This question paper contains 6 printed pages

6867 *Your Roll No*

M.Sc. – Biomedical Science / Sem. II J

Paper – MBS 201 Organic Chemistry – II

(**New Course** Admissions of 2009 and onwards)

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No on the top immediately on receipt of this question paper)

Answer three questions from each Section (6 questions in all). All questions carry equal marks.

Section A

1 Attempt any *three* parts:

(*a*) How does *s*-adenosyl methionine help to bring about group transfer reactions?

(*b*) What are the essential differences in the mode of action of the enzymes NAD and FAD?

(*c*) Provide the structure of —

(*i*) Lipoic acid

(*ii*) Riboflavin.

(*d*) Provide an example of an enzyme whose reaction is catalysed with the help of (*i*) NAD, (*ii*) FAD.

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Provide the mechanism of any *one*.

2 Attempt any *three* parts.

(*a*) Explain the mechanism of a reaction catalysed with the help of biotin

(*b*) Explain the mechanism of a reaction brought about by vitamin B_{12}.

(*c*) Write short notes on:

(*i*) Function of ascorbic acid in the human body

(*ii*) Mechanism of action of cytochrome P450.

(*d*) How does TPP help to bring about the decarboxylation of pyruvate.

3. Attempt any *three* parts:

(*a*) Explain the conformation of peptide bond in proteins. What are the forces involved in folding of the protein to secondary structure?

(*b*) Describe the solid phase synthesis of the tripeptide valine-glycine-serine.

(*c*) Why does glycine occur at every third residue in collagen?

(*d*) Write a short note on nucleophilic reactions of amino acids

4 Attempt any *three* parts.

(*a*) Write a short note on structure and numbering of purines and pyrimidines.

(*b*) Explain the stereochemistry of ribose and deoxyribose in nucleic acids

(*c*) Establish the structure of *either* Lactose *or* Sucrose

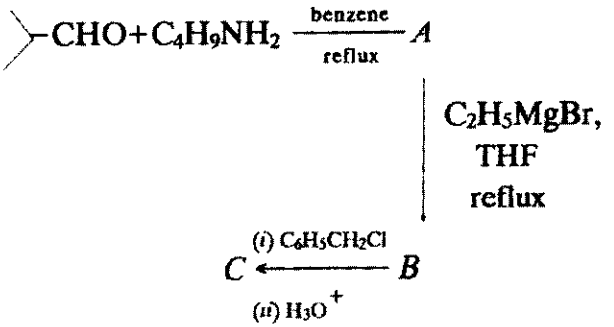
(*d*) Write the mechanism of ring expansion in aldohexoses.

SECTION B

5. Attempt any *three* parts:

(*a*) Write a short note on phase transfer catalysis

(*b*) Show the product of the following reaction:



(*c*) Compete the following reactions. Which of the products will be formed predominantly?

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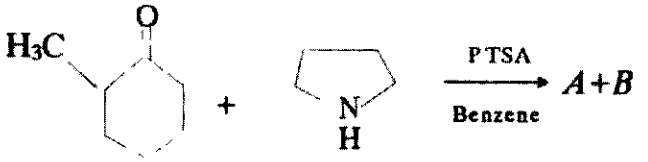


(*d*) $CH_3CH_2\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow[-78°C]{LDA,\ THF} A \xrightarrow{CH_3CHO} ?$

$\xrightarrow{NaOH} B \xrightarrow{CH_3CHO} ?$

6. Attempt any *three* parts:

(*a*) Give synthesis of following compounds using diethyl malonate / ethyl acetoacetate:

(*i*) $CH_3CO-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$

(*ii*) Succinic acid

(*b*) Complete the following reaction:

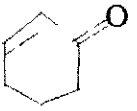
(*i*) $PPh_3+C_6H_5CH_2Br \longrightarrow A \xrightarrow[?]{base} B$

$B+CH_3CH_2CHO \longrightarrow C$

(*u*) $(CH_3)_3 S^+X^- \xrightarrow{RLi} A$

$$A + \begin{matrix} R \\ \diagdown \\ \quad C=O \\ \diagup \\ R' \end{matrix} \longrightarrow B$$

(*c*) Give structures of two sulphur ylides and comment upon their reactivity with:



(*d*) Explain the meaning of term Umpolung using example of trans ketolase reaction.

7. Attempt any *three* parts

(*a*) Derive the Hammett equation.

(*b*) Explain the significance of substituent constant and reaction constant involved in it.

(*c*) Explain how Hammett equation was modified to incorporate steric effects in case of aliphatic esters

(*d*) Give two examples of reactions involving phase transfer catalysts

8 Attempt any *three* parts

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(*a*) Define the term host guest chemistry. What are various supramolecular interactions? Give one example of each. 1

(*b*) With mechanism show how alkali metal cations are important in maintaining membrane potential.

(*c*) Write structures of [15] crown-5 and [18] crown-6 Explain how these can be used to carry out synthesis of 1-cyanooctane.

(*d*) Explain how cyclodextran works as an artificial enzyme/host for organic transformations.