



FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
SCHOOL	AGRICULTURE AND FISHERIES SCIENCES		
DEPARTMENT	FOOD SCIENCE AND SYSTEMS		
SUBJECT	FOOD CHEMISTRY		
SUBJECT CODE	AFST 3781		
DATE	JUNE 2024		
DURATION	2 HOURS	MARKS	120

FIRST OPPORTUNITY EXAMINATION

Examiner: Prof KKM Nantanga and Dr W Embashu

Internal Moderator: Dr S Barrion

External Moderator:

This question paper consists of **TWO (2)** pages excluding this front page.

Instructions:

- Answer all **five (5)** questions

QUESTION 1

- a) Outline two (2) key preservation effects of the freezing process. [4]
- b) The quality of fish can be preserved by proper freezing. Compare and contrast drip loss, freezer burn and glazing in relation to freezing and frozen storage of fish. [8]
- c) Freezing of, for instance tomatoes, causes freeze concentration and decompartmentalisation. Discuss these effects. [8]
- d) Heat can cause starch gelatinisation and protein denaturation. Compare and contrast the molecular changes and effects of these two (2) processes. [8]

QUESTION 2

- a) As a food chemist, you have been hired in an enterprise that produces a specialty brandy called Ombike, which comprises 43% ethanol and the rest is primarily water. You have therefore been requested to advise the Technical Director on the water activity of this premier product. Show your calculations. [6]
- b) "Don't consume sugary foods or beverages right before going to bed". However, toothpastes are generally sweet and are used to brush teeth before bed. Justify the sweeteners that are used in toothpastes and diet food products. [8]
- c) Compare and contrast the chemistry involved in the making of popcorn and NikNaks snacks. [10]

QUESTION 3

- a) Differentiate between an amino acid and a polypeptide. [6]
- b) Differentiate between proteinases, peptidases and lipases. [3]
- c) While on a food shopping trip in ABS supermarket with your family, one of your family members wondered whether there is a difference between golden and glucose syrups. Convince your relative by discussing the differences. [6]
- d) Outline the product(s) formed when a β -amylase is added to β -glucans. [2]
- e) Discuss using labelled sketches the effects of temperature and pH on the activity of enzymes. [6]
- f) Compare and contrast Caramelisation and Maillard browning. [12]
- g) Outline the key requirements for the chemical reactions that leads to the browning of a freshly cut apple. [8]

QUESTION 4

State the chemical composition (qualitatively and quantitatively) of margarine.
The Rama shown in the picture below is not a margarine. Defend this statement. [8]



QUESTION 5

Discuss briefly the effect of the following on lipid quality:

- a) Temperature [4]
- b) Amber packaging [4]
- c) Degree of saturation of fatty acids [4]
- d) Presence of linolenic fatty acid [5]

END OF EXAMINATION!