Q.P. Code : 40357

[2½ Hours] **[Marks: 75]**

Please check whether you have got the right question paper.

N.B:
1. **All** questions are **compulsory**.
2. **Figures** to the **right** indicates **full** marks.
3. Use of log tables/non-programmable calculators is **allowed**.

I. Answer any **three** of the following:

(A) What is Michael addition? Explain its mechanism and give one application. **05**

(B) Show that the reaction of conc. H_2SO_4 to naphthalene is a kinetically & thermodynamically controlled reaction. Write its mechanism. **05**

(C) State and explain the Saytzeff rule with one example. Write the E_1 and E_2 mechanism. **05**

(D) Write the reaction and mechanism for the following : **05**
- i) An aliphatic aldehyde reacts with two moles of dil. HCl.
- ii) A carboxylic acid reacts with one mole of an alcohol in the presence of conc. H_2SO_4.

(E) What is pinacol-pinacalone rearrangement? Write the mechanism and give one application. **05**

(F) A ketoxime is treated with conc. H_2SO_4. Identify the reaction, write the reaction & the mechanism involved. **05**

2. Answer any **three** of the following :-

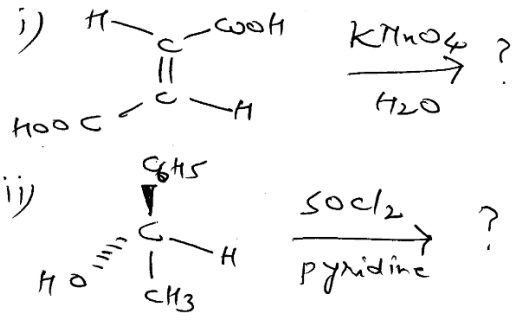
(A) Explain the following terms : **05**
- i) n-fold alternating axis of symmetry
- ii) Pitzer strain in cycloalkanes
- iii) Diastereotopic ligands.

(B) Discuss the conformation of 1,3-Dimethyl cyclohexane and explain the geometrical isomerism involved. **05**

(C) What is molecular chirality? Explain atropisomerism in substituted biphenyls with suitable examples. **05**

(D) What are stereoselective reactions? Explain enantioselectivity and diastereoselectivity with examples. **05**

(E) Discuss the stereochemical outcome of the following reactions: **05**



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(F) Justify the following statements : **05**

i) S_N1 reaction at an asymmetric carbon generally takes place with racemization.

ii) The boat form of cyclohexane has greater energy than the chair form.

3. Answer any **three** of the following :

(A) a) Draw the Haworth's formula of the following sugars **03**

i) β-D-ribofuranose

ii) α-D-glucopyranose

b) Explain the action of the following reagents on D-fructose **02**

i) H_2 / Ni

ii) Bromine water

(B) Discuss the following reactions giving step-wise equations. **05**

i) Complete methylation of α – D – fructopyranose

ii) Osazone formation in D – glucose

(C) a) What is Wohl's degradation in sugars? Explain with a suitable example. **03**

b) Give the commercial importance of carbohydrates in food industry. **02**

(D) Explain the following terms with suitable examples. **05**

i) Anomers and epimers

ii) Mutarotation.

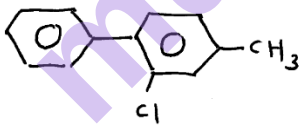
(E) a) Explain the action of HIO_4 on D-glucose and D-fructose. **03**

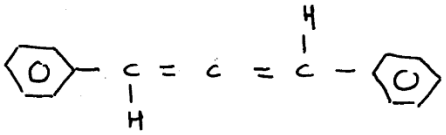
b) Give the conversion of D-fructose to D-glucose. **02**

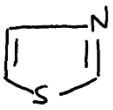
(F) Give the IUPAC names of the following: **05**

i) 

ii) 

iii) 

iv) 

v) 

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4. Answer any **three** of the following :

(A) a) Explain Hofmann's exhaustive methylation and elimination reaction with pyrrolidine. **03**

b) Give Paal-knorr synthesis for the preparation of thiophene **02**

(B) a) Explain Chichibabin reaction of pyridine. **03**

b) Give resonance structure of pyrrole. **02**

(C) a) How will you convert? **03**

i) Thiopene to thiophene 2- aldehyde

ii) Furan to 2-acetyl furan

iii) Pyrrole to Tetrabromopyrrole.

b) Explain aromatic character of thiophene **02**

(D) Explain linear & convergent synthesis. **05**

(E) Give synthesis of the following : **05**

i) Paracetamol

ii) Bifenox – I

(F) Explain the use of microwave in organic synthesis with any two examples. **05**

5. (A) Choose the correct option and rewrite the statement : **04**

a) The carbocation is an example of a _____ species.
(electron loving, proton loving electron donating, none of above)

b) An aromatic aldehyde reacts with a primary amine to form a _____.
(enamine, imine, amide, tertiary amine)

c) Claisen's condensation proceeds through the formation of _____ as a reactive intermediate.
(carbonium ion, carbene, free radical, carbanion)

d) A nitrene has a _____ nitrogen atom.
(divalent, monovalent, trivalent, tetravalent)

OR

(A) State whether the following statements are true or false :- **04**

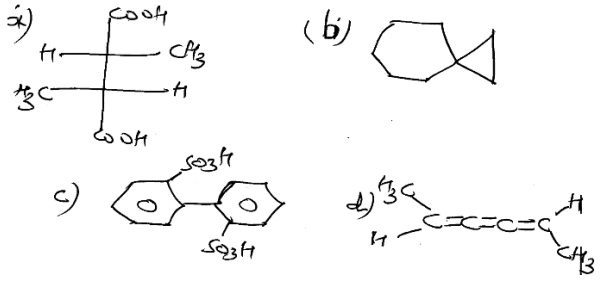
p) Nucleophiles are electron rich species.

q) A acid-base reaction is a thermodynamically controlled reaction.

r) The conversion of an amide to a primary amine in the presence of halogens and a strong base is called Hofmann's rearrangement reaction.

s) Base catalysed hydrolysis of ethers is called saponification.

(B) State whether the following molecules are chiral or achiral: **04**



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OR

(B) State whether the following are true or false: **04**

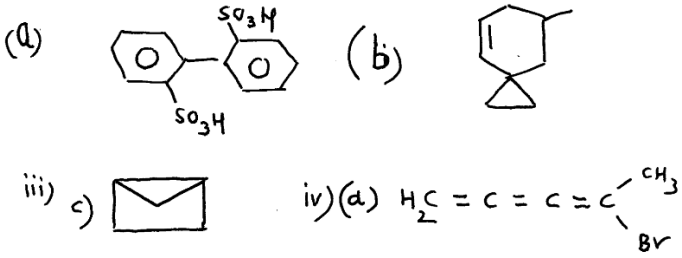
p) All stereospecific reactions are also stereoselective.

q) An chiral molecule contains at least one element of symmetry.

r) Cyclopropane is less stable than cyclobutane.

s) Cummulenes containing even number of double bonds exhibit geometrical isomerism.

(C) Write the IUPAC Names of the following : **04**



OR

(C) Draw the structures of the following: **04**

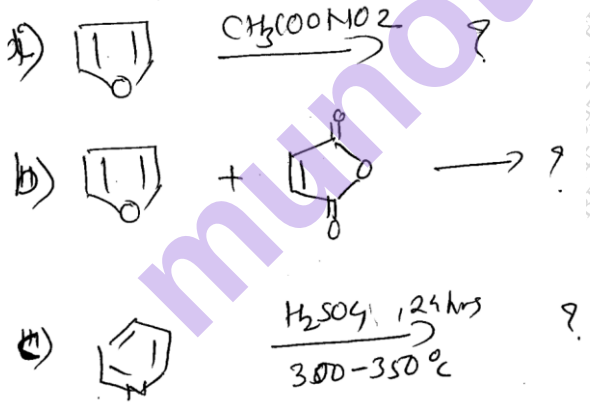
p) 4 – nitropyridine

q) γ – 4 [H] pyran

r) 3 - nitro-2' methyl diphenyl

s) Bicyclo [2.2.1] heptane

(D) Complete the following reactions. **03**



OR

(D) Match the columns : **03**

Compounds	Uses	
p) Thyroxine	i)	Vat dye
q) Vanillin	ii)	Speeds up metabolism
r) Bifenox-I	iii)	Perfumery chemical
	iv)	Herbicide
	v)	vitamin

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