

Model Question Paper -1 with effect from 2020-21(CBCS Scheme)

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Fifth Semester B.E. Degree Examination Biochemical Engineering

TIME: 03 Hours

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing at least ONE question from each MODULE.

Module – 1			
Q.1	(a)	Explain the major advantages and disadvantages of biological process. Also explain the role of a chemical engineer in bioprocess industry	10
	(b)	Describe the taxonomical classification of five kingdoms as proposed by Whittakar.	10
OR			
Q.2	(a)	Describe a prokaryotic cell with its salient features.	10
	(b)	Sketch a typical Eucaryotic cell and describe in brief.	10
Module – 2			
Q.3	(a)	Explain the Watson-crick model of DNA and describe the important features.	10
	(b)	Enlist the functions of lipids.	04
	(c)	Give the classification of RNA and explain the functions of each.	06
OR			
Q.4	(a)	Describe how enzymes are classified.	10
	(b)	<p>When glucose is converted to fructose by glucose isomerase, the slow product formation step is also reversible. Derive the rate equation by employing (i) M – M approach, and (ii) Briggs – Haldane approach. The reaction mechanism is given by</p> $ \begin{array}{c} S + E \xrightleftharpoons[k_2]{k_1} ES \\ ES \xrightleftharpoons[k_4]{k_3} P + E \end{array} $	10

Module – 3																														
Q.5	(a)	Explain the methods for the evaluation of M-M kinetic parameters.	10																											
	(b)	Estimate the values of kinetic parameters of M-M equation for the data given below:	10																											
		<table border="1"> <thead> <tr> <th>S. No.</th> <th>Substrate concentration (g-mol/m³)</th> <th>Initial rate of reaction (g-mol/m³.min)</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.2</td><td>4.36</td></tr> <tr><td>2</td><td>0.15</td><td>3.89</td></tr> <tr><td>3</td><td>0.1</td><td>3.55</td></tr> <tr><td>4</td><td>0.075</td><td>3.07</td></tr> <tr><td>5</td><td>0.05</td><td>2.53</td></tr> <tr><td>6</td><td>0.025</td><td>1.65</td></tr> <tr><td>7</td><td>0.01</td><td>0.777</td></tr> <tr><td>8</td><td>0.005</td><td>0.430</td></tr> </tbody> </table>	S. No.	Substrate concentration (g-mol/m ³)	Initial rate of reaction (g-mol/m ³ .min)	1	0.2	4.36	2	0.15	3.89	3	0.1	3.55	4	0.075	3.07	5	0.05	2.53	6	0.025	1.65	7	0.01	0.777	8	0.005	0.430	
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Q.6	(a)	Derive an expression to determine the rate equation for non-competitive inhibition.	10																											
	(b)	What is meant by immobilization of enzymes? Describe different methods of immobilization.	10																											
Module – 4																														
Q.7	(a)	Describe the operation & maintenance of a typical aseptic aerobic fermentation.	10																											
	(b)	Describe in detail batch and continuous thermal sterilization.	10																											
OR																														
Q.8	(a)	Describe various phases of cell cell growth in a batch culture, with a neat diagram.	10																											
	(b)	Derive an expression to determine the substrate concentration resulting in maximum value of specific growth rate.	10																											
Module – 5																														
Q.9	(a)	Explain theory of filtration. With a neat sketch describe the working principle of continuous rotary vacuum filter.	10																											
	(b)	Describe the theory of sedimentation and explain the sedimentation process.	10																											
OR																														
Q.10	(a)	Explain in detail the physical methods of cell disruption.	10																											
	(b)	Describe the working of tubular bowl centrifuge with a neat diagram	10																											

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

