M.Sc. 1st Semester Examination
2021

Full Mark: **50**

Time: *As in Programme*

SUB: ORGANIC CHEMISTRY (CH-402)

The figures in the right-hand margin indicates marks

Answer all questions

Group A **2X10**

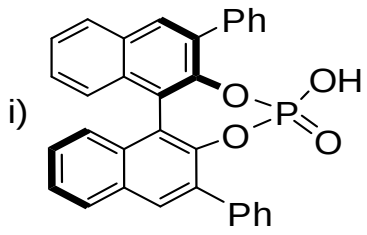
1.(a) Differentiate between properties of α, β, and γ cyclodextrin?

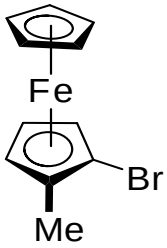
(b) Why chlorination of CH_4 is about 10 times faster than chlorination of CD_4?

(c) State two methods with example for generation of carbene?

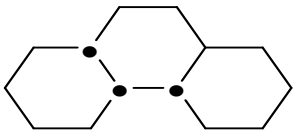
(d) State Hammett's equation only?

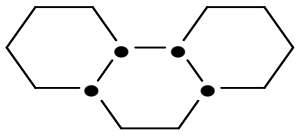
(e) Assign the configuration for the following compounds

i) 

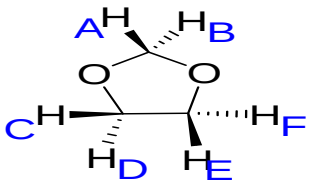
ii) 

(f) Write down the correct name of the conformation of the following compounds based on fusion of the rings

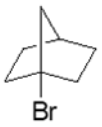
i) 

ii) 

(g) Based on stereochemical existence point out the types of ligands in the following compound



(h) Explain why the following bicyclic compound is unreactive towards nucleophilic substitution either by SN^1 or SN^2 mechanism.



(i) Consider the SN^1 reaction of tert-butyl chloride with iodide ion: What will be the rate of formation of the product If the concentration of iodide is doubled?

(j) Why bromocyclopropane bromide does not undergo a SN^1 reaction whereas 2-bromopropane undergo a SN^1 reaction?

Group B

2.(a) Explain Curtin-Hammett principle? What is meant by transition state of an organic reaction? How does it differ from reaction intermediate? **[4+3]**

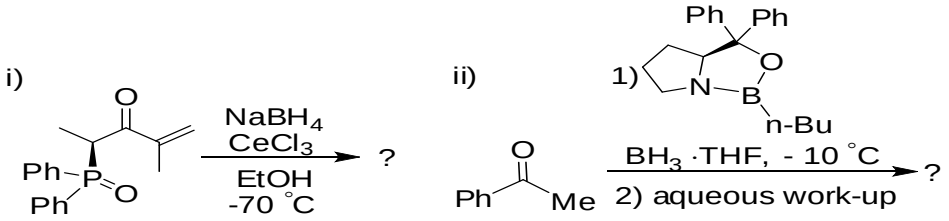
(b) Draw the structure and state applications of Catenane and Rotaxane? **[3]**

OR

3.(a) Write a short note on Hard and soft acids and bases? What is Cram's rule? Explain with example? **[4+3]**

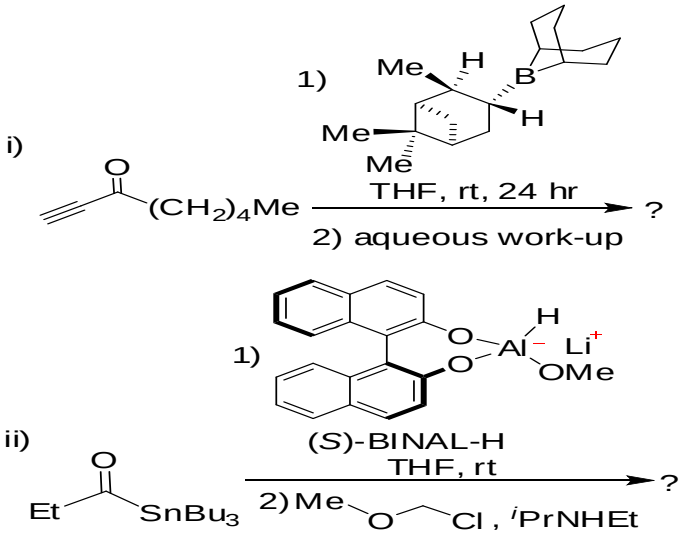
(b) Explain the structure and stability of nonclassical carbocations? **[3]**

4. Predict the major product of the following organic transformation and depict the reaction mechanism **[5+5]**

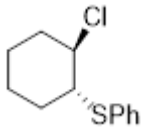


OR

5. **[5+5]**



6.(a) The rate of hydrolysis of following compound is lowered by substitution of P-NO_2 group in the benzene ring. Explain? **[2.5]**



(b) Explain why Vinyl chloride does not undergo substitution reaction? **[2.5]**

(c) Describe the effect of solvent polarity and the structure of the substrate on the course of the aliphatic nucleophilic substitution reactions? **[5]**

OR

7.(a) Explain why Alkyl fluoride unreactive towards SN^1 and SN^2 reaction **[2.5]**

(b) C_2H_5-S-CH_2-CH_2Cl undergoes solvolysis 10^4 times faster than $C_2H_5OCH_2CH_2Cl$. Explain? **[2.5]**

(c) Write a short note on Mixed SN^1 and SN^2 reaction? **[5]**