

[111]

No. of Printed pages: 02

Sardar Patel University Examination 2019
M.Sc. Semester-III (Inorganic Chemistry)
Organometallic compounds (PS03CINC23)
22nd November 2019 (Friday)
Time: 2.00 pm to 5.00 pm

Note: Numbers at the right show full marks.

Total Marks: 70

Q.1. Answer the followings:

[8]

- The organometallic compounds are those, which contain _____ elements than carbon.
 - more electronegative
 - less electronegative
 - more electropositive
 - less electropositive
- The $\text{Li-C}_5\text{H}_5$ is _____ than $\text{Li-C}_5\text{H}_9$ ($-\text{C}_5\text{H}_5$: cyclopentadienyl; $-\text{C}_5\text{H}_9$: cyclopentyl).
 - more reactive
 - less reactive
 - more nucleophilic
 - more electrophilic
- The metal-carbon bond in alkyl derivatives of heavier alkali metals (M-R ; $\text{M}=\text{Na}$ to Cs) are _____ than that in alkyl derivatives of lithium (Li-R).
 - more covalent
 - more ionic
 - more electron deficient
 - less electron deficient
- The oxythallation reactions involve conversion of _____.
 - Th(I) into Th(II)
 - Th(II) into Th(I)
 - Th(I) into Th(III)
 - Th(III) into Th(I)
- The $\text{RhH(CO)(PPh}_3)_3$ is used as catalyst in _____.
 - Hydrogenation process
 - Monsanto process,
 - Wacker process
 - Hydroformylation process
- The Water Gas Shift Reaction is carried out using _____ as catalyst.
 - $\text{Co}_2(\text{CO})_8$
 - Fe_3O_4
 - PdCl_2
 - CuO
- Salvarsan and Neosalvarsan are derivatives of _____.
 - Sb
 - Hg
 - As
 - Si
- The Alsol, an organosilicon compound is used _____.
 - as pesticide
 - as fungicide for seed preservation
 - as herbicide
 - for ripening of fruits

Q.2. Answer any SEVEN of the followings:

[14]

- Write the decreasing order of dimer formation tendency for following organoaluminium compounds giving reason: Al(Me)_3 , Al(Et)_3 , $\text{Al}(i\text{-Pr)}_3$ and $\text{Al}(t\text{-Bu)}_3$ [Me: methyl; Et: ethyl; *i*-Pr: *iso*-propyl; *t*-Bu: *tert.*-butyl].
- Write the metal hydride addition reactions to alkenes for the synthesis of main group organometallic compounds.
- Write the methods for the synthesis of η^4 -complexes of transition metals.
- Write a reaction which involves the formation of organozinc compound as intermediate.
- Write the uses of organocadmium compounds in organic synthesis.
- What are Ziegler-Natta catalysts?
- Explain the alkene metathesis process.
- Give the name of important organosilicon compounds which are used as medicines.
- Write the name of organotin compounds useful as pesticides.

(1)

(P.T.O)

Q.3 [A] Answer the following:

- (i) Define electron deficient organometallic compounds and explain their structure. [3]
(ii) Explain hapticity with examples. [3]

[B] Answer the following:

- (i) Discuss the oxidative-addition reactions for the synthesis of main group organometallic compounds. [3]
(ii) Write the typical chemical reactions of ferrocene. [3]

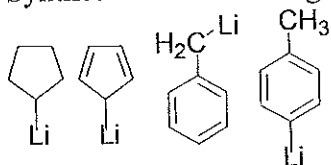
Or

[B] Answer the following:

- (i) Write the important chemical reactions of η^4 -cyclobutadiene complexes of transition metals. [3]
(ii) Discuss the carbanion-halide exchange reactions for the synthesis of main group organometallic compounds. [3]

Q.4 [A] Answer the following:

- (i) Discuss the reactions of a Grignard reagent with (i) acids, (ii) water, (iii) alcohols, (iv) carbon dioxide, (v) carbonyls and (vi) metal halides. [3]
(ii) Synthesize the following organolithium compounds: [3]



[B] Answer the following:

- (i) Discuss the oxymercuration-demercuration reaction. [3]
(ii) Describe the uses of organolithium compounds in organic synthesis. [3]

Or

[B] Answer the following:

- (i) Discuss the hydroboration reaction. [3]
(ii) Write a short note on application of organotin compounds in organic synthesis. [3]

Q.5 [A] Discuss the 'Oxo' process and the mechanism of involved reactions. [6]

[B] Discuss the mechanistic pathway of Monsanto acetic acid process. [6]

Or

[B] What is Wacker process? Discuss the mechanism of the process reactions. [6]

Q.6 [A] Answer the following:

- (i) Write a short note on the uses of organometallic compounds in agriculture. [3]
(ii) Write a short note on applications of organometallic compounds in industries. [3]

[B] Discuss the main group (Group I to V) organometallic compounds which are used as medicines. [6]

Or

[B] Discuss about environmental methylation process. [6]
