STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2023 – 2024 & thereafter)

M. Sc. DEGREE EXAMINATION - NOVEMBER 2024
BIOTECHNOLOGY
FIRST SEMESTER

COURSE : CORE
PAPER : BIOCHEMISTRY
SUBJECT CODE : 23BY/PC/BC14
TIME : 3 HOURS **MAX. MARKS:100**

Q.NO.	SECTION A ANSWER ALL QUESTIONS (10X1=10)	CO	KL
1.	How does the body maintain fluid balance between the inside and outside of cells? a) Diffusion b) Active transport of glucose c) Osmosis d) Filtration through lymphatic vessels	1	1
2.	What condition occurs when there is an excess of acid in the body fluids, leading to a lower blood pH? a) Acidosis b) Alkalosis c) Hypoxia d) Hyperkalemia	1	1
3.	Which of the following is the primary function of carbohydrates in the human body? a) Storing genetic information b) Providing energy c) Building muscle d) Regulating body temperature	1	1
4.	What type of bond links amino acids together to form proteins? a) Hydrogen bond b) Ionic bond b) Peptide bond d) Covalent bond	1	1
5.	Which of the following is a characteristic of complex lipids? a) They contain only fatty acids and glycerol. b) They include additional components like phosphate groups or carbohydrates. c) They are composed solely of carbon and hydrogen atoms. d) They do not have any role in cell membranes.	1	1
6.	Which of the following is a component of a nucleotide? a) Amino acid, phosphate group, and ribose sugar b) Nitrogenous base, phosphate group, and sugar c) Fatty acid, nitrogenous base, and glucose d) Glycerol, phosphate group, and nitrogenous base	1	1
7.	In the respiratory chain, which of the following is the main role of the electron transport chain? a) Synthesize carbohydrates b) Generate ATP through oxidative phosphorylation c) Break down proteins for energy d) Store oxygen in the blood	1	1
8.	Which of the following is a key precursor in the synthesis of pyrimidines? a) Glucose b) Aspartate c) Acetyl-CoA d) Glycine	1	1

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9.	Which of the following is an example of competitive enzyme inhibition? a) Inhibitor binds to the active site, competing with the substrate. b) Inhibitor binds to a different site, changing the enzyme's shape. c) Inhibitor binds irreversibly to the enzyme's active site. d) Inhibitor increases the enzyme's activity by allosteric modulation.	1	1
10.	Which of the following mechanisms controls the quantity of enzymes in a cell? a) Feedback inhibition b) Allosteric regulation c) Gene expression regulation d) Competitive inhibition	1	1
Q. No.	**SECTION B** **ANSWER ALL QUESTIONS (5X2=10)**	**CO**	**KL**
11.	Summarize the role of buffers in maintaining pH in biological systems.	2	2
12.	Explain the primary function of glycogen in the human body.	2	2
13.	Classify fatty acids.	2	2
14.	Relate the oxidation in biochemical terms and its impact in molecules.	2	2
15.	Explain how enzymes are used in clinical diagnosis.	2	2
Q. No.	**SECTION C** **ANSWER ALL QUESTIONS (4X10=40)**	**CO**	**KL**
16.	Narrate how disaccharides are constructed and utilized in the human body, and discuss their role in nutrition. **(OR)** Classify amino acids, and describe how peptide bonds build protein structures.	3	3
17.	Draw and identify the structures of purines and pyrimidines, and explain their roles in nucleic acids. **(OR)** Comment on complex and derived lipids.	3	3
18.	Analyze how oxidative phosphorylation builds ATP, and determine the roles of the electron transport chain. **(OR)** Elucidate the key steps in fatty acid biosynthesis and categorize the main enzymes involved.	4	4
19.	Discuss the main mechanisms of enzyme regulation and how they impact enzyme activity. **(OR)** Analyze how different factors can alter the catalytic efficiency of an enzyme.	4	4

Q. No.	SECTION D ANSWER ALL QUESTIONS (2X20=40)	CO	KL
20.	Appraise the importance of the urea cycle in nitrogen metabolism and explain how it contributes to maintaining metabolic balance and preventing toxicity. **(OR)** Justify the significance of lipids in human physiology, focusing on their roles in energy storage, cellular membrane structure, and hormone synthesis.	4	5
21.	Comment on the synthesis of pyrimidines in detail. **(OR)** Evaluate the role and impact of enzymes in clinical diagnosis and pharmaceutical industries, and discuss their contributions to diagnostic methods and drug development.	5	6

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