

2018
CHEMISTRY
CHM 403(I)
BIOINORGANIC CHEMISTRY
Full Marks: 80
Time: 3 Hour

The figures in the margin indicate full marks for the question :

1. Answer the following questions (any four) : **6x4=24**

- (a) What is a supra molecule? Give one example and application of supra molecule.
- (b) Write briefly about the basis of recognition of metal ions, such as Na^+ and K^+ , by macrocyclic crown ethers.
- (c) Write a note on biominerals containing calcium giving their compositions and occurrence in nature..
- (d) Give an account of how cis platin interact with DNA.
- (e) What do you understand by term molecular recognition? Explain.

2. Answer the following questions (any four) : **5x4=20**

- (a) Describe the active site and structure and function of hemerythrin.
- (b) What is the rough structure of cytochrome-c oxidase in terms of heme and Cu centres? What is the reaction catalysed by this protein?
- (c) Give an account of the structure of the heme centre in deoxy and oxy forms of myoglobin.
- (d) Give the structure of the active site of hemocyanin. How does oxygen bind to this site?
- (e) Give the biological function of pyrocatechol dioxygenase.

3. Answer the following questions (any two) : **8x2=16**

- (a) Give a rough sketch of the enzyme substrate complex of carboxypeptidase A, showing all the interactions present. What is the importance of Co(II) substitution in Zn proteins?
- (b) What is biological nitrogen fixation? Compare the reaction conditions of this process with those Habers process. Give an account of the structure of enzyme nitrogenase.
- (c) Give an account of the biological role of the following:
Zn, Co

4. Answer the following questions:

- (a) Draw the potential energy diagrams cross reaction for electron transfer to show the value of HAB (electronic coupling matrix element) determine electron transfer. 2
- (b) Draw a rough sketch of the structure of chlorophyll and indicate why it is a useful pigment in photosynthesis.

OR

Discuss the electron transfer chains in chloroplast, membranes with special reference to the role of PS I and PS II. What are the various metalloproteins involved in the electron transfer chains? 8

5. Answer the following questions (any two): **5x2=10**

- (a) What is chelation therapy? Give an account of various types of chelates used for this purpose.
- (b) Explain how cisplatin binds to DNA. Give a rough sketch to show the drug-DNA interaction.
- (c) What is Rheumatoid Arthritis (RA)? How does gold inhibit the inflammatory action of lysosomal enzymes? What is prodrug? Name one prodrug used in RA.

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