

SL No of QP 13336

Unique Paper Code : 2174001003
Name of the Paper : GE: Bioinorganic Chemistry
Name of the Course : B.Sc. (Hons)/ B.Sc. (Prog)
Semester : I/III/V/VII
Duration : 2 hours
Maximum Marks : 60

Instructions for Candidate

- i. Write your Roll No. on top of the question paper immediately.
- ii. Attempt **four** questions in all.
- iii. All questions carry equal marks.

1.
 - a) Name the essential and trace elements in biological processes.
 - 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 is the significance of bioinorganic chemistry?
 - d) Write the name of any two Cu containing transport and storage proteins.
 - e) Write the name of the chelating ligand used for the treatment of lead poisoning in humans. Also, draw its structure.
 - f) What is an antidote? Give one example.
 - g) What is reverse cooperativity in haemoglobin?
 - h) Name an important enzyme containing Zn^{2+} ion.

(2, 2, 2, 2, 2, 2, 2, 1)

2.
 - a) What are metallobiomolecules? Classify them.
 - b) Draw a cyclic process showing the role of haemoglobin and myoglobin as O_2 and CO_2 transporters.
 - c) Explain the function of Ca^{2+} ions in muscle contraction and signal transduction.
 - d) Write down the toxic effects of cadmium in humans. How can it be treated?

(5, 4, 3, 3)

3.
 - a) Write a detailed note on the Na^+/K^+ pump. Explain its working mechanism and biological significance.
 - b) What is meant by essential and non-essential metal ions in the biological system? Give at least two examples of each type.
 - c) What do you understand by the cooperativity phenomenon in haemoglobin?
 - d) Write the toxic effects of Arsenic. Give the reasons for its toxicity.

(5, 4, 3, 3)

4. a) Describe the Perutz mechanism in haemoglobin.

- b) Discuss the toxicity of mercury, including the impact on biological systems. How can it be treated?
- c) Differentiate between trace elements and essential elements in biological systems.
- d) What is the role of myoglobin in oxygen storage?
- (5, 4, 3, 3)
5. a) Explain with the help of a diagram the mechanism of the Na^+/K^+ pump in the human body.
- b) Explain the structure and biological functions of chlorophyll.
- c) Mention any two biological functions of calcium and magnesium.
- d) What is the significance of the globin part in haemoglobin?
- (5, 4, 3, 3)
6. a) Write the toxic effects of lead. Give the reasons for its toxicity. How can it be treated?
- b) Explain the Bohr effect and its relevance to oxygen delivery.
- c) What is the role of transferrin in iron transport?
- d) Mention any two differences between haemoglobin and myoglobin.
- (5, 4, 3, 3)