MAR IVANIOS COLLEGE (AUTONOMOUS)
THIRUVANANTHAPURAM

Reg. No. :…… **Name :…….**

Second Semester B.Sc. Degree Examination, June 2015

First Degree Programme under CBCSS

Complementary Course: Chemistry – II (for Botany and Zoology)

AUCH231.2a / AUCH231.2e: Inorganic and Bioinorganic Chemistry

Time: **3** Hours Max. Marks: **80**

SECTION – A

*Answer **ALL** questions in one or two sentences.*

1. Give an example of a coagulant used in water purification.
2. Which are the major greenhouse gases ?
3. Write the formula of potassium hexacyanoferrate (III).
4. What is force constant ? Give the expression for calculating force constant.
5. Which type of molecules exhibit rotational spectra ?
6. What is the selection rule for a rigid diatomic rotator ?
7. What is the coordination number of iron in haem and in haemoglobin ?
8. Name the diseases caused by the deficiency and excess of iron.
9. What are essential and trace elements in biological systems ?
10. What are metalloporphyrins ?

(10 x 1 = 10 Marks)

SECTION – B

*Answer any **EIGHT** questions, each in a short paragraph not exceeding 50 words.*

11. How is acid rain formed ?
12. What is eutrophication? How is it formed ?
13. What is meant by BOD of water ? How is it different from COD ?
14. Differentiate between fundamental bands and overtones.

15. What do you mean by zero point energy ?
16. What are high spin and low spin complexes ?
17. Give the expression for the vibrational energy of a diatomic molecule.
18. How is moment of inertia of a molecule calculated from rotational spectra ?
19. Explain carbon cycle.
20. What is linkage isomerism ? Explain with an example.
21. Explain the principle of reverse osmosis.
22. Write the IUPAC names of i). K [Ag $(CN)_2$] and ii). [Cr $(NH_3)_6$] Cl.

(8 x 2 = 16 Marks)

SECTION – C

*Answer any **SIX** questions, each in a paragraph not exceeding 120 words.*

23. What are the preventive measures to minimize global warming and greenhouse effect ?
24. How many vibrational modes are possible for CO_2 ? How many are IR active ?
25. Describe the applications of coordination complexes in qualitative and quantitative analysis.
26. Discuss the formation of the complex ion $[Cr(NH_3)_6]^{3+}$ on the basis of V.B. theory.
27. Write briefly on depletion of ozone layer.
28. How is dissolved oxygen estimated in a water sample ?
29. Write a note on oxygen transport by haemoglobin.
30. Explain why Ni $(CO)_4$ is diamagnetic and tetrahedral in shape ?
31. What are the limitations of valence bond theory of coordination compounds ?

(6 x 4 = 24 Marks)

SECTION – D

*Answer any **TWO** questions, not exceeding four pages.*

32. Discuss in detail the various water pollutants, their environmental effects and toxic effects to humans.
33. Illustrate geometrical and optical isomerism exhibited by coordination compounds.
34. Discuss the principle of I.R. Spectroscopy. What are its applications ?
35. Write notes on i). Cytochromes and ii). Role of chlorophyll in plants.

(2 x 15 = 30 Marks)

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