Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Course: Inorganic Chemistry-IV **Semester : VIth**
Program: B.Sc. Hons. Chemistry

Time : 03 hrs.
Course Code: CHEM-3003 **Max. Marks: 100**

Instructions: Complete the statements

SECTION A
(5Qx4M=20Marks)

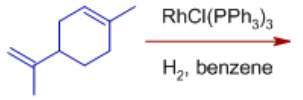
S. No.		Marks	CO
Q 1	Briefly discuss the detrimental health effects of lead (Pb). State few methods to reduce the exposure of lead into drinking water.	**4**	**CO3**
Q 2	(a) Can we use glass rod instead of platinum wire for performing the flame test? Explain your answer. (b) Which form of mercury (Hg) is more toxic: elemental, organic or inorganic? Write the name of compound found to be involved in Minamata disease in Japan.	**4**	**CO1** **CO3**
Q 3	The compound vanadium hexacarbonyl is paramagnetic in nature. Explain with the help of valence bond theory (VBT).	**4**	**CO3**
Q 4	In comparison to dioxygen (O_2), carbon monoxide (CO) displays relatively stronger binding with iron(II) porphyrins. Why it is so?	**4**	**CO2** **CO3**
Q 5	Do the following compounds obey the 18 e^- rule? Comment on the magnetic behaviour and geometry attained by individual metal atom in each case. $Fe_2(CO)_9$, Diiron nonacarbonyl $Co_2(CO)_8$, Dicobalt octacarbonyl	**4**	**CO2**

SECTION B
(4Qx10M= 40 Marks)

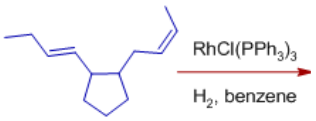
Q 6	What are the possible ways to treat arsenic (As) poisoning in living beings? Write a short note on chelation therapy to treat As poisoning.	**10**	**CO3**

Q 7	Draw the chemical structure of Zeise's salt. State the hapticity of ligand in this case, if any.	**10**	**CO2**
Q 8	What is the role of sodium-potassium (Na-K) pump in physiological processes. How does it function to maintain the electrical gradient across the cell membrane?	**10**	**CO3**
Q 9	What are π-donor and π-acceptor ligands? Discuss in brief the synergic effect in complex $[Ni(CO)_4]$. OR What do you mean by the term *hapticity* of a ligand in organometallic compounds. State the *hapticity* of ligand in the following cases: (i) (ii) 	**10**	**CO2**
SECTION-C (2Qx20M=40 Marks)			
Q 10	(a) Write a short note on the active site and functions of *carboxypeptidase* in biosystem. (b) What are the possible modes in which a drug can interact with DNA? Explain the mechanism of cisplatin-DNA interaction.	**10+10**	**CO3**
Q 11	What is Ziegler-Natta (ZN) catalyst. Draw the chemical structures of two well-known ZN catalysts. Discuss all the steps involved in polymerization of alkenes using such catalysts. OR Explain and draw all the steps involved in the catalytic cycle of alkene hydrogenation driven by Wilkinson's catalyst. How does the steric factor on double bond affect the catalytic process? Write down the reaction product in each of the following cases:	**20**	**CO1 CO3**

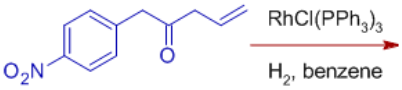
(i)


RhCl(PPh3)3
H2, benzene

(ii)


RhCl(PPh3)3
H2, benzene

(iii)


O2N
O
RhCl(PPh3)3
H2, benzene