LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PLANT BIOLOGY AND PLANT BIOTECHNOLOGY**

THIRD SEMESTER – **NOVEMBER 2023**

UCH 3403 – BIOCHEMISTRY FOR BIOLOGY

Date: 08-11-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)	
	Answer ALL the Questions -	**(10 x 1 = 10)**
1.	**MCQ**	
a)	Disulphide bonds are formed between _____. a) cysteine residues that are close together b) hemoglobin residues that are close together c) proline residues that are close together d) histidine residues that are close together.	
b)	A phosphodiester bond is present in _____. a) fatty acids in a diglyceride b) amino acids in a polypeptide c) monosaccharides in a polysaccharide d) nucleic acids in a nucleotide	
c)	Which of the following is an example of derived lipids? a) Steroids b) Carotenoids c) Terpenes (d) All of the above	
d)	Which of these compounds is unable to undergo mutarotation? a) Glucose b) Maltose c) Lactose d) Sucrose	
e)	Which one is not a secondary metabolite? a) Terpenoid b) Alkaloid c) Phenylpropanoid d) Chitin	
2.	**MCQ**	
a)	Enzyme-catalysed rearrangement of atomic grouping without altering molecular weight or number of atoms is _____. a) ligase b) isomerase c) oxidoreductase d) hydrolase	
b)	The sugar molecule present in the nucleotide is _____. a) hexose b) tetrose c) pentose d) triose	
c)	The melting point of fatty acids depends upon chain length and _____. a) the shape of the fatty acids b) the position of the double bond c) charge on the carbon d) degree of unsaturation	
d)	The predominant form of glucose in solution is _____. a) acyclic structure b) hydrated acyclic structure c) glucofuranose d) glucopyranose	
e)	Which of the following is the nitrogen-containing molecules. a) Proteins b) Alkaloids c) Nucleic acids d) All the above	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Answer the following**	
a)	What does a pKa value mean?	
b)	Write down the chemical constituents of nucleosides.	
c)	Give an example of sterols.	
d)	What is glycoside?	
e)	Name any one indole-based medicinal compound.	

4.	**Answer the following**	
a)	What is the effect of enzyme on the activation energy of a reaction?	
b)	Name the linkage that connects nucleobases and sugars in nucleic acids.	
c)	Mention the sources of omega-3 and omega-6 essential fatty acids.	
d)	Give an example of polysaccharides.	
e)	How many carbons are in the hemiterpene?	
	SECTION B - K3 (CO2)	
Answer any TWO of the following		**(2 x 10 = 20)**
5.	a) What is isoelectric point of amino acids? How is it calculated?	(5 Marks)
	b) Discuss the mechanism of enzyme action.	(5 Marks)
6.	Illustrate Watson and Crick model of deoxyribonucleic acid.	(10 Marks)
7.	Explain the following with suitable examples i) Phospholipids ii) Isomerism in unsaturated fatty acids.	(10 Marks)
8.	a) Draw the epimers of glucose and fructose.	(5 Marks)
	b) How are mono- and sesquiterpenoids extracted from the plant material?	(5 Marks)
	SECTION C – K4 (CO3)	
Answer any TWO of the following		**(2 x 10 = 20)**
9.	a) Classify proteins based on their biological functions.	(5 Marks)
	b) Discuss the following i) Isoprene rule ii) Properties of terpenoids.	(5 Marks)
10.	a) Discuss the nucleotides present in the ribonucleic acid with their structures.	(5 Marks)
	b) Differentiate deoxyadenosine from deoxyadenosine 5'-monophosphate.	(5 Marks)
11.	Explain the following in detail with structure i) Lecithins ii) Cephalins iii) Plasmologens.	(10 Marks)
12.	a) Discuss the functions and biological importance of carbohydrates.	(5 Marks)
	b) How does sucrose differ from maltose and lactose?	(5 Marks)
	SECTION D – K5 (CO4)	
Answer any ONE of the following		**(1 x 20 = 20)**
13.	a) Explain the principle of the ninhydrin and biuret tests with a reaction.	(10 Marks)
	b) Explain the steps involved in the DNA transcription process.	(10 Marks)
14.	a) Compare animal and plant fats.	(5 Marks)
	b) Explain the following: i) inversion of cane sugar ii) Mutarotation.	(10 Marks)
	c) How are alkaloids classified?	(5 Marks)
	SECTION E – K6 (CO5)	
Answer any ONE of the following		**(1 x 20 = 20)**
15.	a) Describe the zwitterionic, D-, and L- structures of amino acids.	(5 Marks)
	b) Illustrate the significance of enzymes in the process of DNA replication.	(5 Marks)
	c) Explain the properties of triacylglycerol with suitable reactions.	(10 Marks)
16.	a) How are reducing and non-reducing carbohydrates qualitatively identified?	(10 Marks)
	b) Draw the Fischer and Haworth structures of glucose and fructose.	(5 Marks)
	c) Explain the biological functions of any three alkaloids.	(5 Marks)