

C 22011

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Name.....

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2017

Chemistry

CH 4E 08—BIO-INORGANIC AND ORGANOMETALLIC CHEMISTRY

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Section A

Answer all questions.

Each question carries a weightage of 1.

1. Identify the co-ordination sites in proline and β -alanine.
2. Differentiate between active transport and passive transport.
3. What is the necessity of entatic state in metalloenzymes ?
4. Explain the structure and functions of peroxidase.
5. How does dioxygen binding affect the spin-state of iron in haemoglobin ?
6. Haemocyanin is colourless, but in the oxy-form it is coloured ; Why ?
7. What do you mean by 'red-drop' in photosynthesis ?
8. What are the side effects of *cis*-platin as an anticancer drug ?
9. Explain the bonding modes of N_2 In transition metal complexes.
10. State and explain 18-electron rule as applied to organometallic compounds.
11. What is Collmann's reagent ? Give *one* example for its synthetic application.
12. When a ligand is co-ordinated to a metal ion, its reactivity gets modified ; Why ?
13. Explain the role of a co-catalyst in Wacker process.
14. Explain the role of Pd catalyst in the synthesis of acetaldehyde from ethylene.

(14 \times 1 = 14 weightage)

Turn over

Section B

Answer any seven questions.

Each question carries a weightage of 2.

15. Discuss the structure and functions of superoxide dismutase.
16. Describe the important features of vitamin B₁₂, that differentiate it from other vitamins.
17. Compare the structure and functions of haemoglobin and myoglobin.
18. Write a note on cytochromes.
19. Give an account of the classification of organometallic compounds with suitable examples.
20. What is transmetallation ? How this reaction is useful for the preparation of organometallics ?
21. Describe the mechanism involved in Ziegler-Natta catalysis.
22. What are zeolites ? Bring out any two examples for zeolite based heterogeneous catalysis.
23. Describe the catalytic cycle and reactions involved in Monsanto acetic acid process.
24. What is a promoter ? Discuss the role of a promoter in Haber process.

(7 × 2 = 14 weightage)

Section C

Answer any two questions.

Each question carries a weightage of 4.

25. Describe the functions of Na⁺-K⁺ pump in biological system. How does vanadate ion interfere with Na⁺-K⁺ pump ?
26. Explain the role of Photosystem-I and Photosystem-II in photosynthetic process. Suggest a suitable model system for photosynthesis.
27. Discuss the mechanisms of oxidative addition and reductive elimination reactions of organometallic compounds with suitable examples.
28. What is Wilkinson's catalyst ? Draw the catalytic cycle and explain how hydrogenation reaction is catalysed by it.

(2 × 4 = 8 weightage)