

**SEMESTER EXAMINATION-2021**  
**CLASS – M.Sc.**  
**SUBJECT - CHEMISTRY**  
**PAPER CODE: MCH-C101**  
**(General Inorganic Chemistry)**

**Time: 3 hour**

**Max. Marks: 70**

**Min. Pass: 40%**

**Note:** Question Paper is divided into two sections: **A and B**. Attempt both the sections as per given instructions.

**SECTION-A (SHORT ANSWER TYPE QUESTIONS)**

**Instructions:** Answer any five questions in about 150 words each. Each question carries six marks. (5 X 6 = 30 Marks)

Question-1: What do you understand by Dihedral plane? Give a few examples.

Question-2: How rise in temperature affects ferromagnetic and anti-ferromagnetic substances.

Question-3: Discuss the role of pH in the formation of carboxy- hemoglobin?

Question-4: What is the chemical composition of sea-shells found on sea- shores? Discuss the process of their formation?

Question-5: What are non-bonding orbitals? Give their significance.

Question-6: What is charge-transfer spectra? State the role of oxidation state of metal ion in this phenomenon.

Question-7: Which elements are termed as building blocks of life and why?

Question-8: What is Pairing energy? Give its role in octahedral complexes with weak ligands.

Question-9: How Nitrogen is fixed in nature by natural processes?

Question-10: Discuss the splitting of terms in  $d^2$  configuration for the determination of ground state term.

## SECTION-B (LONG ANSWER TYPE QUESTIONS)

**Instructions:** Answer any FOUR questions in detail. Each question carries 10 marks. (4 X 10 = 40 Marks)

Question-1: (a) Explain Bohr's effect in detail.  
(b) Discuss the features of enzyme responsible for the substrate selectivity characteristic.

Question-2: Derive the term symbol for  $d^2$  configuration.

Question-3 : (a) What is the role of superoxide dismutase in living cells?  
(b) Write a short note on co-operativity effect.  
(c) Discuss the role of Sodium/ Potassium pump in biological systems.  
(d) Give the role of phosphorylation in photosynthesis.

Question-4: Discuss the ligand substitution reaction in octahedral complexes in detail. Also cite a few examples.

Question-5: Give a detailed account of  $\sigma$ - bonding process in octahedral complexes.

Question-6: (a) Give an account on  $C_4$  photosynthesis. Also give its importance.  
(b) How ground state term varies in Tanabe- Sugano diagram of  $d^6$  octahedral complexes?

Question-7: How degeneracy of d- orbitals in the central metal cation is affected by the presence of ligands?

Question-8: (a) Discuss the variation of magnetic moment along the first transition series (i.e., from  $Sc^{3+}$  to  $Zn^{2+}$ )  
(b) Why  $d^3$  and  $d^8$  complexes are generally inert in nature?

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