Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Course: Organometallic and Bio-Inorganic chemistry **Semester: IV**
Programme: **M. Sc. Chemistry** **Time: 3 hours**
Course Code: CHEM8007 **Max. Marks: 100**

SECTION A

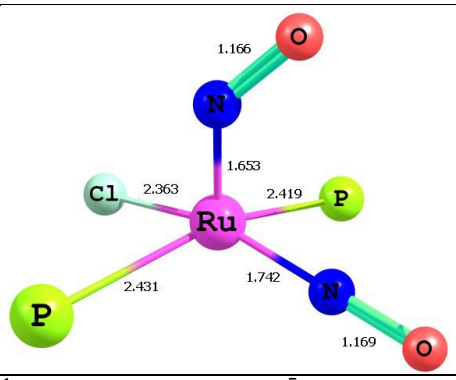
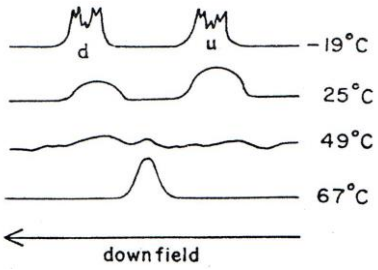
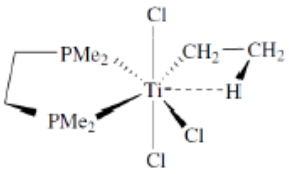
1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)

S. No.	Question	Marks	CO
Q 1	(i) The geometry of Cu and Zn in superoxide dismutase respectively----------& ------ (ii) The prosthetic group of carboxy peptidase contains----------	5	CO4
Q 2	In which bioactive materials the following ions, can be found? (One example each (i) Mg^{2+} (ii) Fe^{2+} (iii) Co^{3+} (iv) Mn^{3+} (v) Ni^{2+}	5	CO4
Q 3	(i) Specify the hapticity of the cyclopentadienyl ligands in $Cp_2W(CO)_2$ (ii) The hapticities displayed by an allyl moiety in binding to metals are.	5	CO3
Q 4	(i) _____, ____ & _____ types of bonding modes are observed in dinitrogen complexes (ii) Shrock Carbene's are _____philic and central metal observed in ____oxidation states	5	CO1
Q 5	Dihydrogen coordination characterized by observing i) IR absorption at _____ ii) NMR peak in the range of _____ iii) Coupling constant in the range of _____	5	CO3
Q 6	(i) Mention two advantages of Heterogeneous catalyst. (ii) _____ catalyst used for Hydroformylation of Alkenes ('Oxo' Process)	5	CO2

SECTION B

1. Each question will carry 10 marks
2. Instruction: Write short / brief notes

Q 1	Write short note on the roles of Hemoglobin & Myoglobin in human biological metabolism.	10	CO4

Q 2		In the given Ruthenium complex, both linear and bent nitrosyl ligands identified. How do you characterize them with suitable spectroscopic methods?	**10**	**CO3**
Q 3	^{1}H-NMR spectra of (η^5-C_5H_5) Rh (C_2H_4)$_2$ complex at different temperatures is  Give reason for getting such kind of spectra at different temperatures.		**10**	**CO3**
Q 4	What are Carbenes? Explain molecular structure of Fischer carbene with suitable example.		**10**	**CO1**
Q 5	(i) Differentiate between Classical & Non-classical metal hydrides.  (ii) Explain "Agostic" term with respect to bonding behavior for above metal complex.		**5+5**	**CO1**
Section C **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer.**				
Q 1	(i) Explain the oxidation mechanism ethylene to acetaldehyde through Wacker process. (ii) Write catalytic cycle of the Wacker process. **OR** (i) What is Wilkinson's catalyst? How this does catalyzes the hydrogenation of alkenes to alkanes? (ii) Explain this hydrogenation process through catalytic cycle.		**8+12**	**CO2**