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M.Sc. Chemistry IV Semester Examination, 2024

Paper Title: Chemistry of Natural Products - II

Paper Code: MCHCCO - 401

Time: 3 hours

Maximum Marks: 60

Note: This paper has 3 sections A, B, and C, Attempt all 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 Learning Outcome, PLO- Program learning 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

Q.No		BTL	CLO	PLO
SECTION - A				
Attempt <u>any ten</u> questions		(1½ x 10 = 15 Marks)		
A 1.	What are phytoalexins? Give two examples?	1	1-2	1-2
A 2.	Draw the structure of anthraquinone and identify its α and β -positions?	1-3	1-3	1-3
A 3.	What is Sanger's reagent?	1	1	1
A 4.	Name the amino acid containing an indole ring.	1-2	1-2	1-2
A 5.	What are Zymogens?	1-2	1-2	1-2
A 6.	Name the enzyme that couples fatty acids to carnitine.	1-2	1-2	1-2
A 7.	What is a prosthetic group?	1-2	1-2	1-2
A 8.	Name and draw the structure of the poisonous compound in the plant <i>Melilotus officinalis</i> responsible for causing haemorrhage in animals feeding this plant?	3-4	3-4	3-4
A 9.	Draw the structures of prostane and prostanoic acid and show how their carbons are numbered.	3-4	3-4	3-4
A 10.	What are serine proteases?	1	1-2	1-2
A 11.	In what compartment of the cell of an organism does the de novo fatty acid synthesis occur?	1-2	1-2	1-2
A 12.	What are phlobaphenes ?	1	1-2	1-2
A 13.	What is the wavelength of absorption for a peptide bond?	1/4	1/4	1/4
A 14.	How many carbon atoms typically separate the double bonds in unsaturated fatty acids?	1/4	1/4	1/4
A 15.	What is the distinguishing feature of prostacyclin (PGI)?	1-3	1-3	1-3

<u>SECTION – B</u>			
Attempt <i>any two</i> out of following four questions		10 x 2 = 20 Marks)	
B 1.	(a) What are eicosanoids? Discuss its type, classification and functions. (b) Describe briefly the two isoforms of cyclooxygenase (COX) and their functions? Sketch the mechanism of inhibition of the synthesis of prostaglandin by aspirin?	1-5	1-5-1-5
B 2.	Discuss the four levels of protein structure.	3	3 3
B 3.	What is β -oxidation? Where does it occur in the cell? Describe all the steps of β -oxidation through chemical equations giving the names of the enzymes involved in each step.	3-5	3-5 3-5
B 4.	How can chain shortening be achieved through Ruff degradation, and conversely, how can chain lengthening be accomplished via Kiliani-Fischer synthesis? Explain.	3-6	3-6 3-6
<u>SECTION – C</u>			
Attempt <i>all</i> questions, each question has an <i>internal choice</i>		5 x 5 = 25 Marks)	
C 1.	Provide a concise description of the classification, properties and functions of coumarin. Explain the lactone test used for identification of coumarins.	4	4 4
	OR		
	Explain and outline the synthesis of coumarin by Perkin's Method.	3-4	3-4 3-4
C 2.	What are lipids. Classify lipids with suitable examples.	1-3	1-3 1-3
	OR		
	How does the activation process of fatty acids occur and what are the sequential steps involved in this process?	4-5	4-5 4-5
C 3.	Describe the N-terminal amino-acid determination by Edman's method.	3-5	3-5 3-5
	OR		
	Compare the structural characteristics of the S1 pocket in trypsin and chymotrypsin."	4	4 4
C 4.	Give a brief description of naturally occurring deoxy-sugars and amino sugars	2-3	2-3 2-4
	OR		
	Describe the occurrence, properties and structure of starch considering basic components and type of linkages.	4-5	4-5 4-5
C 5.	What are ketone bodies? Provide a schematic depiction of the four steps involved in ketogenesis, along with the corresponding enzymes engaged in each step.	4-6	4-6 4-6
	OR		
	Differentiate between hydrolysable tannins and condensed tannins. How are tannins identified by Goldbeater's skin test?	4-6	4-6 4-6

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