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**St Aloysius College (Autonomous)**  
**Mangaluru**  
**Semester III – P.G. Examination – M.Sc. Analytical Chemistry**  
**February - 2022**

**ORGANOMETALLIC, BIOINORGANIC AND COORDINATION  
 CHEMISTRY**

Time: 3 Hours

Max. Marks: 70

**PART - A**

1. Answer any **FIVE** sub divisions of the following: (5x2=10)
- Give two examples each for di and tetra haptic ligands.
  - Citing an example, explain 18-electron rule.
  - Distinguish between homogeneous and heterogeneous catalysis with suitable examples.
  - Illustrate the industrial importance of oxo process.
  - Explain the roles of Zinc and Manganese in biological system.
  - Give the biological functions of myoglobin.
  - Distinguish between complementary and non-complementary reactions.
  - Illustrate the terms: inert and labile complexes with examples.

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**PART - B**

Answer any **FIVE** of the following choosing at least one full question from each unit: (5x12=60)

**UNIT - I**

- Discuss the methods of synthesis, structure and bonding in Lithium alkyls. (4)
  - Explain the bonding in metal complexes of butadiene. (4)
  - Explain the synthesis and bonding in ferrocene. (4)
- Discuss the structure and bonding in metal cyclopentadiene complexes. (4)
  - Explain the bonding in metal alkene complexes. (4)
  - Write a brief account of structure and bonding in transition metal complexes with  $\pi$  – ligands with special reference to arenes and COD. (4)

**UNIT - II**

- Write a note on Fischer-Tropsch reaction. (4)
  - What is water-gas shift reaction? Explain the catalytic cycle for water gas shift reaction. (4)
  - Discuss the mechanism of hydrogenation of olefins. (4)

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## St Aloysius College (Autonomous)

Mangaluru

Semester III - P.G. Examination - M.Sc. Analytical Chemistry

February - 2022

### ELECTROANALYTICAL, RADIOCHEMICAL AND THERMOANALYTICAL TECHNIQUES

Time: 3 Hours

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Max. Marks: 70

#### PART - A

1. Answer any **FIVE** sub-divisions of the following: (5x2=10)
- Define liquid junction potential. Give the role of a reference electrode in electrode Potential measurement.
  - Classify membrane electrodes and mention their basic properties.
  - Define overvoltage. What are the factors affecting it?
  - Write the principle of stripping analysis.
  - Differentiate between natural and artificial radioactivity with suitable examples.
  - Define decomposition potential and give its significance.
  - What is the effect of temperature on solids, liquids and gases?
  - Give the principle of dilatometric analysis.

#### PART - B

Answer any **FIVE** of the following choosing at least one full question from each unit: (5x12=60)

#### UNIT- I

2. a) Explain the following:
- Theory of ion selective electrodes.
  - Difference between potentiometric titrations and direct potentiometry. (4)
- b) Discuss first and second kind of metallic indicator electrodes. (4)
- c) Discuss the composition and working of glass electrode. (4)
3. a) Write short notes on
- acid and alkali errors in glass electrode measurements
  - enzyme electrodes (6)
- b) Discuss
- The concept of Faradaic and non-faradaic currents
  - The conductometric titration of a mixture of strong and weak acids with a strong base (6)

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  - Illustrate the industrial importance of oxo process.
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  - Give the biological functions of myoglobin.
  - Distinguish between complementary and non-complementary reactions.
  - Illustrate the terms: inert and labile complexes with examples.

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## PART - B

Answer any **FIVE** of the following choosing at least one full question from each unit: (5x12=60)

## UNIT - I

- Discuss the methods of synthesis, structure and bonding in Lithium alkyls. (4)
  - Explain the bonding in metal complexes of butadiene. (4)
  - Explain the synthesis and bonding in ferrocene. (4)
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  - Explain the bonding in metal alkene complexes. (4)
  - Write a brief account of structure and bonding in transition metal complexes with  $\pi$  – ligands with special reference to arenes and COD. (4)

## UNIT - II

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  - What is water-gas shift reaction? Explain the catalytic cycle for water gas shift reaction. (4)
  - Discuss the mechanism of hydrogenation of olefins. (4)

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