

M. Sc. DEGREE (C.S.S.) EXAMINATION, MARCH 2017
SEMESTER IV– CHEMISTRY
CH4E13TM – ADVANCED INORGANIC CHEMISTRY

Time: Three Hours**Maximum Marks: 75****PART A****I. Answer any five of the following. Each question carries 3 marks**

1. What is SALC?
2. Briefly describe correlation diagram.
3. Explain the principle of Mossbauer Spectroscopy.
4. Distinguish between Phosphorescence and Fluorescence.
5. What is Photochromism?
6. Write note on Chemical Vapor Deposition?
7. Discuss the principle of XRD.

(5x3=15)**PART B****II. Answer any six of the following. Each question carries 5 marks**

8. Construct SALC of atomic orbitals in octahedral complexes.
9. Draw the correlation diagram for a d^2 ion in an octahedral environment.
10. Explain the ligand field splitting of d orbitals in octahedral environment using group theoretical considerations
11. Discuss the EPR spectrum of d^9 transition metal in tetragonal ligand field.
12. Briefly describe the photochemical reactions of Cr(II), Ru(II) and Ru(III) complexes.
13. Explain electroplating and electrophoretic deposition used for the synthesis of nanoparticles.
14. Discuss the principle of SEM and TEM.
15. Write a short note on Gas phase clusters.
16. Write a short note on solutions of metals in liquid ammonia.

(6x5=30)**PART C****III. Answer any two of the following. Each question carries 15 marks**

17. Explain briefly molecular orbital treatment of sigma bonding in AB_6 molecules.
18. a. A complex of the metal M having the formula $[M(CO)_4(PMe_3)_2]$ exist in two isomeric forms, One shows four IR bands at 2016, 1915, 1900 and 1890 cm^{-1} , whereas the other shows only one strong band at 1890 cm^{-1} , Explain these data.
b. Discuss the applications of character table to IR and Raman Spectroscopy
19. a. Explain briefly the synthesis and properties of fullerenes and carbon nanotubes
b. Discuss HSAB concepts and its applications.
20. What are Quantum dots? Discuss its preparation, characterization and application.

(2x15=30)