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Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, February 2021

Chemistry / Polymer Chemistry

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

Common for Chemistry (2016 Admission onwards) and

Polymer Chemistry (2018 Admission onwards)

Time : 3 Hours Max. Marks : 75

SECTION – A

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

1. (a) Explain the structure of bis (benzene) chromium.

   (b) Explain the hapto nomenclature of organometallics with a suitable example.

   (c) Give the mechanism of Zeigler-Natta polymerization of alkenes.

2. (a) What is macrocyclic effect?

   (b) Explain photoaquation reactions in metal complexes with example.

   (c) Explain the terms stability and lability of complexes?

3. (a) Explain the electron systems used in photosynthesis.

   (b) What are metalloenzymes? Give examples.

   (c) Explain the role of ferritin in biological systems.

P.T.O.

4. (a) What happens to CO stretching frequency in IR pectrum of acetylacetone on metal ion cordination?

   (b) Explain the EPR spectra of $[Cu(acac)_2]$.

   (c) What is the principle behind ^{19}F NMR?

5. (a) What is Mass defect? How is it related to binding energy?

   (b) Write a note on magic numbers?

   (c) What is meant by secular equilibria?

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) Discuss the structure and bonding in Zeise's salt.

   (b) Write a note on fluxional molecules.

7. (a) Discuss the Marcus theory of outer sphere electron transfer reactions.

   (b) Explain spectrophotometric method to determine stability of complexes.

8. (a) Give a brief explanation on toxicity of metal ions.

   (b) Manganese plays an important role in production of oxygen in photosynthesis. Justify.

9. (a) Explain chemical shift and spin-spin coupling in NMR spectroscopy.

   (b) Write a note on CD spectra of metal complexes.

10. (a) Write a note on breeder reactor.

    (b) Write a note on nuclear shell model.

(5 × 5 = 25 Marks)

SECTION – C

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

11. Discuss briefly the application of organometallic compounds in organic synthesis and catalysis.

12. Give a brief account on the photochemical reactions of ruthenium complexes.

13. Discuss oxygen transport by heme proteins with special reference to pH dependence such as haemoglobin and myoglobin.

14. Discuss the theory behind Mossbauer spectroscopy. Explain the use of Mossbauer spectroscopy in studying iron complexes.

15. Write a note on GM counters and scintillation counters.

(3 × 10 = 30 Marks)

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