

**PARUL UNIVERSITY**  
**PARUL INSTITUTE OF APPLIED SCIENCES**  
**MID SEMESTER INTERNAL EXAMINATION, MARCH 2020**  
**M. Sc Semester II**  
**Subject: Chemistry**

**Paper Code: 11205152**

**Title of the paper: Inorganic Chemistry II**

**Date: 04/03/2020**

**Time: 2:30 to 4:00**

**Maximum Marks: 40**

**Instructions: 1. All questions are compulsory and options are given in first and second question only.**

**2. Numbers to the right of question indicate the marks of respective question.**

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- Q. 1** Attempt any one question of the following. **(08)**  
(i) Explain the Structure of Mb and Hb  
(ii) What is Orgel diagram. Explain for the  $d^1$  octahedral case.
- Q. 2** Attempt any three questions of the following. **(12)**  
(i) Explain Bohr effect  
(ii) Brief in short about Cooperative effect  
(iii) Give reason why Trans Platin is ineffective against cancer cells  
(iv) explain the preparative method of  $\eta^2$  alkene complex.  
(v) Explain Orgel diagram for the  $d^2$  octahedral case.
- Q. 3** Do as directed. Attempt all five questions. **(05)**  
(i) Define the Principle of MRI  
(ii) What are Metalloenzymes  
(iii) Write down the structure of  $\mu$  – oxo product of heme  
(iv) What is 18 electron rule.  
(v) How to calculate electron contribution of a ligand.
- Q. 4** Write correct option in your answer sheet for following 15 multiple **(15)**  
choice questions.

- MCQ 1 A trace element is an element in a sample that has an average concentration of ----  
(A) <100 parts per million (ppm) (B) <200 parts per million (ppm)  
(C) <10 parts per million (ppm) (D) <400 parts per million (ppm)
- MCQ 2 The metal ion present in carbonic anhydrase  
(A)  $Zn^{2+}$  (B)  $Fe^{2+}$   
(C)  $Cu^{2+}$  (D)  $Ni^{2+}$
- MCQ 3 The toxic form of Chromium is  
(A)  $Cr^{2+}$  (B)  $Cr^{3+}$   
(C)  $Cr^{6+}$  (D)  $Cr^+$
- MCQ 4 In deoxy hemoglobin (Hb), the Fe (II) is 5-coordinated to  
(A) four nitrogens of heme and to (B) four nitrogens of heme and to a  
the proximal His of Hb water molecule.  
(C) four nitrogens of heme and to (D) two nitrogens of heme and to three  
an O<sub>2</sub> molecule. water molecules
- MCQ 5 Important enzymes involved in nitrogen fixation are  
(A) Nitrogenase and hydrogenase (B) Nitrogenase and hexokinase  
(C) Nitrogenase and peptidase (D) Nitrogenase and hydrolyase
- MCQ 6 Nitrogen fixation is the conversion of  
(A)  $N_2$  to N (B)  $N_2$  to urea

- (C)  $N_2$  to  $NH_3$  (D) All the three
- MCQ 7 The non-protein part in enzyme is called as -----  
 (A) Cofactor (B) Substrate  
 (C) Prosthetic Group (D) Both A and B
- MCQ 8 Which of the following is the neutral complex which follows the 18- electron rule?  
 (A)  $(\eta^5-C_5H_5)Fe(CO)_2$  (B)  $(\eta^5-C_5H_5)_2Mo(CO)_3$   
 (C)  $(\eta^5-C_5H_5)_2Co$  (D)  $(\eta^5-C_5H_5)_2Re(\eta^6-C_6H_6)$
- MCQ 9 If complex  $[W(Cp)_2(CO)_2]$  follows 18e- rule. What is Hapticity of Cp?  
 (A) 5 and 5 (B) 3 and 5  
 (C) 3 and 3 (D) 1 and 5
- MCQ 10 Which of the following is the incorrect statement about Zeise's salt?  
 (A) Zeise's salt is diamagnetic (B) Oxidation state of Pt in Zeis's salt is +2  
 (C) All the Pt-Cl bond length in Zeise's salt are equal (D) C-C bond length of ethylene moiety in Zeise's salt longer than that of free ethylene molecule
- MCQ 11 How many M—M bonds are present in  $[Cp Mo(CO_3)]_2$ ?  
 (A) 1 (B) 2  
 (C) 0 (D) 4
- MCQ 12 Transition occur from singlet to singlet, but change in multiplicity is  
 (A) Allowed transition (B) Forbidden transition  
 (C) Partially allowed (D) Partially forbidden
- MCQ 13 Term G split in octahedral field into  
 (A)  $A_{2g}+A_{2g}$  (B)  $T_{2g}+E_g$   
 (C)  $A_{1g}+E_g+T_{2g}+T_{1g}$  (D)  $E_g+T_{1g}+T_{1g}+T_{2g}$
- MCQ 14 The spin multiplicity of the ground state of a  $Ti^{3+}$  &  $V^{3+}$  ion.  
 (A)  $d^3$  &  $d^2$  (B)  $d^1$  &  $d^2$   
 (C)  $d^4$  &  $d^6$  (D)  $d^2$  &  $d^1$
- MCQ 15 Which of the following ions exhibits color in aqueous solution?  
 (A)  $Sc^{3+}$  (B)  $Ni^{2+}$   
 (C)  $Ti^{4+}$  (D)  $Zn^{2+}$

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