

(3 Hours)

[Total Marks : 100]

- N.B. :** (1) All questions are compulsory.  
 (2) Figures to the right indicate full marks.  
 (3) Use of log-tables / Non-programmable calculator is allowed.

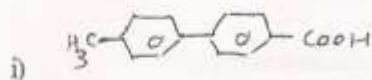
I. a) Give the mechanism and application of Benzilic acid rearrangement. 5

**OR**

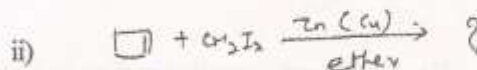
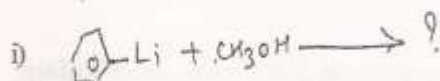
- a) I) Explain mechanism of  $E_2$  reaction with suitable example. 3  
 II) Discuss synthetic application of Michael addition. 2

Attempt any three of the following.

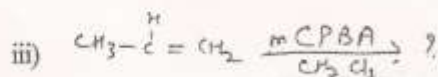
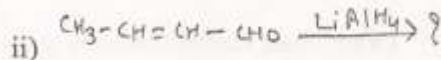
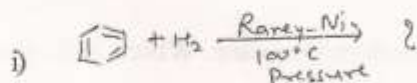
b) I) Write IUPAC name of the following. 3



II) Complete the following reactions. 2

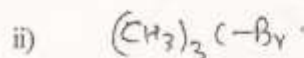
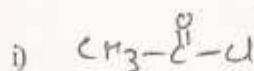


c) I) Complete the following reactions. 3

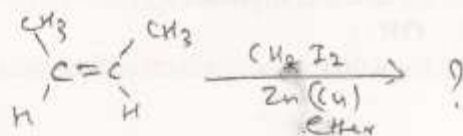


II) Explain the use of Lindlar catalyst with suitable example. 2

d) I) Give one method of preparation of diethylzinc. What is the action of the following on it? 3

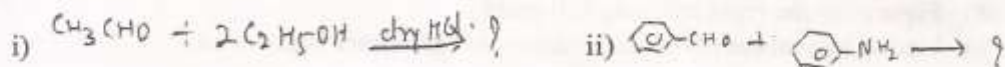


II) Complete the following reaction & name it. 2

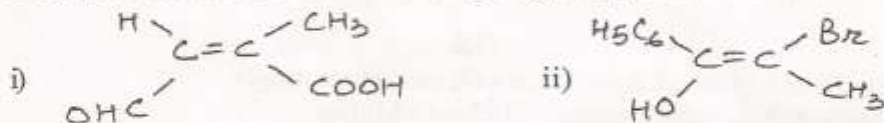


[TURN OVER]

- e) I) Explain the effect of temperature on addition of HBr to 1,3-butadiene. 3  
 II) Complete the following reactions. 2



2. a) I) Assign E/Z notations to the following and justify your answer. 3



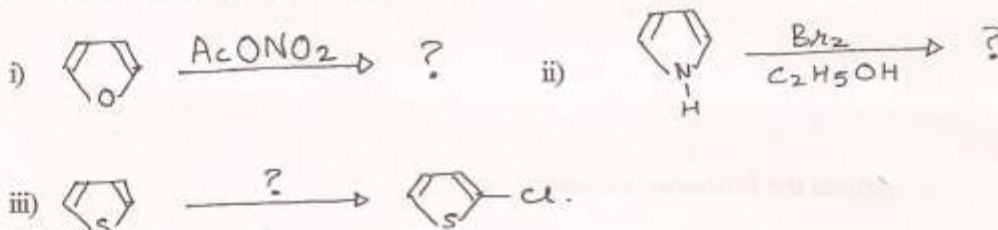
- II) Explain angle strain in cycloalkanes with a suitable example. 2

OR

- a) I) Discuss stereochemistry of biphenyls with suitable example. 3  
 II) Define 'Alternating axis of symmetry' with suitable example. 2

Attempt any three of the following.

- b) I) Complete the following reactions. 3



- II) Electrophilic substitution in Furan takes place at 2 or 5 position. Explain. 2

- c) Give the synthesis of. 5

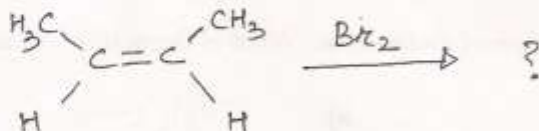
- i) Vanillin      ii) Bifenox-I

- d) I) Draw chair conformations of cis-1,3-dimethylcyclohexane. Which of these is more stable and why? 3

- II) 'Pyrrole is a weak base' - Explain. 2

- e) I) Give Paal Knorr Synthesis of Pyrrole and Thiophene. 3

- II) Complete the following reaction and explain its stereochemistry. 2



3. a) A compound has M.F.  $\text{C}_4\text{H}_8\text{O}$ . Its I.R. spectra shows absorption at  $1720\text{ cm}^{-1}$ . NMR spectra gives singlets at  $\delta 2.4\text{ ppm}$  (s),  $\delta 2\text{ ppm}$  (q),  $\delta 1.0\text{ ppm}$  (t). Determine its index of hydrogen deficiency. Assign structure to the compound and justify your answer. 5

OR

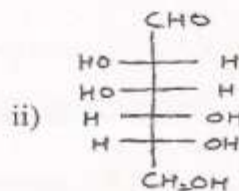
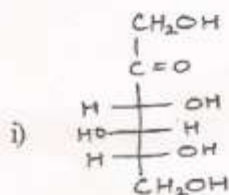
- a) I) What is addition polymerization? Explain the mechanism of free radical polymerization of vinyl chloride. 3

- II) Explain syndiotactic polymers. 2

Attempt **any three** of the following.

- b) I) Explain Norrish Type II cleavage of ketones. 3  
 II) Distinguish between thermal reactions and photochemical reactions. 2
- c) I) Predict the number of PMR signals and splitting pattern of the following compounds. 3  
 i)  $\text{CH}_3\text{OCH}_2\text{CH}_3$  ii)  $\text{CH}_3-\underset{\text{Br}}{\text{CH}}-\text{CH}_3$
- II) Explain in brief fingerprint region in I.R. spectra. 2
- d) I) Discuss thermosetting and thermoplastic polymers with suitable examples. 3  
 II) Give the preparation and applications of phenol-formaldehyde resins. 2
- e) I) What is meant by base peak and molecular ion peak? Mention their importance. 3  
 II) 'A typical U.V. spectrum does not show sharp peaks as in I.R. spectrum but it shows only a broad hump.' Explain. 2

4. a) I) Convert the following open chain formulae to Howorth pyranose ( $\beta$ -form) formulae. 3



- II) What are epimers? Give one example. 2

**OR**

- a) I) Give synthesis of citral from 3-methylbutan-1-ol. 3  
 II) Give structure of Atropine and mention its chemical class. 2

Attempt **any three** of the following.

- b) I) Explain Mutarotation in D (+) Glucose with mechanism. 3  
 I) Give reaction of D (+) Glucose with : 2  
 i)  $\text{H}_2/\text{Ni}$   
 ii) Excess of phenyl hydrazine
- c) I) Give analytical evidences for the presence of following in Nicotine. 3  
 i) N-methyl group  
 ii) Pyridine ring  
 II) Explain ozonolysis reaction in structure determination of citral. 2
- d) What are nucleic acids? Write step wise hydrolysis of nucleic acids and give structure of nucleoside. 5
- e) I) Give strecker synthesis of  $\alpha$ -amino acids. 3  
 II) Define the following terms w.r.t. oils and fats. 2  
 i) Iodine value  
 ii) Saponification value

5. a) Explain the mechanism of acid catalysed esterification of carboxylic acid. 3  
**OR**
- a) Write the structural formulae of the following compounds. 3  
i) bicyclo [3.2.0] heptane  
ii) 1, 3-dichloropropadiene  
iii) 1, 4-diazine
- b) Discuss stereochemistry of  $SN^2$  and  $SN^1$  reactions. 3  
**OR**
- b) Describe in brief phase transfer catalysis. 3
- c) Explain the following terms w.r.t. polymer chemistry. 3  
i) Stabilizers  
ii) Fillers
- d) What are disaccharides ? Give structure of maltose. 3
- e) Discuss selectivity of NBS in synthetic organic chemistry. 2
- f) With suitable example explain multicomponent synthesis. 2
- g) Explain the terms auxochrome with example. 2  
**OR**
- g) Give any two biomedical uses of polymers. 2
- h) Explain role of ATP as energy source. 2  
**OR**
- h) Give synthesis of ionones from citral. 2
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