

T.Y.B.A./B.Sc
Sem. - V
Reg. 07/11/25

(2 1/2 Hours)

Total Marks: 75

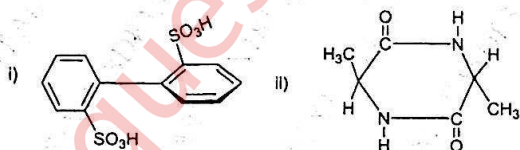
- N.B.:** (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Use of log table/ non-programmable calculator is allowed.

Q.1 Attempt any three of the following: 15

- A) What is Neighbouring group participation? With a suitable example explain the mechanism of Neighbouring group assisted Nucleophilic substitution. 5
- B) Distinguish between: 5
i) Nucleophilicity and Basicity
ii) Transition state and Reaction intermediate
- C) Complete the following reaction. Name the reaction and give its mechanism. 5
- $$\begin{array}{c}
 \text{H}_5\text{C}_2 \quad \quad \quad \text{C}_2\text{H}_5 \\
 | \quad \quad \quad | \\
 \text{H}_5\text{C}_2 - \text{C} - \text{C} - \text{C}_2\text{H}_5 \\
 | \quad \quad \quad | \\
 \text{OH} \quad \quad \quad \text{OH}
 \end{array}
 \xrightarrow{\text{H}_2\text{SO}_4} ?$$
- D) Give the reaction and mechanism for the base catalysed hydrolysis of esters. 5
- E) What is an elimination reaction? Explain E1cB mechanism. 5
- F) Define Regioselectivity. Explain Hoffmann's elimination with a suitable example. 5

Q.2 Attempt any three of the following: 15

- A) Explain the stereochemistry of unsymmetrically substituted biphenyls using suitable example. 5
- B) Define the term Molecular chirality. State whether following molecules are chiral or achiral and justify the answer. 5



- C) Draw two chair conformations of each cis and trans isomer of 1,4-dimethylcyclohexane. Which of the four conformers is more stable? Why? 5
- D) Define the following terms: 5
i) Enantiotropic ligands.
ii) Diastereotopic ligands
iii) Stereoselectivity.
iv) Topicity
v) Atropisomerism.

- D) a) Describe multicomponent synthesis using Mannich Reaction. 3
 b) Discuss Chichibabin reaction. 2
 E) Give a comprehensive account of Microwave-assisted organic synthesis. 5
 F) Compare the basicity of Pyridine, Pyrrole and Piperidine. 5

Q.5 A) **Fill in the blanks with the most correct option.** 4

- a) The acid catalysed rearrangement of an oxime to N-substituted amide is called reaction.
 (Chugaev/ Michael/ Beckmann)
 b) react with alcohol to form an acetal.
 (Aldehyde/ Ketone/ Ester)
 c) E₂ essentially follows a step mechanism.
 (one/ two/ multi)
 d) Cope elimination is observed in.....
 (N-substituted amide/ Aromatic ketoxime / Tertiary amine oxide)

OR

State whether the following statements are TRUE or FALSE 4

- p) α,β -unsaturated carbonyl compounds are Michael acceptor.
 q) A primary alkyl halide prefers to undergo E₂ reaction rather than S_N2.
 r) Acid catalysed hydrolysis of esters is called saponification.
 s) Electrophiles are electron rich species.

Q.5 B) **Fill in the blanks with suitable options.** 4

- a) Chirality without stereogenic centre is shown by.....
 (alkanes/cumulenes/alkynes)
 b) form is the most stable form of cyclohexane.
 (Half-Chair/Boat/Chair)
 c) Hydroxylation of an alkene take place by addition of OsO₄.
 (syn/trans/anti)
 d) is free from angle strain.
 (Cyclopropane/Cyclohexane/Cyclopentane)

OR

B) State true or false. 4

- p) Cumulenes with an odd number of double bonds can be chiral.
 q) Stereochemically equivalent ligands are called homotopic ligands.
 r) S_N¹ reaction proceeds with retention of configuration.
 s) E₂ reactions involve syn elimination.

Q.5 C) **Fill in the blanks with suitable options.** 4

- a) The simplest carbohydrates are.....
 (disaccharides/monosaccharides/polysaccharides)
 b) D-and L-notations of sugars are based on the configuration of.....
 (D-glucose/D-arabinose/D-glyceraldehyde)

- c) In the Fischer projection, the most oxidized carbon is placed.....
(at the bottom/at the top/in the middle)
- d) Quinolines and isoquinolines belong to class of fused compounds.
(acyclic/carbocyclic/heterocyclic)

OR

C State whether true or false.

- p) Butatriene is a cumulene.
- q) The most stable conformation of D-glucose is the boat form.
- r) D-glucose and L-glucose are enantiomers.
- s) Acetylation of glucose occurs at hydroxyl groups.

Q.5 D) Fill in the blanks with suitable options.

3

- a) A particular reaction site reacting in preference to other is known as
(chemoselectivity/ regioselectivity/ stereoselectivity)
- b) Hantzsch reaction is an example of synthesis.
(multicomponent/chiral/convergent)
- c) Pyridines belong to the class of compounds.
(acyclic/ carbocyclic/ heterocyclic)

OR

D) State true or false.

3

- p) A reaction with 100% atom economy will form no by-product.
- q) Methylene chloride, Chloroform and Carbon tetrachloride are examples of green solvents.
- r) Pyrrole is a 6-membered heterocyclic compound.