

Prabhat Kumar College Contai

M. Sc. 3<sup>rd</sup> Semester

Examination, 2021

Subject: Chemistry

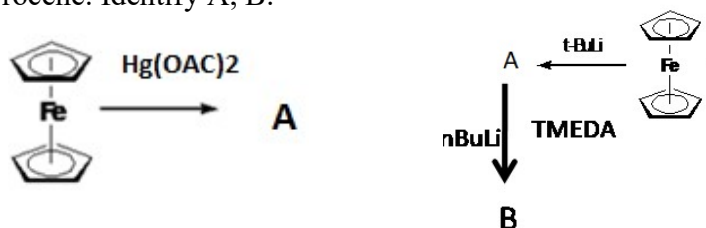
Paper:CEM 302

F.M: 40

Time: 2 h

Answer any four questions. (4x10= 40)

1. What is a metal-sandwich compound? Describe some utilities of the metal-sandwich compounds? Write two synthetic methods of-ferrocene. Identify A, B.



2+2+6

2. (a) Write one example with mechanistic study of 1, 1 insertion 1, 2 insertion reactions.

(b) Complete the following reaction



(3+3)+(2+2)

3. Write down the catalytic processes of hydroformylation and carbonylation of -olefins. 5+5

4. Write a short note on TON and TOF. Write the catalytic cycle of Monsanto's acetic acid synthesis. 3+2+5

5. Write down the uses of Ziegler-Natta catalyst. Draw the Orgel diagram of  $[\text{Ni(CN)}_4]^{2-}$  and  $[\text{Fe(H}_2\text{O)}_6]^{3+}$

4+3+3

6. Write down the wacker oxidation process. Write one example of substitution and oxidative elimination reactions. 5+3+3

7. a) Derive the correlation diagram for  $d^2$  configuration in strong and weak octahedral field following group theoretical treatment.

b) State the selection rules for IR and Raman active molecules.

8+2

8. a) What is vibronic coupling?

b) Show that d-d transition is electronically forbidden but vibronically allowed for  $[\text{Co}(\text{NH}_3)_6]^{3+}$  complex ion.

c) Why less symmetric complexes generally do not encounter with polarization ?

2+6+2

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