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(FOR THE CANDIDATES ADMITTED  
DURING THE ACADEMIC YEAR 2023 ONLY)

SUBJECT CODE **22PCY3E4**  
REG.NO. :

**N.G.M.COLLEGE (AUTONOMOUS): POLLACHI**

**END-OF-SEMESTER EXAMINATIONS: NOVEMBER 2023**

**M.Sc CHEMISTRY**

**MAXIMUM MARKS: 50**

**SEMESTER: III**

**TIME: 3 HOURS**

**PART - III**

**ORGANOMETALLIC CHEMISTRY**

**SECTION – A**

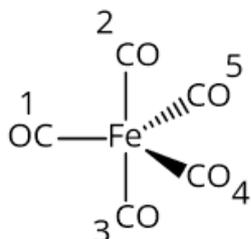
**(10 X 1 = 10 MARKS)**

**ANSWER THE FOLLOWING QUESTIONS.**

**(Objective Questions with four Multiple Choices)**

**(K1)**

1. With which of the following compounds  $Mn(CO)_5$  is isolobal with  
a)  $CH_4$                       b)  $CH_3$                       c)  $CH_2$                       d)  $CH$
2. 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
3. Which of the following is in which the organic ligand having only one bond with metal?  
a)  $W(CH_3)_6$                       b)  $K[PtCl_3(C_2H_4)]$                       c)  $(\eta^5-C_5H_5)_2Fe$                       d)  $(\eta^5-C_6H_6)_2Ru$
4. Ferrocene cannot undergo which of the following reaction?  
a) Friedal craft acylation                      b) Diels-Alder reaction                      c) Oxidation by  $Ag^+$  ions  
d) Electrophilic substitution
5. For fluxional  $Fe(CO)_5$  (structure given below) in solution, the exchange of numbered CO groups will be between



- (a) 2 and 5; 3 and 4                      (b) 2 and 3; 4 and 5                      (c) 2 and 3; 1 and 5  
(d) 1 and 2; 4 and 5

**ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES**

**(K2)**

6. Define 18 electron rules.
7. Explain Wades rule.
8. Illustrate the reactivity of alkyne complexes.
9. How many M — M bonds are present in  $[Cp Mo(CO)_3]_2$ ?
10. What is the role of organometallic compound in catalytic reaction?

**(CONTD .... 2)**

**SECTION – B****(5 X 3 = 15 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K3)**

11. a) write note on the binding mode of CO and IR spectra of metal carbonyl bonds.  
(OR)  
b) Illustrate metal nitrosyl complexes.
12. a) Describe the synthesis of metal halides.  
(OR)  
b) Distinguish the insertion reactions of alkene complexes to M-H bonds.
13. a) Write the synthesis of alkene complexes by ligand substitution reactions.  
(OR)  
b) Explain the bonding of metal alkene complexes.
14. a) Describe the reactions of metallocenes.  
(OR)  
b) Discuss the structure of allyl complexes.
15. a) Elaborate the hydroformylation reaction.  
(OR)  
b) Explain the preparation of acetic acid by Monsanto acetic acid process.

**SECTION – C****(5 X 5 = 25 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K4 (Or) K5)**

16. a) Classify the organometallic compounds. Illustrate with examples.  
(OR)  
b) Explain the synthesis, structure and reactions of metal carbonyl complexes.
17. a) Outline the reactions involving modification of ligands (insertion reaction).  
(OR)  
b) Write note on structure and reactions of metal alkyl complexes.
18. a) Survey the bonding of alkenes to transition metals complexes.  
(OR)  
b) Illustrate the cobalt catalyzed alkyne cycloaddition reactions.
19. a) Make a note on the synthesis of metallocenes.  
(OR)  
b) Explain multi-decker complexes.
20. a) Explain the hydrogenation reaction with mechanisms.  
(OR)  
b) Write note on Ziegler Natta polymerization reactions with suitable mechanisms.

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**ETHICAL PAPER****22PCY3E4/-**