering? Explain domain model of hydrogen bonding in inorganic crystal engineering.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Derive the SALCs for π MOs of staggered form of ferrocene. Develop the MO diagram.
20. Explain the applications of Mossbauer spectroscopy in the study of Iron complexes.
21. Describe a) the role of manganese-based photosystems for the conversion of water into oxygen b) Photochromism.
22. What are the importance of nanomaterials in the pharmaceutical industry and future possibilities of medical nanotechnology?

(2×5=10 weightage)