MANIPAL ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

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# DEPARTMENT OF SCIENCES, II SEMESTER M.Sc (CHEMISTRY)
## END SEMESTER EXAMINATIONS, JUNE 2022
SUBJECT: ORGANIC CHEMISTRY II [CHM 5201]
## (REVISED CREDIT SYSTEM)

Time: 3 Hours Date: MAX. MARKS: 50

Note: (i) Answer **ALL** questions

(ii) Write reactions, structures or mechanisms wherever necessary

**1A.** Give the reaction for the following. **4**
i) Preparation of Collman's reagent
ii) Hydroformylation
iii)Walker process
iv)Preparation of metal arene complex by Grignard method.

**1B.** Predict the proper reagent in the following reactions. **4**
i) $W(CO)_6$ + ? $\xrightarrow{?}$ $(CO)_5W{=}COMeR$
ii) $(CO)_5W{=}COMePh$ + ? $\xrightarrow{?}$ $(CO)_4BrW{\equiv}CPh$ + CO + $Al_2Br_5OMe$
iii) $Me_3SiCl$ + ? $\xrightarrow{?}$ $Me_3SiO\ SiMe_3$
iv) $BF_3$ + ? $\xrightarrow{?}$ $BR_3$ + MgXF

**1C.** Give reason for the following. **2**
i)Main group organic compounds are stored in ether solvent.
ii) Oraganoberyllium compounds with coordination of more than 4 are not possible.

**2A.** Give an example for the following. **4**
**i)** Hydrogenation of metal alkene complexes
**ii)** Ferrocene acts as an aromatic compound.
**iii)** Substitution reactions of Metal carbonyls
**iv)** Oxidative addition of organolithium compounds.

**2B.** i)Name the catalyst used to prepare unsaturated alcohols and give reactions for the same. **4**
ii) Explain the type of isomerism present in $Fe(CO)_5$.

**2C.** Differentiate between the following. **2**
i)Organo zinc compounds and Organo mercury compounds.
ii)Organomagnesium compounds and organoberyllium compounds

**3A.** Write a note on the followings. **4**
i)Л back bonding.
ii)Isolobal behaviour.

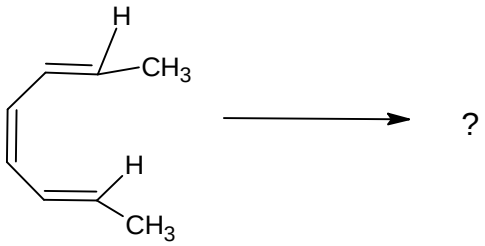
**3B.** Describe feasible conditions of [2+2]-cycloaddition reactions using Woodward Hoffmann correlation diagram. **4**

**3C.** Give reason for the following. **2**
i)Ferrocene exist as staggered form in the gas phase.

ii)Metal alkene complexes undergo nucleophilic addition easily.

**4A.** Explain the nomenclature system used for sigmatropic reactions. Write the mechanism of [3,3]-sigmatropic reaction using FMO theory. **4**

**4B.** Apply FMO theory to the following reaction, identify reaction condition and stereochemistry of the following reaction. **4**




**4C.** Sketch and explain suprafacial and antarafacial shift of methyl group using an illustrative example. **2**

**5A.** i) Explain the mechanism of Tischenko reaction. Write its industrial importance. **4**
ii) How is dioxirane reagent prepared? Write two of its synthetic applications

**5B.** Describe the synthetic scope, mechanism and applications of cross coupling reaction in the presence of metal catalyst and suitable ligands. **4**

**5C.** Write the mechanism and pharmaceutical importance of Henry reaction. **2**

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Scheme of evaluation End Semister Exam 25-6-2022

Organic chemistry 11

1A. Proper reactions (1+1+1+1) M

1B. Proper reagent (1+1+1+1) M

1C. i) Main group organometallic compounds undergo hydrolysis and oxidation. 1M

ii) There is no d orbitals and the gap between second shell and third shell is large. 1M

2A. Proper example with reaction. (1+1+1+1)M.

2B. i)Name (0.5)M

Reaction (1.5)M

ii) Proper explanation (2)M

2C. Any two proper differences (1+1)M

3A. Proper explanations (2+2)M

3B. Correlation diagram for [2+2]-cycloaddition reaction:

Main reaction, molecular orbitals of reactant and product with appropriate symmetry, Proper flow of electrons from reactant orbitals to product orbitals: (1+1+1) M

Conclusion from orbital correlation diagram: 1 M

3C. proper reason for each (1+1)M

4A. Nomenclature of sigmatropic reaction: 1 M; Example of [3,3]-sigmatropic reaction, MO's with HOMO/LUMO labelling, Application of FMO theory: (1+1+1) M

4B. Identification of product and reaction conditions: 1 M

FMO theory for the molecule: 2 M

Stereochemistry aspects: 1 M

4C. Suprafacial and antarafacial shift: (1+1) M

5A. i) & ii): 2 M each for reaction, mechanism and applications,

5B. Synthetic scope: 1 M; Mechanism: 2 M; Applications: 1 M.

5C. Mechanism: 1 M; Importance: 1 M