



**University of Ruhuna- Faculty of Technology**  
**Bachelor of Biosystems Technology Honours**  
**Level 2 (Semester I) Examination, June / July 2023**  
**Academic year 2021 / 2022**

**Course Unit: BST 2132 Enzyme Technology (Theory)**

**Duration: 1 hour and 30 minutes**

**Student No: .....** *TG/2020/994* **.....**

.....  
Please read and follow the **instruction** carefully before answering the questions.

- Answer **All Two (2)** questions in **PART 1** in the given space.
- Answer **Only Two (2)** questions in **PART 2**.
- Use separate book for answering the questions in **PART 2**.
- Each question should be started with a new page.
- Calculators and mobile phones are not allowed



Part 1 – Answer both questions

01. Answer all parts

One of the properties of enzymes that makes them so important as diagnostic and research tools is their specificity relative to the reactions they catalyze.

I. Differentiate the kinds of specificity and group specificity. (20 marks)

.....  
.....  
.....  
.....

B. The enzyme "alcohol dehydrogenase" has an ability to act on both ethanol and methanol.

a. What type of specificity is shown by alcohol dehydrogenase? (10 marks)

.....

b. Using a suitable illustration, show how alcohol dehydrogenase acts on ethanol and methanol. (10 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

iii. Write down the type of specificity that is the highest specificity shown by enzymes. (10 marks)

.....



IV. What is the enzyme property considered in the type of specificity mentioned in Part III? (10 marks)

.....

V. What is substrate specificity? Give an example for substrate specificity. (20 marks)

.....

.....

.....

.....

**02. Answer all parts**

The stoppage of enzyme activity is referred to as enzyme inhibition. Enzyme inhibitors can bind to active sites or to another sites and halt or inhibit further activity.

I. Differentiate between reversible and irreversible inhibition. (20 marks).

.....

.....

.....

.....

.....

.....

II. State one (01) difference between competitive inhibition and non-competitive inhibition. (10 marks).

.....

.....

.....

.....



III. What effect does each type of inhibitor have on the kinetic constants  $V_{max}$  and  $K_m$ ?

(15 marks)

.....  
.....  
.....  
.....

IV. On the same graph show the variation of reaction rate of enzymes with competitive inhibitor, non-competitive inhibitor and without inhibitors. (45 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

V. State one (01) medical application of enzyme inhibition in living cells. (10 marks)

.....  
.....



**Part 2 – Answer two (02) questions only**

**01.**

Enzyme can catalyze reactions in different states as individual molecules in solution or as attached to surfaces (immobilized).

- I. Write down **five (05)** characteristic features of immobilized enzymes (**20 marks**).
- II. State **four (04)** physical and **four (04)** chemical properties of an ideal matrix used in enzyme immobilization (**20 marks**).
- III. Briefly describe the differences of following enzyme immobilized methods (**60 marks**).
  - Adsorption
  - Covalent binding
  - Encapsulation

**02.**

- I. Indicate three (03) main purposes of enzyme assays (**15 marks**).
- II. Write down five (05) major features in successful enzyme assay (**15 marks**).
- III. "The behavior of enzymatic reaction is the main determinant of the selection of enzymatic assay". Justify this statement using suitable examples (**70 marks**).

**03.**

Write short notes on following.

- I. Sequential reaction (**25 marks**)
- II. Double-displacement reaction (**25 marks**)
- III. Enzyme activity Vs. Specific activity (**25 marks**)
- IV. Induced-fit hypothesis of enzyme activity (**25 marks**)

@@