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(Pages : 2)

Name.....

Reg. No.....

THIRD SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2021

(CBCSS)

Chemistry

CHE 3C 10—ORGANOMETALLIC AND BIO-INORGANIC CHEMISTRY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Section A

Answer any **eight** *questions.*
Each question carries a weight of 1.

1. What is meant by reductive carbonylation ? Explain with an example.
2. Which is more reactive ; Fischer carbene or Schrock carbene ? Substantiate your answer.
3. Discuss the structure and bonding in metal-acetylene complexes.
4. What hapticities are possible for 1, 3-butadiene ? Sketch the interactions.
5. What is Collman's reagent ? Give any *one* of its synthetic applications.
6. Explain anation reaction with a suitable example.
7. Calculate the number of metal-metal bonds in : (a) $Co_4(CO)_{12}$; and (b) $Ru_3(CO)_{12}$.
8. What is superoxide dismutase ? Explain its structure and function.
9. Differentiate between active and passive transport across cell membrane.
10. Identify the co-ordination sites in proline and α-alanine.

(8 × 1 = 8 weightage)

Turn over

Section B

Answer any **six** *questions.*
Each question carries a weight of 2.

11. State and explain 16-electron and 18-electron rules as applied to organometallic compound

12. How is Zeise's salt synthesized ? Give an account of the structure and bonding in this com

13. Describe the catalytic process and the mechanism of the reactions involved in Monsanto ac process.

14. Discuss the factors that favour the formation of metal clusters.

15. Explain the role of calcium in blood clotting process.

16. Describe the mechanism of the action of *cis*-platin as an anticancer drug.

    What are the side effects of this drug ?

17. How is methyllithium prepared ? How this compound forms molecular aggregate ? Expla

18. Discuss the structure and functions of cytochrome P_{450}.

(6 × 2 = 12 w

Section C

Answer any **two** *questions.*
Each question carries a weight of 5.

19. Give an account of the synthesis, structure and important reactions of ferrocene.

20. Describe the mechanisms involved in oxidative addition, reductive elimination and inserti of organometallic compounds, giving suitable examples.

21. What is biological nitrogen fixation ? Explain the structure and functions of M-c P-cluster of nitrogenase in nitrogen fixation. Mention the role of metal-dinitrogen co nitrogen fixation.

22. Write briefly on :

    (a) Sodium-potassium pump in biological systems.

    (b) Physiology of myoglobin and hemoglobin.

    (c) Hydroformylation of alkene.

(2 × 5 = 1