

M. SC. CHEMISTRY EXAMINATION, 2022

(4th Semester)

ORGANIC CHEMISTRY SPECIAL

PAPER – XVI-O

Time : Two hours

Full Marks : 50

(25 marks for each unit)

Use a separate answer script for each Unit.

UNIT: O-4161

Answer *any four* of the following questions: 5×4

1. a) What is pseudoglycerol lipid? Write down plausible synthetic schemes for DPPC (1, 2-dipalmitoylglycerol-3-phosphatidylcholine)-mimic with 1,2-diether and 1-ether-2-ester-linked glycerophosphocholine. 1+2+2
- b) i) What is depsiptide? How do you synthesize a depsiptide? 1+1
- ii) What are α , β and γ - turn motif in peptidic architecture? How do you synthesize a β -turn mimic? 1+2
- c) Justify PNA (peptide nucleic acid) and PMO (phosphorodiamidate morpholino oligomer) as DNA-mimic. Give a plausible synthetic scheme of β -PNA with a nucleobase of your choice. 3+2

[2]

- d) What is Ala-scan? Comment on the different step involved in peptidomimetic approach. Give an example of a peptide and its non-peptidomimetic model. 1+3+1
- e) Write short notes on (answer any *two* of the following): $2\frac{1}{2} \times 2$
- i) Packing parameter
 - ii) Cationic liposome
 - iii) Peptoid
 - iv) Watson-Crick base pairing

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Answer all the questions

2. a) Show mechanistically how ingested pyridoxine is converted in the liver to pyridoxamine phosphate and 4-pyridoxic acid? Show any one mechanistic pathway how pyridoxal phosphate participates in amino acid metabolism. $1\frac{1}{2} + 1\frac{1}{2}$
- b) How folic acid is getting converted to N⁵-methyl H₄F? 2
- c) Draw the chemical structure of active coenzyme of vitamin B₁. Mechanistically describe how vitamin B₁ catalyzes the conversion of pyruvic acid to acetaldehyde. $2\frac{1}{2}$

[3]

- d) Vitamin E has the capacity to protect the mitochondrial system from irreversible inhibition by lipid peroxide. Justify the statement with mechanistic details and draw the chemical structure of most biologically active form of vitamin E. Show mechanistically the final fate of that active form after breaking the chain of peroxidation. 2+1+2
3. a) Explain with the mechanism of action why Sulfa drugs are called bacteriostatic agents. 2+2
- b) Explain the terms agonist and antagonist with an example. 2
- c) Define the term 'apparent volume of distribution' of a drug? What does it signify? 2
- d) Briefly, discuss the Lipinski's rule of five for orally administrative drugs? 2
- e) Briefly mention the importance of binding drugs with the plasma proteins. $2\frac{1}{2}$