

Write Your Roll Number: -----

M.Sc. Chemistry
IV Semester Examination, 2023
Paper Title: Chemistry of Natural Products - II
Paper Code: MCHCCO-401

Time: 3 Hours

Max. Marks: 75

Note: This paper has 3 sections A, B, and C, Attempt all the three sections

Section A: Answer *all* the questions; **Section B:** Answer *any 2* out of 4; **Section C:** Answer *all* the questions, each question has an *internal choice*

Abbreviations Used

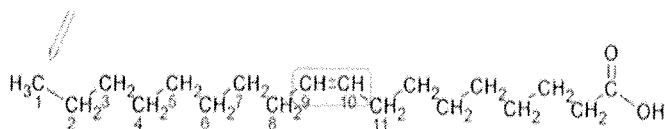
CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

SECTION: A

Q1A. Answer very briefly:

1x15 = 15

	BTL	CLO	PLO
i. Name the cyclooxygenase isoenzymes which is constitutively expressed?	2/3	1/3	1/2
ii. Name the NSAID which is a selective COX-2 inhibitor?	3/4	3/4	2
iii. Most eicosanoids are produced from which polyunsaturated fatty acid.	3/4	2	3/4
iv. Draw the structure of coumarin scaffold and give its numbering	1/3	2	2
v. Name the sugars present in Hyaluronic acid and draw its structure.	1/2	2-4	2
vi. What is Sanger's reagent?	1/3	3-5	3/4
vii. What is the average molecular weight of an amino acid residue in a protein?	1/2	2/3	4
viii. In living organisms, the process of hydrolysis of peptide bonds is catalysed by enzymes. Name the enzymes.	2/3	3/4	4
ix. A Greek subscript (α or β) is used with prostaglandins of the PGF series to describe the stereochemistry of the hydroxyl group on which carbon.	2/3	3/4	5
x. What are phytoalexins? Give one example	2/3	3/4	5
xi. What do you understand by carnitine shuttle?	2/3	1/3	1/2
xii. What are chylomicrons?	3/4	3/4	2
xiii. What does HPETE stand for? Write its one function.	3/4	2	3/4
xiv. Name a homo-polysaccharide that is present in plants wall that humans cannot digest.	1/3	2	2
xv. What does the arrow indicate in specific in the following structure of a fatty acid?	1/2	2-4	2



Q1B Select the most appropriate answer in the following question

1x5 = 5

	BTL	CLO	PLO
i. In what compartment does the de novo fatty acid synthesis occur?	2/3	1/3	1/2
a) Cytosol			
b) Peroxisome			
c) Endoplasmic reticulum			
d) Mitochondria			
ii. Adult human haemoglobin consists of	3/4	3/4	2
a) 2 sub units (β, β)			
b) 2 sub units (α, α)			
c) 3 sub units ($2\alpha, 1\beta$)			
d) 4 sub units ($2\alpha, 2\beta$)			

- | | | | | |
|------|--|-----|-----|-----|
| iii. | The role of calcium ions in pectin is | 3/4 | 2 | 3/4 |
| | a) To increase its solubility | | | |
| | b) To increase its viscosity | | | |
| | c) To stabilize its structure | | | |
| | d) To enhance its gelling properties | | | |
| iv. | Aggregation of the platelets is inhibited by the | 1/3 | 2 | 2 |
| | a) Prostaglandin | | | |
| | b) Prostacyclin | | | |
| | c) Thromboxane | | | |
| | d) Bradikinin | | | |
| v. | The conversion of acetyl CoA to malonyl CoA is the rate-limiting step in fatty acid synthesis. | 1/2 | 2-4 | 2 |
| | Which of the following enzyme catalyzes the above-mentioned reaction? | | | |
| | a) Acetyl CoA carboxylase | | | |
| | b) Malonyl CoA synthetase | | | |
| | c) Acetyl CoA decarboxylase | | | |
| | d) Malonyl CoA synthase | | | |

SECTION: B

Q2. Answer any two of the following questions

10x2 = 20

- | | | BTL | CLO | PLO |
|------|---|------|-----|-----|
| i. | Discuss the classification, extraction, and identification tests of coumarins. | 3/4 | 2-5 | 3-4 |
| ii. | Evaluate the four orders of the structural organization of proteins with suitable examples. | 4/5 | 3-4 | 4-7 |
| iii. | Give an account of the β -oxidation of fatty acids. Explain the energetics of oxidation of one molecule of palmitic acid. | 4//5 | 1-2 | 4-7 |
| iv. | The principal food-reserve polysaccharide in the plant kingdom is starch. Justify the statement and discuss the chemistry of starch.. | 3/5 | 1-2 | 5-6 |

SECTION C

Q3. Answer the following questions.

7x5 = 35

- | | | BTL | CLO | PLO |
|------|--|-----|-----|-----|
| i. | Give an account of fatty acid synthase complex. | 4/5 | 2-4 | 3-4 |
| | OR | | | |
| | Classify different phospholipids of physiological importance with their functions. | | | |
| ii. | You are given a sample containing proteins. How would you analyze the presence of proteins in the sample by five different chemical tests. | 4/5 | 2-4 | 3-4 |
| | OR | | | |
| | Explain how the amino acid composition, N-terminal and C-terminal residues of a protein are determined and identified. | | | |
| iii. | The eicosanoids are potent signaling molecules involved in the variety of processes. Justify the statement with suitable examples. | 4/5 | 1-3 | 2-4 |
| | OR | | | |
| | Explain the mechanism of inhibition of prostaglandin synthesis by aspirin drug. Sketch also the graphical presentation. | | | |
| iv. | Discuss and analyse the method(s) used for the chain lengthening and chain shortening of aldose. | 4/5 | 2-5 | 2-4 |
| | OR | | | |
| | Explain and analyze the methods used for the determination of ring size of an aldohexose. | | | |
| v. | Discuss briefly the structural features and functions of naphthoquinones and anthraquinones. | 4/5 | 2-4 | 3-4 |
| | OR | | | |
| | Outline the synthesis of coumarin by Pechmann condensation. Give the mechanism of the reactions. | | | |

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