

Ty Buse Rev  
13/11/18 75:25  
A1111

Q.P. Code : 40357

[2½ Hours]

[ Marks: 75]

Please check whether you have got the right question paper.

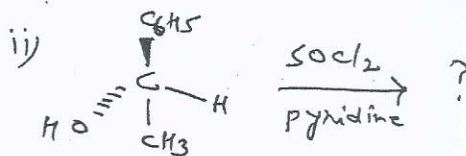
- N.B:**
1. All questions are compulsory.
  2. Figures to the right indicates full marks.
  3. Use of log tables/non-programmable calculators is allowed.

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-pinacolone 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



(F) Justify the following statements :

- 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.

05

3. Answer any three of the following :

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

- i)  $\beta$ -D-ribofuranose
- ii)  $\alpha$ -D-glucopyranose

03

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

- i)  $H_2 / Ni$
- ii) Bromine water

02

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

- i) Complete methylation of  $\alpha$ -D-fructopyranose
- ii) Osazone formation in D-glucose

05

(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.

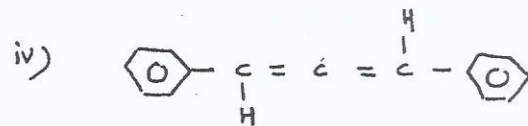
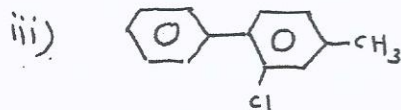
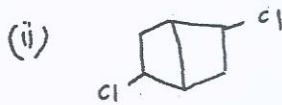
03

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

02

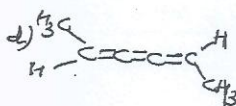
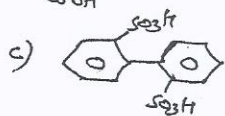
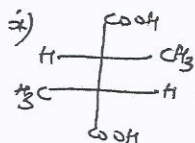
(F) Give the IUPAC names of the following:

05



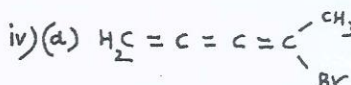
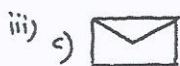
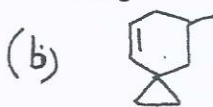
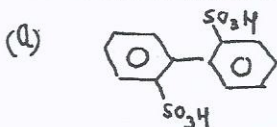
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4. Answer any **three** of the following :
- (A) a) Explain Hofmann's exhaustive methylation and elimination reaction with pyrrolidine. **03**  
 b) Give Paal-knorr synthesis for the preparation of thiophene **02**
- (B) a) Explain Chichibabin reaction 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**



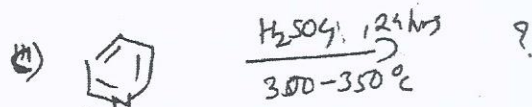
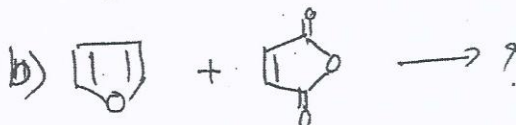
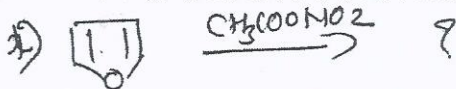
OR

- (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)  $\gamma$  - 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               |