

(FOR THE CANDIDATES ADMITTED

23PCY3E4

DURING THE ACADEMIC YEAR 2023

ONLY)

REG.NO. :

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

END-OF-SEMESTER EXAMINATIONS : NOV-2024

MSc CHEMISTRY

MAXIMUM MARKS: 75

SEMESTER-III

TIME : 3 HOURS

PART – III-23PC3E4

MAJOR ELECTIVE –II - ORGANOMETALLIC CHEMISTRY

SECTION – A

(10 X 1 = 10 MARKS)

CHOOSE THE CORRECT ANSWERS

1. Which of the following is the neutral complex which follows the 18- electron rule? (K1)

- a) $(\eta^5\text{-C}_5\text{H}_5)\text{Fe}(\text{CO})_2$ b) $(\eta^5\text{-C}_5\text{H}_5)_2\text{Mo}(\text{CO})_3$
c) $(\eta^5\text{-C}_5\text{H}_5)_2\text{Co}$ d) $(\eta^5\text{-C}_5\text{H}_5)_2\text{Re}(\eta^6\text{-C}_6\text{H}_6)$

2. How many M — M bonds are present in $[\text{Cp Mo}(\text{CO})_3]_2$? (K1)

- a) 1 b) 2 c) 0 d) 4

3. Transition metal alkyne complexes are often formed by the displacement of ----- by the alkyne. (K1)

- (a) Labile ligands (b) inner ligands (c) Neutral ligands (d) Positive ligands

4. Ferrocene cannot undergo which of the following reaction? (K1)

- a) Friedal craft acylation
b) Diels-Alder reaction
c) Oxidation by Ag + ions
d) Electrophilic substitution

5. In which process hydroformylation of olefin to an aldehyde occurs? (K1)

- a) Azo process b) Alkyl process
c) Oxo process d) None of the mentioned

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. Define-Effective atomic number rule.(K2)

7. What are metal alkyl complexes? (K2)

8. Defend- bonding in alkyne complexes (K2)

9. What are metallocenes? (K2)

10. Define-Oligomerization..(K2)

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

11. a) State and explain-18 electron rule in organo metallic chemistry.(K3)

(OR)

b) Describe the classification of organo metallic compounds.(K3)

12. a) Compare Metal alkene complexes and metal alkyne complexes(K3)

(OR)

b) Describe the synthesis by alkylation of metal halides (K3)

13. a) Compare between-bonding in alkyne complexes and alkene complexes.

(OR)

b) Describe the reactivity of alkene complexes (K3)

14. a) Explain the synthesis of metallocenes (K3)

(OR)

b) Describe the alkyne complexes synthesis (K3)

15. a) Explain the alkene polymerization with suitable examples.(K3)

(OR)

b) Describe the fluxional molecules.(K3)

SECTION – C**(5 X 8 = 40 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)**

16. a) Analyze the synthesis, structure and reactions of metal carbonyls.(K4)

(OR)

b) Defend the Wade's rule and isolobal relationship (K5)

17. a) Discuss the Metal alkyl complexes stability and structure.(K4)

(OR)

b) Summarize the reactivity of metal alkyl complexes.(K5)

18. a) Point out and explain the bonding in diene complexes (K4)

(OR)

b) Discuss the cobalt catalysed alkyne cycloaddition reactions.(K4)

19. a) Outline the reactions of metallocenes .(K4)

(OR)

b) Analyze the structure and reactivity of arene complexes.(K4)

20. a) Discuss the Organometallic compounds in homogeneous catalytic reactions (K4)

(OR)

b) Defend and explain the hydroformylation and hydrosilation of alkenes.(K5)