

MSc DEGREE END SEMESTER EXAMINATION MARCH 2016**SEMESTER - 4 CHEMISTRY****COURSE: P4CHET13EL- ADVANCED INORGANIC CHEMISTRY**

Time: Three Hours

Max. Marks: 75

Section A(Answer **any ten** questions. 2 mark each)

1. What are vanishing integrals?
2. Describe what is the "method of descending symmetry".
3. Deduce the characters of the reducible representations for the d - orbital wave function in a tetrahedral field.
4. What happens to the carbonyl stretching frequency in the IR spectrum of CN^- on coordination with metal ions?
5. Predict the number of lines in the EPR spectrum of H_2O group.
6. What is meant by phosphorescence?
7. Explain Moore's law and how is useful for nano materials.
8. What are nano sensors?
9. How is carbon nano tube synthesized?
10. Describe the basis and procedure of sampling.
11. Give the various methods of air pollution monitoring.
12. Explain how liquid ammonia solution of alkali metal ions show intense colour.
13. What are soft acids? Give two examples.

(10 x 2 = 20)

Section B(Answer **any five** questions. 5 mark each)

14. Arrive at the SALC of atomic orbitals in octahedral complexes.

15. Discuss the selection rules for electronic $d - d$ transitions and their exceptions.
16. What are quantum dots? Give its applications.
17. Describe briefly on nano lithography and nano wires.
18. Compare the principles behind BOD and COD determinations. Give the methods employed.
19. Explain the technique of electrophoretic deposition.
20. Differentiate between essential and non essential water samples. How can you eliminate moisture in a sample?
21. Explain the non-aqueous solvents like anhydrous sulphuric acid and hydrogen halides. Give its applications.

(5 x 5 = 25)

(PTO)

Section C

(Answer **any two** questions. 15 mark each)

22. Construct molecular orbital energy level diagram for an octahedral complex involving π - bonding ligands.
23. Explain the self-assembled mono layers on gold-growth process and its phase transitions, including formation, detection and analysis of gas phase clusters.
24. What is the isomer shift in Mössbauer spectroscopy? How is it used in the study of Fe(II) complexes, giving its spectrum?
25. Describe the use of IR and Raman spectroscopy in the structural elucidation of coordination complexes.

(15 x 2 = 30)
