(Pages : 3) **S – 7627**

Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, February 2024

Chemistry/Analytical Chemistry/Applied Chemistry/Medicinal Chemistry/ Polymer Chemistry

CH/CL/CA/CM/PC 231 : INORGANIC CHEMISTRY III

(Chemistry/Analytical Chemistry/Applied Chemistry/Medicinal Chemistry : 2016-2019 Admission and Polymer Chemistry : 2018-2019 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) Discuss the 18 and 16 rules. What are their significances?

   (b) What is Wilkinson's catalyst? Discuss its applications.

   (c) Discuss the use of Ziegler – Natta catalyst in polymerization reactions.

2. (a) What is trans effect? What causes trans effect?

   (b) What is the difference between stepwise and overall stability constants? How are they related?

   (c) Discuss Eigen – Wilkins mechanism.

3. (a) Discuss the mechanism of ion transport across membranes.

   (b) Describe the structure of biological membranes. What are its functions?

   (c) Discuss the role of calcium in biological systems.

P.T.O.

4. (a) Discuss the various factors affecting the ligand vibration frequencies.

   (b) Discuss the ORD spectra of metal complexes.

   (c) Why do N-H vibrations in NH_3 and O-H vibrations in H_2O for IR bands have almost same values? Why do they appear as broadband?

5. (a) What are magic numbers? Why are they called 'magic numbers'?

   (b) Distinguish between transient and secular radioactive equilibria.

   (c) What are photonuclear reactions? What are their applications?

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) Describe the MO treatment for the structure and bonding of dibenzene chromium complexes.

   (b) Discuss the bonding in metal – nitrosyl compounds.

7. (a) Describe the outer sphere and inner sphere mechanisms of electron transfer reactions.

   (b) Discuss the mechanism of ligand substitution reaction in square planner complexes.

8. (a) What are the methods of oxygen transport? Why is it required? Discuss the mechanism of oxygen transport.

   (b) Briefly explain the metal toxicity due to cadmium and chromium.

9. (a) Describe the vibrational spectra of metal carbonyls.

   (b) Discuss ^{19}F and ^{31}P NIMR and their applications.

10. (a) Briefly explain the principle and working of a nuclear reactor.

    (b) Briefly explain the principle, working and uses of radiation counters.

(5 × 5 = 25 Marks)

SECTION – C

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

11. (a) Explain the Hapto nomenclature of organometallic compounds.

    (b) Explain the various types of metal complexes.

12. Explain the various methods used for the determination of stability constant of a complex.

13. Explain the iron storage and transport in biological systems. Discuss the functions of iron in biological systems.

14. Explain Mossbauer spectroscopy and its applications in complex studies.

15. Explain the principle, working and uses of radiation counters. What are the various types of counters?

(3 × 10 = 30 Marks)

———————