

QP Code : 78931

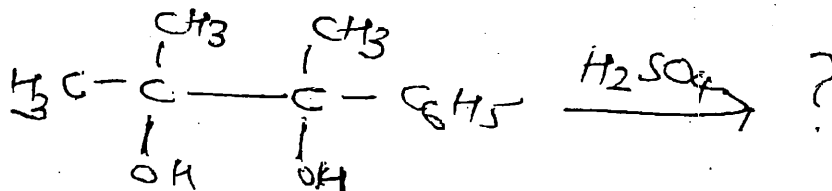
(2 ½ Hours)

[ Total Marks : 75

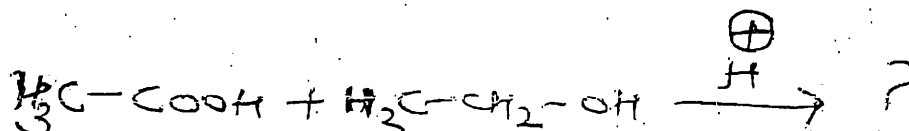
- N.B. : (1) All questions are compulsory  
(2) Figures to the right indicate full marks.  
(3) Use of log tables / Non Programmable calculator is allowed.

1. Answer any three of the following :

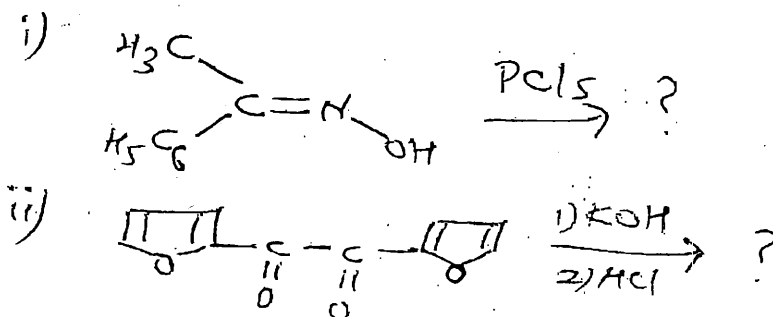
- (A) Complete the following reaction, name the reaction and suggest a suitable mechanism. 5



- (B) Distinguish between kinetically and thermodynamically controlled reactions with relevant examples. 5  
(C) What is Hofmann rearrangement? Give an example and suggest its mechanism. 5  
(D) (a) Give the mechanism involved in the following reaction. 3



- (b) Give one synthetic application of Michael addition reaction. 2  
(E) (a) Discuss the mechanism involved in the base catalysed dehydrohalogenation of tertiary butylbromide. 3  
(b) Write the products formed in the following reactions. 2

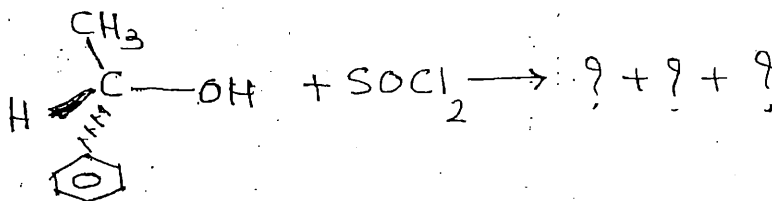


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- (F) (a) Give the mechanism involved in the formation of acetal. 3  
 (b) Explain the term basicity with a suitable example. 2

2. Answer any three of the following :-

- (A) Complete the following reaction Explain its  $S_N1$  mechanism and stereochemistry. 5



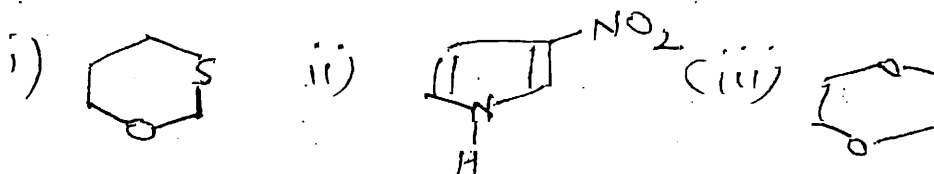
- (B) Explain 'angle strain' in cycloalkanes. Calculate angle strain in cyclopropane, cyclobutane, cyclopentane, considering their planar structures. 5  
 (C) Explain the mechanism and stereochemistry of bromination of trans-2-butene. 5  
 (D) Draw two chair conformations each of cis and trans isomers of 1, 3-dimethylcyclohexane. Which of the four conformers is more stable? Why? 5  
 (E) Explain the chirality of unsymmetrically substituted spirans with suitable examples. 5  
 (F) Explain the mechanism and stereochemistry of base induced dehydrohalogenation of i-bromo-1,2-diphenylpropane. 5

3. Answer any three of the following :-

- (A) (a) What is anomeric carbon? What are anomers? Draw the chair conformation of  $\alpha$ -D-fructopyranose and  $\beta$ -D-Glucopyranose. 3  
 (b) What are  $\alpha$ -anomers? Give examples. 2  
 (B) Explain the following 5  
 (a) mutarotation  
 (b) oligosaccharides  
 (C) (a) Give the following reactions of D-glucose 3  
 (i) acetylation  
 (ii) reduction with  $\text{NaBH}_4$

3

- (b) How will you convert D (-) Arabinose to D (+) Glucose? 3
- (D) (a) Give the complete methylation reaction of  $\alpha$  and  $\beta$ -D -glucopyranose. 3  
 (b) What is the action of phenyl hydrazine on D (+) glucose and D (-) fructose? 2
- (E) (a) Write an account of commercial importance of carbohydrates. 3  
 (b) What is the action of  $\text{HIO}_4$  on D-Glucose and D-fructose? 2
- (F) (a) Give the I.U.P.A.C names of the following :- 3



- (b) Give the structures of the following : 2  
 (i) 1, 2- oxazole  
 (ii) perhydroazine

4. Answer any three of the following :-

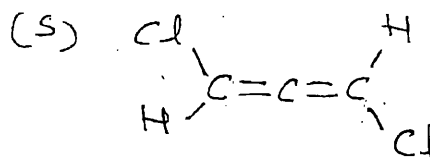
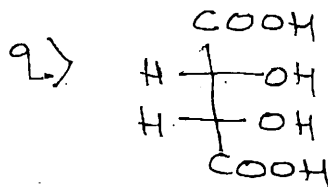
- (A) (a) What is the action of following reagents on pyrrole. 3  
 (i) Acetyl nitrate  
 (ii) pyridine and  $\text{SO}_3$   
 (iii) Acetic anhydride
- (b) Draw the resonating structures of thiophene. 2
- (B) (a) Discuss ring opening reaction of furan 3  
 (b) Write the Paal-Knorr Synthesis for preparation of Furan. 2
- (C) (a) Explain Hoffmann's exhaustive methylation and elimination reaction with pyrrolidine. 3  
 (b) What is quaternisation of amines? Give an example. 2
- (D) Explain the following :- 5  
 (a) Hantzsch synthesis of pyridine derivatives.  
 (b) Mannich reaction, with a suitable example  
 Why are the above two called multicomponent syntheses?

- (E) Explain the use of phase transfer catalysts and crown ethers in organic synthesis with suitable examples. 5
- (F) Write synthesis and uses of the following. 5
- (a) Ibuprofen (Chiral synthesis)
- (b) Bifenox-I 4
5. (A) Complete the following statements by choosing the right alternative.
- (a)  $\text{NH}_3$  is \_\_\_\_\_ than  $\text{H}_2\text{O}$   
(more acidic, more nucleophilic, less basic)
- (b)  $\text{E}_2$  reaction takes place in the \_\_\_\_\_ conformation  
(Syn-periplanar, anti-periplanar, gauche)
- (c) Base catalysed hydrolysis of ester involves \_\_\_\_\_ fission.  
(alkyl-oxygen, aryl-oxygen, acyl-oxygen)
- (d) An aliphatic primary amine reacts with an aldehyde to give an \_\_\_\_\_.  
( amidine, imine, iminol )
- OR** 4
5. (A) State whether the following are true or false.
- (p) Nucleophilicity is a kinetic property.
- (q) Dehydrohalogenation of 2-iodoethane takes place through  $\text{E}_2$  mechanism.
- (r) All Lewis acids are electrophilic
- (s) Claisen condensation involves a nucleophilic substitution. 4
5. (B) State whether the following are true or false.
- (a) In base induced dehydrohalogenation of 1-bromo-1,2-diphenylpropane, the erythro substrate gives a cis-olefin product.
- (b) In bromination of 2-butene, the trans-substrate gives a racemate product.
- (c) In catalytic hydrogenation of 2, 3-diphenyl 2-butene, the cis-substrate gives a racemate product.
- (d) In syn-hydroxylation of alkenes using osmium tetroxide, a cis-substrate gives a meso vicinal diol.

**OR**

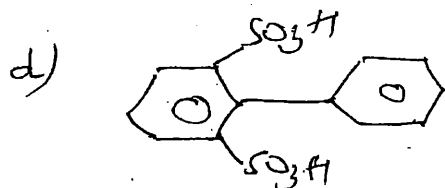
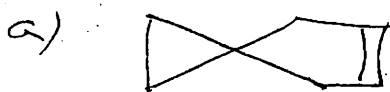
5. (B) State whether the following molecules are chiral or achiral.

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(C) Give IUPAC name for the following :-

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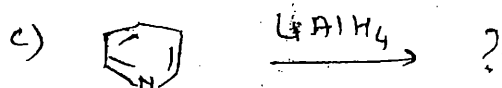
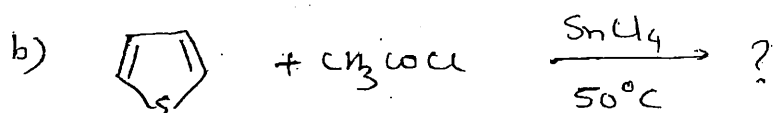
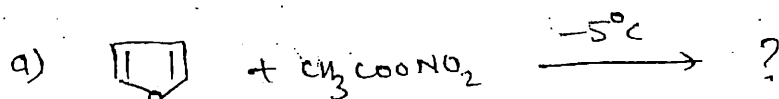
OR

(C) Give the structure of the following :

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- (p) 1-Bromo-1,2- hexadiene
- (q) Bicyclo[4.2.0] octane
- (r) Spiro [ 3.4] oct-2-ene
- (s) 2, 4' - diaminodiphenyl

(D) Complete the following reactions .



3

OR

(D) Match the columns appropriately.

'A'

- (p) Ibuprofen
- (q) Paracetamol
- (r) L-ascorbic-acid

'B'

- antibiotic
- vitamin
- hormone
- analgesic- antipyretic
- anti-inflammatory