



M.Sc. IV Semester Degree Examination, October - 2023

CHEMISTRY

DSC.11 Bioinorganic and Organometallic Chemistry

(NEP)

Time : 3 Hours

Maximum Marks : 70

Notes : (i) Answer **any five** of the following questions with Question No. **1 (Q1) compulsory**.
(ii) Figures to the **right** indicate marks.

1. (a) What is the significance of ion transport across cell membranes ? Explain how the concentration of Na^+ and K^+ in the intracellular fluids is regulated ? **5+4+5**
(b) Write a note on metal complexes as drugs.
(c) Explain the structural features of Cytochrome P-450. Mention its role in biological systems.
2. (a) Discuss the significance of synthetic oxygen carrier with examples. **5+5+4**
(b) Discuss the structural features of heme group in Hb and Mb.
(c) Write a note on electron transfer proteins.
3. (a) Explain the mechanism with schematic representation for nitrogen fixation using nitrogenase enzyme. **5+5+4**
(b) What is the definition of homeostasis ? Discuss any four examples of homeostasis.
(c) Write a note on calcium dependent molecules and their applications.
4. (a) Discuss the mechanism involved in Monsanto acetic acid process. **5+5+4**
(b) Discuss the Fischer-Tropsch process and the mechanism involved in the reaction.
(c) Define oxidative addition reaction. Explain its radical and ionic mechanism.



5. (a) Discuss molecular materials and fullerides. **5+5+4**
(b) Write a note on polymers with organometallic moieties as pendant groups.
(c) Define inorganic pigments and their classification. Discuss their characteristics and applications.
6. (a) Discuss the role of ferritin and transferrin in biological system. **5+5+4**
(b) Explain in-vitro nitrogen fixation.
(c) Write a note on electron transfer proteins.
7. (a) Give a brief account on Wacker process. **5+5+4**
(b) Why ferrocene is most stable among all metallocene. Explain the structure and bonding of ferrocene.
(c) What are Zeigler Natta catalysts ? Explain their properties and applications in polymerization reactions.
8. (a) How the structure of Vitamin B₁₂ coenzyme differs from heme proteins ? **5+5+4**
(b) What are Iron Sulphur Proteins ? Discuss their role in biological systems.
(c) Discuss the clinical symptoms due to deficiency and excess of the metals; iron, manganese and copper.

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