UG 4th Semester Examination - 2025 (Under NCCF)
Award: - B.Sc
Discipline : Chemistry
Course Type : MJC-5
Course Code : BSCCEMMJ401
Course Name : Organic Chemistry-I

Full Marks : 35 (Regular) **Time - 2 hours**

1. Answer any five questions: **1×5=5**

a) State Hammond's postulate.

b) Draw the chair conformation of cis-4-chlorocyclohexanol.

c) What happen when 1-methylcyclopent-1-ene is seperately treated with B_2H_6/H_2O_2 -NaOH and cone H_2SO_4 ?

d) What is free energy of activation ?

e) State Markownikoff's Rule.

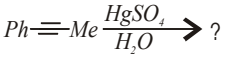
f) Which solvent is suitable for E2 elimination reaction DMSO or carbon tetrachloride (CCl_4) ?

g) What is nucleophilic catalysis ? Give example.

h) EtSCH_2CH_2Cl is hydrolysed in aqueous solvent (dioxan) at 10^3 times faster rate than EtOCH_2CH_2Cl – Explain.

2. Answer any five questions: **2×5=10**

a) Write down the product for the following reaction -



b) Explain the results when 1-chloro-3-methyl-2-butene and 3-chloro-3methyl-1-butene are allowed to hydrolyse.

c) Draw the ecipsed and staggered conformation for propane and mention the stable conformation.

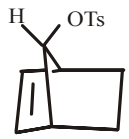
d) Which combination is suitable for the synthesis of ethyl-t--butyl ether-

i) potassium-t-butoxide and ethyl bromide or

ii) sodium ethoxide and t-butyl chloride- Justify your choice.

e) Predict the products of ozonolysis reaction of pent-2-ene.

f) Which one of the following will undergo solvolysis in faster rate ? Justify your choice.



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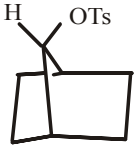
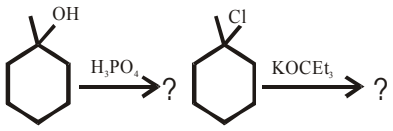


g) Compare the nucleophilicity between acetate ion and methoxide ion in polar protic solvent.

h) Explain why 1-chlorobicyclo [2.2.1] heptane reluctant to participate SN1 reaction whereas 1-chlorobicyclo [2.2.2] heptanes does ?

3. Answer any two questions for the students appearing for their regular courses: 5×2=10

a) i) Predict the major alkene form in the following reaction. Justify your choice.



ii) Draw the stable conformation of trans-1, 3-di-t-butylcyclohexane. What do you mean by conformationally biased system ? 3+1+1

b) i) Write the major and minor products obtained on action of concentrated H_2SO_4 on 2-butanol. What product do you expect if you treat the minor product with B_2H_6 followed by H_2O_2 / $NaOH$?

ii) Write the product when 1, 1, 2- trimethylepoxyethane is treated with ethanol in presence of sulphuric acid. 3+2

c) i) 3- Chlorocycloprop-1-ene when treated with silver nitrate undergoes solvolysis whereas 5-chlorocyclopent-1, 3-diene does not. Give an explanation for this observation.

ii) Suggest a method to determine mechanism for the intramolecular reaction.

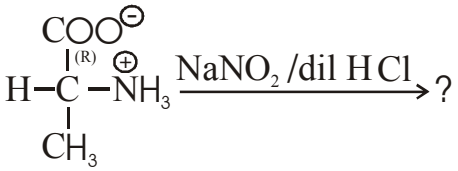
iii) Naphthalene when treated with concentrated sulphuric acid gives two isomeric products namely naphthalene -α-sulphonic acid and β-sulphonic acid in different proportion at low temperature but equilibrium shift to naphthalene -β- sulphonic acid at high temperature- what are the reasons behind it. 2+1+2

d) Hydrolysis of 3-chloro-2, 2-dimethylbutane results 3, 3-dimethyl-2-butanol and 2, 3-dimethyl-2-butanol. Explain the formation of the products. What are the characteristic features of EI and EICB mechanisms? 5

4. Answer any one question: 10×1=10

a) i) What is Lindlar's Catalyst ? Write the product with stereochemical configuration when Lyndlar catalyst and Na / Liq NH_3 are applied separately on 3-hexyne followed by OsO_4 oxidation and subsequent hydrolysis ? 1+4

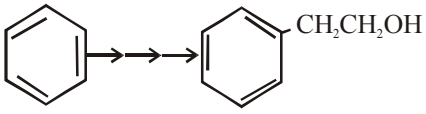
ii) Write the product of the reaction with mechanism.



2½

iii) 2-Bromo-1-pnenyl propane on reaction with t- BuOK in t-BuOH results trans-1- phenyl propene as major product -explain. 2½

b) i) Write a line multi step reaction for this conversion



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ii) Draw the potential energy diagram with changing torsion angle for ethane molecule. Give the name of different conformation. 2

iii) Methyl chloride in presence of *KCN* in alcohol produces methyl cyanide but same substrate in presence of *AgCN* under similar condition produces methyl isocyanide –Explain. 2½

iv) Identify the products when Isopropyl bromide is treated separately with sodium ethoxide and sodium thio ethoxide in alcoholic medium (EtOH) 2½

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