

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M. SC.
BRANCH: CHEMISTRY

SEMESTER : I
SESSION : MO/19

SUBJECT: CH404 ORGANOMETALLIC CHEMISTRY

TIME: 3.00Hrs.

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Discuss the compliance and violation of 18 electron rule in: (i) $[\text{Cr}(\text{Co})_6]$ (ii) $\text{CH}_3\text{Mn}(\text{Co})_5$ (iii) $[\text{PtCl}_4]^{2-}$ (iv) $[\text{Co}(\text{NH}_3)_6]^{3+}$ and (v) Ferrocene [5]
- Q.1(b) What is Isolobal analogy and its applications? Discuss the formation of transition metal butadiene complex using 1,3 butadiene and carbonyl/halide/any suitable coligand. [5]
- Q.2(a) Give an account of Fischer vs Schrock carbenes in terms of synthesis, structure and reactivity. [5]
- Q.2(b) What is Tebbe's reagent? Discuss its applications in synthesis of organometallic complexes. [5]
- Q.3(a) What are Oxidative addition reactions? Discuss its mechanism and salient features giving suitable examples. [5]
- Q.3(b) Discuss the insertion reactions of CO into metal-carbon bond of transition metal alkyls and discuss its mechanism. [5]
- Q.4(a) Discuss the Wacker's process for oxidative hydrolysis of ethene and manufacture of acetaldehyde giving its complete mechanism of synthesis. [5]
- Q.4(b) Discuss the structure and bonding of Ferrocene molecule. [5]
- Q.5(a) What is Wilkinson's catalyst? Discuss its structure and industrial applications. [5]
- Q.5(b) What are the applications of Organometallic complexes in industry? Give an account of currently used complexes and their applications. [5]

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