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S - 6837

Reg. No. :

Name :

Third Semester M.Sc. Degree Examination, February 2024

Chemistry/Analytical Chemistry/Polymer Chemistry

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

(2020 Admission Onwards)

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) Illustrate the Hapto nomenclature of organometallic compounds.
(b) Discuss the bonding in metal carbonyls.
(c) What is the Wilkinson's catalyst? What is its use?
2. (a) What is trans effect theory?
(b) Discuss the Marcus theory of electron transfer reactions
(c) Discuss the photo-isomerization reactions of metal complexes.
3. (a) What are the functions of biological membranes?
(b) What is the difference between photosynthesis I and photosynthesis II?
(c) What are the functions of the hemoglobin and myoglobin?

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4. (a) Using IR spectroscopy how will you distinguish between NH_3 and H_2O ligands of a metal complex?
(b) Discuss the CD spectrum of metal complexes
(c) What are the uses of ^{19}F NMR?
5. (a) What are magic numbers? What are their specialties?
(b) Distinguish between half-life and average life.
(c) What is meant by heavy ion induced nuclear reactions? Give an example.

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) Explain the structure and bonding in ferrocene.
(b) With a suitable example, describe the oxidative addition reaction.
7. (a) Discuss the stability of complex ions in aqueous solutions.
(b) Describe the dissociative mechanism in metal complexes.
8. (a) Briefly explain the mechanism of ion transport across membranes.
(b) Briefly explain the toxic effects of cadmium and mercury.
9. (a) Discuss the changes in ligand vibration frequency on coordination with metal ions.
(b) What are the applications of ESR spectroscopy to metal complexes?
10. (a) Discuss the principle of working of G.M. counter.
(b) Discuss the principle of working of the reactors of nuclear power plants.

(5 × 5 = 25 Marks)



SECTION – C

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

11. (a) Describe the Monsanto acetic acid process
(b) Discuss the synthesis and reactivity of metal complexes with linear π ligands.
12. Explain the kinetics and mechanism of ligand substitution reactions in square planar complexes.
13. (a) Explain the role of calcium in biological systems.
(b) Describe the structure and functions of Carboxypeptidase A.
14. Explain the use of Mossbauer Spectroscopy for the studies of iron and tin complexes.
15. (a) Explain the shell nuclear model.
(b) Explain nuclear fission and its applications.

(3 × 10 = 30 Marks)

