

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY

FOST 425: APPLICATION OF ENZYME TECHNOLOGY IN FOODS

STREAMS: BSC (FOST)

TIME: 2 HOURS

DAY/DATE: MONDAY 10/12/2018

2.30 PM – 4.30 PM

INSTRUCTIONS:

- **Answer ALL Questions**
- **Do not write anything on the question paper**
- **Switch off your mobile phone**

Question One

- (a) Differentiate between the following groups of enzymes
- | | |
|---|-----------|
| (i) Oxidoreductases versus Transferases | [2 marks] |
| (ii) Hydrolases versus Isomerases | [2 marks] |
- (b) Describe the factors that affect activity of enzymes. [6 marks]
- (c) (i) One of the intriguing properties of enzymes is their specificity. State and explain four groups of enzyme specificity. [4 marks]
- (ii) Differentiate 'lock and key' model from induced fit model with regards to enzyme specificity. [3 marks]

Question Two

With respect to dairy industry, show how the following enzymes are utilized in improving the quality of milk and milk products.

- (i) Lactoperoxidase [3 marks]

- (ii) Lysozyme [4 marks]
- (iii) Transglutaminase [4 marks]

Question Three

- (a) Proteases are by far the most studied enzymes for industrial bioprocessing. Describe how proteases are used in the fish industry under the following subheadings
 - (i) De-skinning of fish [3 marks]
 - (ii) Preparation of fish sauce [4 marks]
 - (iii) Extraction of collagen [4 marks]
- (b) How does enzyme papain cause tenderization in meat. [5 marks]

Question Four

Enzymes are processing aids used worldwide for fruit processing, particularly for the production of clear fruit juice and concentrate. Giving examples, discuss the advantages of enzymes in the juice industry. [10 marks]

Question Five

Bread is an important component of our foods either as a snack or during the main meal. Different enzymes are vital in assuming processing of high-quality bread. Complete the following table by putting an X for each enzyme that contributes to a given quality of bread. (N/B Multiple enzymes can contribute to the same parameter) [8 marks]

	Improved gluten network	Gas retention/increased volume	Improved colour and flavor	Improved crumb structure	Improved shelf life properties
Amylase					
Protease					
Xylanase					
Oxidase					
Lipase					

Question Six

Discuss the action of the following starch-hydrolyzing enzymes during the production of potable alcohol.

- (i) α - amylase [3 marks]
- (ii) β - amylase [3 marks]

(iii) Glucoamylase

[3 marks]
