**ANDHRA UNIVERSITY**

**Department of Inorganic and Analytical Chemistry**

M.Sc.(Final) Chemistry Syllabus for 3rd Semester

**Specialization -** **Bio-inorganic Chemistry**

Paper – III: Coordination Chemistry of Biological Systems - I

(Effective from 2005 -2006 admitted batch)

**Unit I:**

Scope of Bio-inorganic Chemistry- Biochemical role played by metal ions -Selection of metal ions for biochemical processes - rule of abundance -Rule or efficiency -Rule of basic fitness -Evolutionary improvement of efficiency and specificity. Alkali and alkaline earth metal ions - Biological roles.

Unit II:

Membrane structure -Transport of cat ions across membranes – Ionophores, the sodium pump.

The calcium pump -role of calcium in biological processes – Muscle contraction -

Enzyme stabilization – Blood clotting – Calcium membrane interaction – Biological classifications – Role of magnesium in bio-systems.

Unit III:

Metalloenzymes -Structure and function –Carbonic anhydrase – Carboxy peptidase -Alkaline phosphatase -Alcohol dehydrogenase. Oxygenases, peroxidases and catalases.

Interchangeability of zinc and cobalt in enzymes, Reasons for interchangeability –uniqueness of zinc as a biochemical element.

**Textbooks:**

I. Bio-inorganic Chemistry -An Introduction: - Ichiro Ochiai - AIlyn and Bacon Inc.

2. Inorganic Biochemistry .Vol. I and II, G.L. Eichhorn.

3. Inorganic Aspects of biological and organic chemistry, Robert P. Hanzlik, A.P

4. Inorganic Chemistry of Biological Processes -M. N. Hughes -

5. Inorganic Chemistry: Principles, Structure and Reactivity, James E. Huheey.

6. Advanced Inorganic Chemistry -F.A. Cotton and G. Wilkinson, Wiley Eastern, New Delhi.

7. Elements of Bio-inorganic Chemistry, By G.N. Mukherjee and Arabinda Das,

U.N.Dhur & Sons Pvt(Ltd), Calcutta, 1993.

8. Bio-inorganc Chemistry by Bertini, Gray, Lippard and Valentine,

Viva Books Private Ltd. 1998.

9. Biochemisty by L. Stryer.

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**Specialization -Bio-inorganic Chemistry**

**Give detailed account on Model Question Paper: 08-10-2020**

**for Units I, II, & III, Leaving IV Unit.**

M.Sc. DEGREE EXAMINATION

Third Semester

Chemistry

Specialisation: BIOINORGANIC CHEMISTRY

Paper lll – COORDINATION CHEMISTRY OF BIOLOGICAL SUSTEMS – l

(effective from the admitted batch of 2009 - 2010)

Time : Three hours Maxium : 80 Marks.

Answer **ALL** questions

**SECTION A – (4 X 5 = 20 Marks ).**

1. (a).Give a brief account on Ionophores

Or

(b) discuss the role of Calcium in Muscle contraction

2 . (a).Write about Crown Ethers giving suitable structures.

Or

(b). Give detailed mechanism for Na-pump across Cell Membrane.

3.(a) Discuss briefly the reaction of CO2 with carbonic anhydrase.

Or

(b).Write about the interchangeability of Zn & Co in Bio-systems.

4. (a). Explain the mechanism of Na-K Pump across Bio-cell membrane.

Or

(b). Summarize the general Characteristic features of Active Sites in enzymes.

**SECTION B – (4 X15 = 60 Marks ).**

5. (a). The “ role of Inorganic Ions is Vital in Bio-systems”. Substantiate the statement.

Or

(b). Give a detailed account on Ionophores with the help of suitable structures.

6.(a). Explain in detail the mechanism to explain the Na-pump across the cell membrane.

Or

(b).Discuss the importance of calcium in the (i) Muscle action & (ii). Blood Clot.

7.(a) Give a detailed account on Carboxy peptidase.

Or

(b)Write about the following Principles in involved in Bio-systems :

(i).Rule of Abundance, (ii). Rule of Efficiency & (iii)Rule of Basic Fitness

8.(a). Write about the (i). Structure of Cell Membrane (ii). Rule of Specificity &

(iii).Alcohol dehydrogenase.

Or

(b). Write detailed notes on the Enzymes, Oxygenases.

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