[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1233 **D**

Unique Paper Code : 2174001003

Name of the Paper : GE-3, Bioinorganic Chemistry

Name of the Course : **B.Sc. (Hons)/ B.Sc. (Prog)**

Semester : I

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Question No. 1** is compulsory.
3. Attempt **four** questions in all.
4. **All questions** carry equal marks.

1. (a) Name the essential and trace elements in biological process.

(b) Where is iron stored in the human body? In what form is it stored and what is the oxidation state of iron in it?

(c) What do you mean by T & R form of haemoglobin?

(d) What is the oxidation state of iron in haemoglobin and myoglobin? Is iron low or high-spin in oxyhaemoglobin?

(e) Write the name of chelating ligand used for the treatment of lead poisoning in humans. Also draw its structure.

(f) What are the symptoms of mercury toxicity in humans.

(g) What is the name of enzyme that hydrolyses ATP in Na^+/K^+ pump?

(h) Name an important enzyme containing Zn^{2+} ion.

(i) Write the name of any two Cu containing transport and storage proteins. (2, 2, 2, 2, 2, 2, 1, 1, 1)

2. (a) What are metallobiomolecules? Classify them.

(b) Draw a cyclic process showing role of haemoglobin and myoglobin as O_2 and CO_2 transporters.

(c) Explain the role of calcium in bone formation.

(d) Write down the toxic effects of cadmium in humans. How it can be treated? (5, 4, 3, 3)

3. (a) Explain with the help of a diagram the mechanism of Na^+/K^+ pump in human body.

(b) What is meant by essential and non-essential metal ions in biological system? Give atleast two examples of each type.

(c) What do you understand by cooperativity phenomenon in haemoglobin?

(d) What are the symptoms of arsenic toxicity in humans? How it can be treated? (5,4,3,3)

4. (a) Draw the oxygen saturation curves for myoglobin and haemoglobin and justify myoglobin has greater affinity for oxygen than haemoglobin.

(b) Explain the structure and biological functions of chlorophyll.

(c) Discuss Bohr effect in biological systems.

(d) Mention any two biological functions of Fe and Zn. (5, 4, 3, 3)

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5. (a) Describe the pathway of iron from food stuffs to haemoglobin and ferritin in human body.

(b) What is metalloporphyrin? Draw the structure of heme.

(c) Elaborate the biological role of Na^+ and K^+ ions.

(d) What is ATP? Why is it called energy rich molecule? (5, 4, 3, 3)

6. (a) Briefly discuss electron transfer proteins in biological systems.

(b) Discuss the biological importance of Ca^{2+}. How is it different from that of Mg^{2+}?

(c) What are similarities and differences in the structures of haemoglobin and myoglobin?

(d) What is the role of iodine in human body? What abnormality is caused due to iodine deficiency? (5, 4, 3, 3)