LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIFTH SEMESTER – **NOVEMBER 2024**

UCH 5601 – BIOCHEMISTRY AND NATURAL PRODUCTS

Date: 21-11-2024 Dept. No. Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
1.	**Definitions**	
a)	Zwitter ion	
b)	Polenske number	
c)	Genetic code	
d)	Isoprene rule	
e)	Flavones	
2.	**Fill in the blanks**	
a)	The classification of proteins into fibrous and globular is based on their ____ .	
b)	Enzymes that have different forms but catalyze the same reaction are called ____ .	
c)	The process where α-D-glucose and β-D-glucose interconvertion in solution is known as _____ .	
d)	Alkaloids are _____ metabolites.	
e)	Anthocyanins are more stable at _____ pH.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Match the following**	
a)	Collagen - Non-protein organic molecule	
b)	Coenzyme - Sequence of three nucleotides	
c)	Codon - Fibrous protein	
d)	Base - Coffee	
e)	Tannins - Thiamine	
4.	**True or False**	
a)	The carbobenzoxy method is used for the solid-phase synthesis of peptides.	
b)	Allosteric inhibition involves the inhibitor binding to the active site of the enzyme.	
c)	Glycolysis is the process by which glucose is converted into pyruvate, generating ATP.	
d)	Anthocynanins give colour to plants and plant products.	
e)	Geraniol is a diterpenoid.	
	SECTION B - K3 (CO2)	
Answer any TWO of the following		**(2 x 10 = 20)**
5.	a) How do essential amino acids differ from non-essential amino acids? b) Explain the synthesis of peptides using the Merrifield method.	(5+5)
6.	Compare the lock and key model with the Induced Fit model in terms of interaction of enzymes with substrates.	(10)
7.	a) Explain the general properties of alkaloids. b) Write a note on classification of terpenoids.	(5+5)

8.	Write a note on biological functions of anthocyanins and flavonoids.	(5+5)

SECTION C – K4 (CO3)		
Answer any TWO of the following		**(2 x 10 = 20)**
9.	Explain the primary and secondary structures of protein.	
10.	a) Highlight the role of coenzymes and cofactors in enzyme activity. b) What is mutarotation? Explain the mechanism.	(5+5)
11.	Explain the structural elucidation of nicotine with its synthesis.	(10)
12.	a) Discuss the colour and constitution of anthocyanins. b) Explain the structural elucidation of flavones.	(5+5)
SECTION D – K5 (CO4)		
Answer any ONE of the following		**(1 x 20 = 20)**
13.	a) How are protein structures determined using Sanger's and Edman's methods? b) Discuss the mechanisms for the various types of enzyme inhibition reactions.	(10+10)
14.	a) Discuss the structural elucidation and synthesis of citral. b) Explain the tests for alkaloids. c) Write a note on classification of anthocyanins.	(10+5+5)
SECTION E – K6 (CO5)		
Answer any ONE of the following		**(1 x 20 = 20)**
15.	a) Write any three tests used for the detection of proteins and amino acids. b) Derive Michaelis Menten equation for the kinetics of enzyme catalysed reaction. c) List any five differences between DNA and RNA.	(10+5+5)
16.	a) Write the industrial preparation of camphor. b) Draw the structure of β-carotene and explain its biological importance. c) Explain the structural elucidation of flavonol.	(10+4+6)
