

C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),
MELVISHARAM - 632 509.
SEMESTER EXAMINATIONS, NOVEMBER - 2018

M.Sc., CHEMISTRY

SEMESTER III
P15MCH302 – ORGANOMETALLICS AND COORDINATION CHEMISTRY

Time: Three Hours

Maximum: 75 Marks

SECTION - A (5 X 6 = 30 Marks)

Answer **ALL** Questions.

1. a) i. Why is $\text{Na}^+(\text{CH}_2\text{C}_6\text{H}_5)^-$ is less reactive than $\text{Na}^+(\text{C}_6\text{H}_5)^-$?

ii. Why is $\text{Na}^+(\text{C}_5\text{H}_5)^-$ is more stable than $\text{Na}^+(\text{C}_5\text{H}_{11})^-$?

(Or)

b) Explain “stereochemical control of valence” with suitable examples.

2. a) Discuss oxo process.

(Or)

b) Explain heterogeneous catalysis with suitable examples.

3. a) The transfer of electron from $[\text{Co}(\text{NH}_3)_6]^{2+}$ to $[\text{Co}(\text{NH}_3)_6]^{3+}$ is more difficult justify.

(Or)

b) The transfer of electron from $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ to $[\text{Cr}(\text{NH}_3)_5\text{NCS}]^{2+}$ in aqueous medium is slower than the transfer of electron from $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ to $[\text{Co}(\text{NH}_3)_5\text{N}_3]^{2+}$.

4. a) Discuss the theory of trans effect. Which theory explains better the trans effect of CO compared to that of pyridine?

(Or)

b) Discuss the substitution of square planar complex.

5. a) Describe the mechanism of acid hydrolysis when the inert ligand is an π acceptor.

(Or)

b) Discuss the mechanism of aquation of cis and trans $[\text{Co}(\text{en})_2\text{Cl}(\text{OH})^+]$ complexes.

SECTION - B (3 X 15 = 45 Marks)

Answer **ANY THREE** Questions.

6. What is fluxional molecule? Discuss the structure of one such molecule.

7. Explain the following.

- i. Wilkinson catalyst
- ii. Reppe's catalyst
- iii. Wacker process
- iv. Polymer bound catalyst

8. Write short notes on.

- i. Outer sphere mechanism
- ii. Marcus theory of electron transfer reaction

9. i. The mechanism of substitution reaction of square planar appears to be associative $\text{S}_{\text{N}}2$ rather than dissociative $\text{S}_{\text{N}}1$ justify your answer.

ii. Explain the factors influencing the lability of non transition metal complexes. Justify your answer.

10. a) Discuss $\text{S}_{\text{N}}1$, $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}\text{CIB}$ mechanisms with suitable examples.

b) How does valence bond theory interpret lability and interaction of transition metal complexes.
