M – 7138

Reg. No. : ....

Name : ....

Third Semester M.Sc. Degree Examination, March 2022

Chemistry/Polymer Chemistry/Analytical Chemistry

CH/CL/PC 231 : INORGANIC CHEMISTRY – III

(2020 Admission)

Time : 3 Hours   Max. Marks : 75

SECTION – A

Answer any **two** sub-questions among (a), (b), or (c) from each question. Each sub-question carries **2** marks.

1. (a) What are oxidative addition reactions? Give an example.

    (b) Describe the Wacker process.

    (c) Discuss the applications of Wilkinson's catalyst.

2. (a) Discuss the various Factors affecting the stability of a complex.

    (b) Discuss the Taube mechanism.

    (c) Discuss the photoisomerization reactions of complexes.

3. (a) Discuss the synthetic model for photosynthesis.

    (b) Discuss the structure and functions of hemoglobin.

    (c) Discuss the structure and functions of Carboxypeptidase A.

4. (a) Discuss the use of vibrational spectroscopy to metal carbonyls.

   (b) Distinguish between contact shifts and pseudocontact shifts in NMR.

   (c) Discuss the applications of Mossbauer spectroscopy to complexes.

5. (a) What are magic numbers? What is its significance?

   (b) Distinguish between transient and secular equilibria.

   (c) Discuss the principle of GM counter.

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) Briefly explain the Hapto nomenclature of organometallic compounds.

   (b) Explain the structure and bonding of ferrocene using MOT.

7. (a) Briefly explain the various methods for the determination of stability constants.

   (b) Briefly explain the dissociative and associative mechanisms.

8. (a) Explain the role of calcium in biological systems.

   (b) Explain the iron storage and transport in biological systems.

9. (a) Briefly explain the applications of IR spectroscopy in coordination compounds.

   (b) Discuss the CD and ORD spectra of metal complexes.

10. (a) Describe the various types of nuclear reactors.

    (b) What is a nuclear fusion reaction? What are its applications?

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions. Each question carries **10** marks.

11. (a) Explain the methods of synthesis and structure of metal carbonyls.

    (b) What is Zingler – Natta catalyst? Discuss its applications.

12. Explain the kinetics and mechanism of ligand substitution reactions in square planner complexes.

13. Explain the toxic effects of cadmium, lead and mercury metals.

14. Explain the use of various NMR techniques in inorganic chemistry.

15. Explain the various nuclear models.

(3 × 10 = 30 Marks)

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