

Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

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Fifth Semester B.E. Degree Examination Enzyme technology and biotransformation

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module – 1			
Q.1	(a)	Define Enzyme? Explain the classification of enzyme in details?	10
	(b)	Explain the source and strategy of purification of enzymes?	10
OR			
Q.2	(a)	Explain the advantages of biocatalyst over chemical catalyst?	10
	(b)	Explain the advantages of enzymes in different industry?	10
Module – 2			
Q.3	(a)	Explain fixed incubation and kinetics methods in details	10
	(b)	Define immunoassay? Explain enzyme immunoassay techniques in details?	10
OR			
Q.4	(a)	Explain standardization and optimization methods for enzymes?	10
	(b)	Explain the mechanism of TPP, PLP, Biotin enzymes?	10
Module – 3			
Q.5	(a)	Define Immobilized enzymes? Explain the techniques of immobilization in details?	10
	(b)	Explain the kinetics of immobilized enzymes?	10
OR			
Q.6	(a)	Explain application of immobilized enzyme in details?	10
	(b)	Discuss economic argument for immobilize enzymes?	10

Module – 4			
Q.7	(a)	Discuss the designing and construction of novel enzymes?	10
	(b)	Explain host guest complexation chemistry?	10
OR			
Q.8	(a)	Explain therapeutic enzymes with examples?	10
	(b)	Explain GDP and ITR isoenzymes in details?	10
Module – 5			
Q.9	(a)	Explain the significance of enzymes in diagnostics?	10
	(b)	Discuss enzyme pattern in disease like myocardial infraction?	10
OR			
Q.10	(a)	Explain the methods involved in production of glucose syrup?	10
	(b)	Explain the uses of lactase in dairy industries?	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	L2	CO1	PO12
	(b)	L2	CO1	PO12
Q.2	(a)	L1	CO1	PO12
	(b)	L1	CO1	PO12
	(c)	L2	CO1	PO12
Q.3	(a)	L2	CO1	PO10
	(b)	L2	CO1	PO10
Q.4	(a)	L2	CO1	PO10
	(b)	L1	CO1	PO10
Q.5	(a)	L1	CO1	PO10
	(b)	L2	CO1	PO10
Q.6	(a)	L3	CO1	PO10
	(b)	L1	CO1	PO10
	c	L1	CO1	
Q.7	(a)	L1	CO3	PO9
	(b)	L1	CO2	PO11
Q.8	(a)	L1	CO3	PO9
	(b)	L2	CO2	PO11
	(c)	L1	CO3	PO9
Q.9	(a)	L1	CO4	PO8
	(b)	L1	CO4	PO8

Q.10	(a)	L3	CO4	PO8	
	(b)	L2	CO4	PO8	
	(c)	L1	CO4	PO8	
Lower order thinking skills					
Bloom's Taxonomy Levels	Remembering (knowledge): □ ₁		Understanding Comprehension : □ ₂	Applying (Application): □ ₃	
	Higher order thinking skills				
	Analyzing (Analysis): □ ₄		Valuating (Evaluation): □ ₅	Creating (Synthesis): □ ₆	



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Fifth Semester B.E. Degree Examination Enzyme Technology and Biotransformation

TIME: 03 Hours

Max. Marks: 100

- Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
02. Graph paper sheets within the answer booklet should be used wherever required for calculations.

Module – 1			
Q.1	(a)	Distinguish between active site, binding site and catalytic sites with reference to product synthesis	10
	(b)	Given that standard marker proteins of size 67kDa, 44kDa, 29kDa & 14kDa travelled to distances of 1.2, 2.4, 3.8 cm & 5.7 cm respectively, calculate the size of a protein that migrates to a distance of 2.3 cm	10
OR			
Q.2	(a)	Given that standard marker proteins of size 93kDa, 67kDa & 30 kDa travelled to distances of 0.8, 1.5 & 3.1cm respectively on 12.5% SDS-PAGE, calculate the distance travelled by a dimeric protein of size whose sub-units are 35 & 40 kDa each.	10
	(b)	Compare metal-induced catalysis with acid–base catalysis. What could be the possible applications of knowing these mechanisms of action & why?	10
Module – 2			
Q.3	(a)	How does NAD ⁺ differ from NADP? (Answer should address both structure as well as physiological function). Is it true that the NAD ⁺ / NADH ratio has implications for health & disease?	10
	(b)	How does fixed incubation assay differ from kinetic methods of assay? Which is more advantageous & why?	10
OR			
Q.4	(a)	How does the initial velocity approach differ from rapid reaction methods of assay? Evaluate the applications of each.	10
	(b)	What is the difference between cofactor & prosthetic group? With examples, substantiate	5
	(c)	Compare PLP with biotin in its mode of action	5
Module – 3			
Q.5	(a)	When 2 reactions cannot be performed simultaneously in solution owing to pH	10

		incompatibility, what is the best way they can be conducted on a large-scale? Mention the approach & its advantages. Can this approach alter enzyme kinetics? If so how?	
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	(b)	'Extremozymes represent the technology of the future'. Do you agree? Whether yes/no, give reasons.	10
OR			
Q.6	(a)	'Covalent modification - attachment of enzymes to matrix' enables their sustained use for prolonged periods of time when compared to physical adsorption. Do you agree? Whether yes/no, give reasons. If no, suggest alternatives.	10
	(b)	Is the statement that "enzymes can be used in bioreactors more efficiently by use of immobilization techniques" justified? Evaluate the statement with reasons.	10
Module – 4			
Q.7	(a)	How do artificial enzymes differ from novel enzymes in terms of applications? Is it true that the active site of an enzyme can be synthetically developed? If true, illustrate. If false, substantiate with reasons.	10
	(b)	'Glutathione (reduced) is a protective agent for cellular functions'. Do you agree? Whether yes/no, give reasons.	10
OR			
Q.8	(a)	Compare Acetylcholine esterase with butrylcholine esterase with respect to function & health implications	10
	(b)	'Enzymes can be used in disease therapy'. Do you agree? Whether yes/no, give reasons.	10
Module – 5			
Q.9	(a)	'Glucose oxidase is noted for a wide range of applications'. Substantiate whether yes/no	10
	(b)	'SGOT & SGPT act as excellent markers of myocardial infarction'. Do you agree? Whether yes/no, give reasons.	10
OR			
Q.10	(a)	"Various types of LDH (1-5) vary in their kinetic properties as well as the conditions under which they function". Is this statement justified? Whether yes/no, give reasons.	5
	(b)	"Creatine can be directly estimated in the blood." Do you agree? Whether yes/no, give reasons.	5
	(c)	"Use of enzymes in detergency has brought sustainable, cost-effective alternatives before the detergent industry.' Evaluate this statement with reasons.	10

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**Fifth Semester B.E. Degree Examination
ENZYME TECHNOLOGY AND BIOTRANSFORMATION**

TIME: 03 Hours Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome					
Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome	
Q.1	(a)	L2,4	1	1	
	(b)	L3	2	1,2	
Q.2	(a)	L3	2	1,2	
	(b)	L2,4	1	1	
Q.3	(a)	L2,4	1	1	
	(b)	L2,4	1,2	1	
Q.4	(a)	L2,4	1	1	
	(b)	L2,4	1,2	1	
	(c)	L2,4	1,2	1	
Q.5	(a)	L4,5	4	1,4	
	(b)	L4	4	1,4	
Q.6	(a)	L4	4	1,4	
	(b)	L4,5	4	1,4	
Q.7	(a)	L4	1	1,2,4	
	(b)	L4	3	1	
Q.8	(a)	L4	3	1	
	(b)	L4	3	1	
Q.9	(a)	L4	3,4	1	
	(b)	L4	3	1	
Q.10	(a)	L4	3	1	
	(b)	L4	2	1,4	
	(c)	L4	4	1,7,11	
Lower order thinking skills					
Bloom's Taxonomy Levels	Remembering(knowledge): L ₁		Understanding Comprehension): L ₂	Applying (Application): L ₃	
	Higher order thinking skills				
	Analyzing (Analysis): L ₄		Valuating (Evaluation): L ₅	Creating (Synthesis): L ₆	

Course Outcomes

1	Apply principles of enzyme structure to elucidate function
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Fifth Semester B.E. Degree Examination
ENZYME TECHNOLOGY AND BIOTRANSFORMATION

TIME: 03 Hours Max. Marks: 100

Note: 01. Answer any FIVE full questions, choosing at least ONE question from each MODULE

2	Analyzing and applying the principles of basic biochemistry and mathematics to solve problems involving enzyme reactions
3	Evaluate enzyme activity in the context of health & disease
4	Evaluate enzymes with respect to industrial applications



MODULE-01			
Q1	a	Explain any two separation methods employed for enzyme based on size	10
	b	Describe the mechanism of enzyme action	10
OR			
Q2	a	Describe the molecular weight determination of enzyme based chromatogram	10
	b	Outline the bases of classification of enzyme with one example	10
MODULE-02			
Q3	a	Explain the mechanism of Coenzyme NAD/NADP	10
	b	Discuss about standardization and optimization methods for enzyme activity?	10
OR			
Q4	a	Explain the mechanism of Coenzyme PLP	10
	b	Illustrate isoenzyme measurement with two example by Kinetic method	10
MODULE-03			
Q5	a	Kinetic parameter of immobilized enzyme and free enzyme will differ. Justify	10
	b	Summarize the significance of enzymes derived from thermophilic and hyperthermophilic organisms	10
OR			
Q6	a	Describe bioreactors for immobilized enzyme. Add a note on difference between free enzyme and immobilized enzyme reactor	10
	b	Define immobilized enzyme. Note on covalent technique of immobilization of enzyme	10
MODULE-04			
Q7	a	Using steroid as a template, explain the construction of novel enzymes	10
	b	Describe the biological importance of enzyme HMG CoA reductase inhibitors	10
OR			
Q8	a	Describe synthesis of artificial enzymes. Note on its application	10
	b	Highlight on the clinical significance of enzyme GPD	10
MODULE-05			

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Fifth Semester B.E. Degree Examination

ENZYME TECHNOLOGY AND BIOTRANSFORMATION

TIME: 03 Hours Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**

Q9	a	Note on SGOT and SGPT	10
	b	Discuss the application of protease in food and Leather and Wool Industry	10
OR			
Q10	a	Explain the production of glucose syrup from starch	10
	b	Enzyme as a biomarker for Myocardial infraction. Justify	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	a	L2	CO-1	PO-2
	b	L2	CO-1	PO-2
Q.2	a	L2	CO-1	PO-2
	b	L2	CO-1	PO-2
Q.3	a	L2	CO-1	PO-1
	b	L2	CO-1	PO-1
Q.4	a	L2	CO-1	PO-1
	b	L2	CO-1	PO-1
Q.5	a	L3	CO-2	PO-3
	b	L2	CO-2	PO-3
Q.6	a	L3	CO-2	PO-3
	b	L2	CO-2	PO-3
Q.7	a	L4	CO-2	PO-4
	b	L2	CO-2	PO-4
Q.8	a	L2	CO-2	PO-4
	b	L2	CO-2	PO-4
Q.9	a	L2	CO-2	PO-6
	b	L2	CO-2	PO-6
Q.10	a	L2	CO-2	PO-6
	b	L3	CO-2	PO-6
Lower order thinking skills				
Bloom's Taxonomy Levels		Remembering (knowledge): L1	Understanding (Comprehension) : L2	Applying (Application): L3
	Higher order thinking skills			
		Analyzing (Analysis): L4	Valuating (Evaluation): L5	Creating (Synthesis): L6

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Fifth Semester B.E. Degree Examination Enzyme technology and Biotransformation

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module – 1			
Q.1	(a)	Define enzymes , Explain the classification	06
	(b)	Discuss the strategies for purification of enzymes	08
	(c)	Describe the molecular weight determination of enzymes	06
OR			
Q.2	(a)	Discuss the purity and characterization of enzymes	06
	(b)	Discuss the advantages of biocatalyst vs Chemical catalysts	08
	(c)	Explain the application of enzymes in different industry.	06
Module – 2			
Q.3	(a)	Explain the enzyme measurement methods	06
	(b)	Discuss the role of enzymes in immune assay techniques	08
	(c)	Explain the methods for investigating the kinetics of enzymes	06
OR			
Q.4	(a)	Discuss the challenges and scope of value added herbal products.	06
	(b)	Discuss the methods to study the stability of the enzymes.	08
	(c)	Explain the mechanism of co enzymes	06
Module – 3			
Q.5	(a)	Describe the enzyme immobilization techniques.	06
	(b)	Explain the effect of solute on immobilized enzymes.	08
	(c)	Discuss the immobilization methods for enzymes	06
OR			
Q.6	(a)	Role of Immobilization enzyme technology in biotech industry discuss	07
	(b)	Discuss the economic growth of biotech industry by using immobilized enzymes	06
	(c)	Describe the role of extremophiles in PCR applications	07

Module – 4			
Q.7	(a)	Discuss the methods for design and construction for novel enzymes	06
	(b)	Write a note on designing of enzymes by using steroid templates	06
	(c)	Explain the role of enzymes in Biotransformation of drugs	08
OR			
Q.8	(a)	Discuss in brief therapeutic enzymes	06
	(b)	Write a note on angiotensin converting enzymes ACE	06
	(c)	Explain the enzyme inhibition mechanism	08
Module – 5			
Q.9	(a)	Elaborate the use of enzymes in diagnostics	08
	(b)	Explain the role of enzymes as markers in cancer disease	07
	(c)	Discuss the use of enzymes in detergents	05
OR			
Q.10	(a)	Explain the role of enzymes in food industry.	08
	(b)	Write an explanatory note on production of glucose syrup from starch	07
	(c)	Discuss the role of enzymes in the production of maltose	05

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	L2	CO1	PO1
	(b)	L2	CO1	PO1
	(c)	L2	CO1	PO1
Q.2	(a)	L2	CO1	PO1
	(b)	L2	CO1	PO1
	(c)	L2	CO1	PO1
Q.3	(a)	L2	CO2	PO3
	(b)	L2	CO2	PO3
	(c)	L2	CO2	PO3
Q.4	(a)	L2	CO2	PO3
	(b)	L2	CO2	PO3
	(c)	L2	CO2	PO3
Q.5	(a)	L3	CO3	PO2
	(b)	L2	CO3	PO2
	(c)	L3	CO3	PO2
Q.6	(a)	L3	CO3	PO5
	(b)	L2	CO3	PO5
	(c)	L3	CO3	PO5
Q.7	(a)	L2	CO4	PO4
	(b)	L3	CO4	PO4
	(c)	L2	CO4	PO4
Q.8	(a)	L3	CO4	PO7
	(b)	L3	CO4	PO4
	(c)	L2	CO4	PO9
Q.9	(a)	L2	CO5	PO6
	(b)	L2	CO5	PO6
	(c)	L2	CO5	PO6
Q.10	(a)	L2	CO6	PO7
	(b)	L2	CO6	PO7
	(c)	L1	CO6	PO7
Bloom's Taxonomy Levels	Lower order thinking skills			
	Remembering (knowledge): □ ₁	Understanding Comprehension): □ ₂	Applying (Application): □ ₃	
	Higher order thinking skills			
	Analyzing (Analysis): □ ₄	Valuating (Evaluation): □ ₅	Creating (Synthesis): □ ₆	