Reg. No ..... Name **19P4005**

MSc DEGREE END SEMESTER EXAMINATION- MARCH/APRIL 2019

SEMESTER 4 : CHEMISTRY

COURSE : **16P4CHET13EL : ADVANCED INORGANIC CHEMISTRY**

(For Regular - 2017 Admission and Supplementary - 2016 Admission)

Time : Three Hours Max. Marks: 75

Section A
Answer any 10 (2 marks each)

1. What happens to the carbonyl stretching frequency in the IR spectrum of Acetyl acetone on coordination with metal ions?
2. What are the advantages of supramolecular sensitizers?
3. Give the principle of TEM.
4. What is the significance of Bohr exciton diameter in quantum dot chemistry?
5. What is correlation diagram?
6. Draw the A_1g molecular orbital of ferrocene.
7. Give the Drago and Wayland equation for acid base interaction. Illustrate its use in acid- base Chemistry?
8. Which is the strongest acid among various hydrohalic acids? Explain your answer.
9. Discuss the hybridisation and structure of trimethyl boron.
10. What is the hybridisation of Aluminium in aluminium bromide? Explain its Structure.
11. Give the hybridisation and structure of Ammonium tetrafluoroborate.
12. What is Size Exclusion Chromatography?
13. What is super critical fluid chromatography?

(2 x 10 = 20)

Section B
Answer any 5 (5 marks each)

14. Explain the structure and mechanism of dye sensitized solar cells.
15. Write a note on various types photo substitution reactions.
16. What are nano shells? How will you synthesis silica-gold nano shell?
17. Discuss the hybridisation scheme for π-bonding in square planar complexes based on Group Theory.
18. Find out the normal modes of vibration of Ammonia molecule and classify them into stretching and bending modes.
19. Illustrate with examples the effect of solvation in the strength of acids and bases.
20. Explain in detail about affinity chromatography.

21. Discuss the procedure involved in the spectrophotometric determination of Iron present in a given sample of water.

(5 x 5 = 25)

Section C
Answer any 2 (15 marks each)

22. Describe the principle of EPR spectroscopy. Define g value and what are the factors which affect its value? Calculate g value of the methyl radical which shows an EPR peak at 3300×10^{-4} T in a spectrometer operating at 9240 MHz. ($\beta = 9.27 \times 10^{-24}$ JT^{-1})

23. How SAM's of alkyl thiols are formed on a gold surface? Discuss the structure, characterization methods and applications of these SAM.

24. Discuss the selection rules for electronic transition. Apply this rule to transition between two non-degenerate states and between states of different degeneracy with suitable examples. Prove the validity of orbital selection rule.

25. Explain in detail about supramolecular chemistry of cation binding hosts, anion binding hosts and neutral molecule binding hosts with suitable examples.

(15 x 2 = 30)