

**SHIVAJI COLLEGE, UNIVERSITY OF DELHI**

**DEPARTMENT OF CHEMISTRY**

**INTERNAL TEST-I (Academic Year 2023-24)**

**Name of the Course** : B.Sc. (P) Life Sciences

**Semester:** VI (A)

**Name of the Paper:** Organometallics, Bioinorganic Chemistry, Polynuclear Hydrocarbons and UV, IR Spectroscopy (Unique Paper Code: 42177926)

**Faculty Name:** Dr. Sunil Yadav and Mr. Deepesh Singh

**Duration:** 1 Hour

**Maximum Marks:** 10

**Date of Test:** 16.04.2024

Attempt any four questions. All questions carry equal marks.

1. Calculate the EAN number of  $\text{HMn}(\text{CO})_5$  and predict the number of metal-metal bonds in  $\text{Mn}_2\text{CO}_{10}$ . (2.5)
2. With reference to biological system define essential metal ions, trace metal and non-essential metal ions with an example of each. (2.5)
3. Explain the structure of haemoglobin and its function in biological system. (2.5)
4. Define organometallic compounds. Classify the organometallic compounds based on the nature of metal carbon bond with an example of each. (2.5)
5. Arrange the following species according to decreasing order of the CO stretching frequency and give reasons:  
(i)  $[\text{V}(\text{CO})_6]^+$ ,  $[\text{Cr}(\text{CO})_6]$ ,  $[\text{Fe}(\text{CO})_6]^{2-}$   
(ii)  $[\text{Mn}(\text{CO})_6]^+$ ,  $[\text{V}(\text{CO})_6]^-$ ,  $[\text{Cr}(\text{CO})_6]$  (2.5)
6. Is  $\text{B}(\text{OCH}_3)_3$  considered as an organometallic compound? Calculate Effective Atomic Number for the following compounds:  
(i)  $\text{Fe}_2(\text{CO})_9$   
(ii)  $[\text{Mn}(\text{CO})_5(\eta^2\text{-C}_2\text{H}_4)]$   
(iii)  $[\text{Cr}(\eta^6\text{-C}_6\text{H}_6)(\text{CO})_2]$  (2.5)

