

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024****Subject Code:3171410****Date:30-05-2024****Subject Name:Food Enzymology****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1**
- (a) Differentiate between inducible and repressible enzyme regulation. **03**
- (b) Write a detailed note on classification of enzymes in tabular manner. **04**
- (c) A chemist measured the initial rate of an enzyme-catalyzed reaction in the absence and presence of inhibitor A and, in a separate procedure, inhibitor B. In each case, the inhibitor's concentration was 8.0 mM (8.0×10^{-3} M). The following data were obtained: **07**

[S] (M)	V_o (M/s) No inhibitor	V_o (M/s) Inhibitor A	V_o (M/s) Inhibitor B
5×10^{-4}	1.25×10^{-6}	5.8×10^{-7}	3.8×10^{-7}
1×10^{-3}	2×10^{-6}	1.04×10^{-6}	6.3×10^{-7}
2.5×10^{-3}	3.13×10^{-6}	2×10^{-6}	1×10^{-6}
5×10^{-3}	3.85×10^{-6}	2.78×10^{-6}	1.25×10^{-6}
1×10^{-2}	4.55×10^{-6}	3.57×10^{-6}	1.43×10^{-6}

Find V_{max} for all 3 cases and comment of type of inhibition displayed by inhibitor A and B. Verify the same using LB equation.

- Q.2**
- (a) Give one example each of competitive, uncompetitive and uncompetitive inhibition **03**
- (b) What is the significance of two consecutive trp codon in regulation of Trp operon **04**
- (c) Derive Michaelis–Menten equation and lineweaver burk equation for non competitive enzyme inhibition. **07**

OR

- (c) Derive Michaelis–Menten equation and lineweaver burk equation for uncompetitive enzyme inhibition. **07**

- Q.3**
- (a) Draw both MM and LB plots for competitive, uncompetitive, and non competitive inhibition. **03**
- (b) Draw a flowchart to depict purification of chymosin. Give one application of chymosin in dairy industry. **04**
- (c) Explain enzyme immobilization, types, matrices, advantages and disadvantages. **07**

OR

- Q.3**
- (a) Draw a flowchart to quantify the amylase enzyme activity **03**
- (b) Draw a flowchart for MSG production. Suggest few applications of MSG **04**
- (c) Explain the role of enzymes in egg processing or lipid modification **07**

- Q.4** (a) Explain regulation of Arabinose operon in case when both inducer and repressor is present **03**
 (b) Explain the following terms: a) Ribozyme b) stereochemical specificity c) induced fit model d) Significance of K_m **04**
 (c) Comment “enzymes play a crucial role in tenderization and flavour development in meat products” **07**

OR

- Q.4** (a) Explain role of enzymes in inactivation of antinutritional factors **03**
 (b) Complete the following table in reference to lac operon **04**

Case	Repressor occupied (Y/N)	Operator site blocked (Y/N)	CAP/ cAMP moiety formed (Y/N)	RNA polymerase moves forward (Y/N)
Only glucose present				
Only lactose present				
Both glucose and lactose present				
Both glucose and lactose absent				

- (c) Explain enzyme aided flavour extraction from hydrolyzed plant and animal sources. **07**
- Q.5** (a) Justify the following: **03**
 1) Gibbs Energy of [ES] is much higher than S or P
 2) MM plot presented certain practical hurdles
 3) effect of temperature on enzyme activity is not exactly bell shaped
 (b) Explain the role of enzymes in deskinning and collagen extraction from fishes **04**
 (c) Enlist application of enzymes in baking and brewing industries **07**

OR

- Q.5** (a) Comment on application of immobilized enzymes **03**
 (b) Mention the enzymes used for liquefaction, saccharification, and dextrinization, isomerization of starch **04**
 (c) What are the application of enzymes in dairy industry. **07**
