


Name:	 UPES UNIVERSITY WITH A PURPOSE
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Online End Semester Examination, May 2021

Course: Inorganic Chemistry IV
 Program: B. Sc. (Hons.) Chemistry
 Course Code: CHEM 3003

Semester: VI
 Time 03 hrs.
 Max. Marks: 100

SECTION A

1. Each question will carry 5 marks

2. Instruction: Complete the statement/ Select the correct answer

S. No.	Question	Marks	CO
Q 1	(i) Ferrocene exists in form in solid state and form in gaseous state. (ii) Two reactions of ferrocene which shows that it is more reactive than benzene are: and	5	CO2
Q 2	Predict which of the following obey the EAN rule: (i) Cr(CO) ₆ (ii) Mn ₂ (CO) ₁₀ (iii) Ti(CO) ₆	5	CO2
Q 3	(i) TON of a catalyst is defined as the amount of divided by the amount of times the percentage yield of product ... (ii) Ziegler-Natta catalyst is an organometallic compound of which metal? a. Iron b. Magnesium c. Rhodium d. Titanium	5	CO3
Q 4	Which of the following are NOT organometallic compounds? Give reason. (i) CH ₃ CH ₂ ONa (ii) (CH ₃ CH ₂) ₂ Zn (iii) CH ₃ CH ₂ Li (iv) CH ₃ CH ₂ BH ₂	5	CO2
Q 5	(i) Bridging carbonyls can be identified in the IR spectrum at a stretching frequency of (ii) There exists a strong back-bonding of metal electrons to the orbitals of CO. (iii) An example of σ-bonded and a π-bonded organometallic compound is and	5	CO2

Q 6	Calculate the total number of M-M bonds and bridged CO present in $\text{Fe}_2(\text{CO})_9$. a. 1, 1 b. 1, 3 c. 2, 1 d. 2, 3	5	CO2
SECTION B			
1. Each question will carry 10 marks 2. Instruction: Write short / brief notes			
Q 1	(i) Using a suitable example explain the concept of solubility products and common ion effect as used in qualitative analysis of ions. (ii) Why do we need to remove Interfering anions (fluoride, borate, oxalate and phosphate) after Group II separation?	10	CO1
Q 2	Create a flowchart to describe the separation of cations into groups. What are the group reagents used in cation separation? Also write the chemical equations of the cations separation.	10	CO1
Q 3	(i) Explain the role of carbonic anhydrase in human body. (ii) Write a short note on sources of lead and its effect on human health.	10	CO3
Q 4	Draw the structure of the following metal carbonyls (any four) i) $\text{Fe}(\text{CO})_5$ ii) $\text{Cr}(\text{CO})_6$ iii) $\text{Mn}_2(\text{CO})_{10}$ iv) $\text{Co}_2(\text{CO})_8$ v) $\text{Fe}_2(\text{CO})_9$	10	CO2
Q 5	Define the term hapticity. Classify organometallic compounds on the basis of hapticity. Give examples of ligands with the hapticity of 3, 4, 5 and 6. OR Which was the first transition metal organometallic compound discovered? Discuss its preparation method and structure in detail.	10	CO2
SECTION-C			
1. Each question carries 20 marks 2. Instruction: Write long answers			
Q 1	a. Write the molecular formula of Wilkinson's catalyst. Discuss the mechanism of alkene hydrogenation using Wilkinson's catalyst. OR What is Ziegler-Natta polymerization? Discuss the mechanism of polymerization along with the role of triethyl aluminium. b. Explain the structure of Na-K pump. Discuss the functioning and mechanism of Na-K pump in detail.	10 10	CO3

OR

What are the factors affecting absorption of Fe in human body. Discuss the Mucosal Block theory of Fe absorption in detail.