(Pages : 3) **J – 4870**

Reg. No. : .....

Name : .....

Fourth Semester M.Sc. Degree Examination, May 2020

Chemistry

CH 242(a) – INORGANIC CHEMISTRY IV

(2016 Admission Onwards)

Time : 3 Hours Max. Marks : 75

SECTION – A

(Answer **any two** among (a), (b), and (c), from each question. Each question carries **2** marks)

1. (a) State and explain the rule of mutual exclusion principle.

   (b) Give the splitting of d orbitals in tetrahedral geometry.

   (c) What is the effect of descending symmetry in metal complexes?

2. (a) Define self-assembly. How is it different from molecular aggregation?

   (b) What is meant by molecular recognition in supramolecular Chemistry? Name different types of interactions observed in molecular recognition.

   (c) DNA is an example of hydrogen bonded supramolecular systems, justify.

3. (a) Classify the following compounds according to Wade's rule.(1) $Fe_3(CO)_{12}$, (2) $Os_5C(CO)_{15}$.

   (b) $[Re_2C_{16}]^2$ is royal blue in colour, $[Mo_2Cl_8]^4$ is red in colour. Explain.

   (c) What is capping rule?

P.T.O.

4. (a) What is SOD? What is its functions?. Name the metal ions involved in SOD.

(b) Name two anticancer drugs.

(c) What is hemocyanine?

5. (a) Explain why covalent compounds like benzene , ethanol become conducting in liquid HF.

(b) What is magic acid? What is the reaction of magic acid with neopentane?

(c) Give two disadvantages of using liquid NH_3 as a non aqueous solvent.

(10 × 2 = 20 Marks)

SECTION – B

(Answer either (a) or (b) of each question. Each question carries **5** marks).

6. (a) Explain MO theory of AB_6 type molecules with example.

(b) Explain Tanabe-Sugano diagram for metal complexes.

7. (a) Role of Van der Waals interaction in supramolecular structures.

(b) Briefly explain template synthesis.

8. (a) Briefly explain isolobal analogy with suitable examples.

(b) What are Chevrel phases and Zintl ions? Discuss their structures.

9. (a) What is oxidase? Discuss its function the mechanism of action.

(b) Cite the toxic effects of following elements in human body .As, Pb, Cu, Hg, Se.

10. (a) Compare the acid base reactions in water and in liquid ammonia.

(b) Briefly explain the role of BrF3 as a non aqueous solvent.

(5 × 5 = 25 Marks)

SECTION – C

(Answer **any three** questions and. each question carries **10** marks).

11. Construct the MO energy level diagram for the $[CoF_6]^{3-}$ complex species and account for its paramagnetic nature.

12. Explain briefly (a) Rotaxane (b) π interactions in supramolecular Chemistry.

13. Discuss the structure and bonding in $[Re_2C_{18}]^{2-}$.

14. What is Cisplatin? State its use and mode of action? What are the demerits of using this? Explain what advancements are made in this area.

15. Briefly discuss the HSAB theory of acids and bases and its applications.

(3 × 10 = 30 Marks)

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