

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 90017

B.E. / B.Tech. DEGREE END - SEMESTER EXAMINATIONS – NOV. / DEC. 2025

Third Semester

Biotechnology

U23BT305 – BIOCHEMISTRY AND BIOENERGETICS

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Distinguish between aldoses and ketoses with suitable examples.	2	K1	CO1
2.	Identify the role of biological buffers.	2	K1	CO1
3.	Classify lipids based on their chemical composition.	2	K2	CO2
4.	Predict the outcome of hydrogenation of unsaturated fatty acids.	2	K2	CO2
5.	Correlate nitrogen balance with amino acid metabolism.	2	K2	CO3
6.	Infer the significance of Ubiquitination process in protein metabolism.	2	K2	CO3
7.	Differentiate purines from pyrimidines with examples.	2	K1	CO4
8.	Relate the Watson - Crick model to DNA replication fidelity.	2	K1	CO4
9.	State the importance of electron transport chain in bioenergetics.	2	K2	CO5
10.	Interpret the reason why ATP is termed a 'high-energy' molecule.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Compare and contrast the major carbohydrate pathways and their cellular locations.	13	K1	CO1
	(OR)			
b)	Portray the Gluconeogenesis pathway step by step. Mention its importance in carbohydrate metabolism.	13	K1	CO1
12. a)	Illustrate the steps involved in β -oxidation of fatty acids and evaluate its energy efficiency compared to glycolysis.	13	K2	CO2
	(OR)			
b)	Examine the structural variations among phospholipids, glycolipids, and sphingolipids, and justify their physiological significance.	13	K2	CO2
13. a)	Map the flow of nitrogen through amino acid metabolism and identify key regulatory enzymes.	13	K3	CO3
	(OR)			
b)	Assess the consequences of defective amino acid metabolism leading to inherited metabolic disorders.	13	K3	CO3
14. a)	Summarize the key structural and functional differences between DNA and RNA.	13	K4	CO4
	(OR)			
b)	Analyze how nucleotides serve as precursors for metabolic energy and signal transduction.	13	K4	CO4
15. a)	Trace the sequence of reactions in the mitochondrial respiratory chain and infer its role in ATP formation.	13	K4	CO5
	(OR)			
b)	Evaluate the energy yield from the complete oxidation of glucose versus fatty acids and explain its bioenergetic implications.	13	K4	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Narrate the sequence of events happening in ATP synthesis with clear illustration.	15	K2	CO5
	(OR)			
b)	Discuss how carbohydrates, proteins and lipids are combined in metabolism to maintain the body's energy balance.	15	K3	CO3