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SEAT No. \_\_\_\_\_  
Sardar Patel University  
External Examination 2019

No. of Printed pages: 03

M.Sc. (Inorganic Chemistry) Semester-III  
Subject: Organometallic compounds (PS03CINC23)  
Date: 25<sup>th</sup> March 2019 (Monday)  
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]

- Transmetallation involves reaction between a \_\_\_\_\_ metal (M) and the alkyl derivative of a heavier metal (M'R).
  - less electropositive,
  - more electropositive,
  - less electronegative,
  - more electronegative
- Among followings, the \_\_\_\_\_ is not an organometallic compound?
  - Zn(CH<sub>3</sub>)<sub>2</sub>
  - CH<sub>3</sub>-Mg-Br
  - Ti(O.C<sub>3</sub>H<sub>7</sub>)<sub>4</sub>
  - Ti(Ph)(O.C<sub>3</sub>H<sub>7</sub>)<sub>3</sub>
- The reagent, which is used in oxymercuration-demercuration reaction, is \_\_\_\_\_.
  - HgCl<sub>2</sub>/THF/H<sub>2</sub>O,
  - Hg(OAc)<sub>2</sub>/THF/H<sub>2</sub>O,
  - Hg/THF/H<sub>2</sub>O,
  - Hg<sub>2</sub>Cl<sub>2</sub>/THF/H<sub>2</sub>O
- The reaction of methyl magnesium bromide with ethanol gives \_\_\_\_\_.
  - Methane,
  - Ethane,
  - Acetaldehyde,
  - Acetone
- The Oxo process involves the conversion of alkenes into \_\_\_\_\_.
  - Aldehydes,
  - Acids,
  - Alcohols,
  - Alkanes
- The Wilkinson catalyst is employed in \_\_\_\_\_.
  - Carbonylation of alkyl halides,
  - Alkenes metathesis
  - Hydrocyanation,
  - Hydrogenation of alkenes
- The \_\_\_\_\_ compounds are widely used as antiseptics.
  - Organomercury,
  - Organotin
  - Organosodium,
  - Organoboron

8. Then vitamin B<sub>12</sub> is complex derivative of \_\_\_\_\_.

- (a) Zinc, (b) Manganese,  
(c) Cobalt, (d) Iron

**Q.2. Answer any SEVEN of the followings:**

[14]

1. What are  $\sigma$ - and  $\pi$ -bonded organometallic compounds?
2. Write the different reactions, which are used for the preparation of main group organometallic compounds.
3. Write the reaction involved in oxymercuration-demercuration of an alkene and the product formed in this reaction.
4. What happens when ethyl bromide is reacted with magnesium metal in ether or THF?
5. Write a reaction in which an organozinc compound is formed as an intermediate.
6. Define the  $\alpha$ -elimination reactions of organometallic compounds giving examples.
7. Write the product(s) formed, when an alkene is oxidized with O<sub>2</sub> in the presence of PdCl<sub>2</sub>/ CuCl<sub>2</sub> and also write the name of this reaction/ process.
8. Write the name of organosilicon compounds, which are used as medicine.
9. Write the name of organometallic compounds used in agriculture and horticulture.

**Q.3 (A) Answer the followings:**

[6]

- (1) Write a short note on electron deficient bridged organometallic compounds.
- (2) Discuss the synthesis of various  $\eta^4$ -Diene complexes of iron.

**(B) Answer the followings:**

[6]

- (1) Write the typical chemical reactions of organoaluminium compounds.
- (2) Discuss the transmetallation reactions for the preparation of main group organometallic compounds.

Or

**(B) Answer the followings:**

- (1) Discuss the typical chemical reactions of organoboron compounds.
- (2) Write the metal-hydrogen exchange (metallation) reactions for the synthesis of main group organometallic compounds.

**Q.4 (A)** Discuss the organolithium catalyzed polymerizations of butadiene in polar and non-polar solvents. [6]

**(B) Answer the followings:** [6]

(1) Write the synthetic uses of Grignard reagents.

(2) Discuss the uses of organoboron compounds as reagents in organic synthesis.

**Or**

**(B) Answer the followings:**

(1) Discuss the uses of organosilicon compounds in organic synthesis.

(2) Write the important synthesis reactions involving use of organolithium compounds.

**Q.5 (A)** Describe the Wacker process and the mechanism of the involved reactions. [6]

**(B)** What is the Oxo Process? Discuss the mechanism of the reaction involved in Oxo Process. [6]

**Or**

**(B)** Discuss the mechanism of alkene dimerization using  $\text{Rh}^{(\text{III})}\text{Cl}_3$  catalyst.

**Q.6 (A)** Discuss briefly the importance of the transition metal organometallic compounds in industries. [6]

**(B)** Discuss the uses of group IV and group V organometallics as medicines. [6]

**Or**

**(B)** Describe the environmental methylation process in detail.

→ X ←

(3)

