

**Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)**

M. Tech. (First Semester – Regular/Supplementary) Examinations, January – 2026
24MBTPC11002– Advanced Bioprocess Engineering
(Biotechnology)



Time: 3 hrs

Maximum: 60 Marks

(The figures in the right hand margin indicate marks)

PART – A**(2 x 5 = 10 Marks)**Q.1. Answer *ALL* questions

	CO #	Blooms Level
a. Write down the rate equations for homogeneous reaction.	CO1	K1
b. What is the principle of solvent extraction?	CO2	K1
c. What is the relationship between pH and the activity of the enzyme?	CO3	K1
d. What is Monod equation?	CO4	K1
e. How do you calculate substrate consumption rate?	CO4	K2

PART – B**(10 x 5 = 50 Marks)**Answer *ALL* the questions

	Marks	CO #	Blooms Level
2. a. Explain about principles and operation of Continuous bioreactor.	5	CO1	K1
b. Discuss different applications of Continuous bioreactor.	5	CO1	K2
(OR)			
c. Explain briefly about different type of bioreactors.	5	CO1	K2
d. Explain design aspects and working of reactor for cell culture.	5	CO1	K2
3.a. What are types of economic process?	5	CO2	K1
b. Explain importance economic process with example(s)?	5	CO2	K2
(OR)			
c. Explain about principle and operation of adsorption chromatography.	5	CO2	K1
d. Discuss different applications of adsorption chromatography.	5	CO2	K2
4.a. What is Catalytic Strategies in case of Enzyme? Explain with example.	5	CO3	K1
b. What is Regulatory Strategies in case of Enzyme? Explain with example.	5	CO3	K1
(OR)			
c. Give detail derivation of Michaelis-Menten equation.	5	CO3	K2
d. Explain different factors which can influence the Michaelis Menten constant?	5	CO3	K1
5.a. Write about bacterial nutrition?	5	CO4	K3
b. Explain different phases of bacterial growth along with the growth curve.	5	CO4	K1
(OR)			
c. Explain material balance calculations with respect to Law of Conservation of Mass, Process Flow and System Boundaries.	5	CO4	K2
d. Differentiate between total mass balance and component mass balance.	5	CO4	K2
6.a. Explain Industrial applications of microbial enzymes with reference to Dairy, Baking and Cosmetics Industry.	5	CO4	K3
b. Explain the advantages and disadvantages of Membrane Bioreactor Technology	5	CO3	K1

(OR)

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| c. Discuss different applications of Fed-batch reactor. | 5 | CO2 | K2 |
| d. What are different benefits of Aeration and Sensors in a bioreactor. | 5 | CO1 | K1 |

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