KUMARAGURU
college of technology
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B.TECH. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

BIOTECHNOLOGY

U18BTI4202: Protein and Enzyme Technology

COURSE OUTCOMES

CO1: Analyze and demonstrate the secondary, super-secondary, tertiary and quaternary structures of proteins and structure-function relationship.

CO2: Apply the knowledge on protein structures in protein engineering and protein prediction.

CO3: Compare the enzyme properties and kinetics.

CO4: Evaluate the immobilization of enzymes and its effectiveness.

CO5: Apply the knowledge on design of enzyme based biosensors and their applications.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	What are right handed and left handed α-helix?	CO1	[K$_2$]
2.	Enlist the importance of super secondary structure.	CO1	[K$_2$]
3.	How does a zinc finger bind to DNA?	CO2	[K$_3$]
4.	The light reactions convert solar energy to the chemical energy of ATP and NADPH. Justify the statement.	CO2	[K$_3$]
5.	How does an active site work?	CO3	[K$_3$]
6.	Derive the Lineweaver-Burk equation and draw its plot.	CO3	[K$_4$]
7.	Sketch the outline for production of enzyme from microorganisms.	CO4	[K$_3$]
8.	What are the criteria for selecting the matrix for enzyme immobilization?	CO4	[K$_2$]
9.	Provide the working principle of biosensor with a neat sketch.	CO5	[K$_2$]
10.	List any two applications of enzymes in detergent industry.	CO5	[K$_2$]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.		Write a detailed note on secondary structure of protein (α – helix and β – bleated sheet with suitable example.	16	CO1	[K2]

12.	a)	Explain any two DNA binding protein with a neat sketch.	10	CO2	[K2]
	b)	Explain the mechanism of TATA box binding protein in transcription process in two stages.	6	CO2	[K3]

13. a) Enzymes are classified by placing them in categories according to the reactions that they catalyze. Substantiate the statement in detail.   8   CO3   [K3]

b) The following data on the substrate removal rate and the substrate concentration is available for some waste treatment.   8   CO3   [K5]

[S] (mol)	0.002	0.005	0.02	0.04	0.06	0.08	0.10
V (mol/min)	0.045	0.115	0.285	0.38	0.46	0.475	0.505

Estimate the value of substrate removal rate constant Km and the value of Vmax.

14. Derive the Michaelis-Menten equation for a single substrate enzyme catalyzed reaction.   16   CO3   [K4]

15. a) Sketch the outline process of extraction and purification of enzymes from plant source.   10   CO4   [K3]

b) Explain the physical methods of enzyme immobilization with neat illustrations.   6   C04   [K2]

16. Describe the applications of enzyme in food, leather, wool and brewery industries.   16   CO5   [K2]

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