



FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
SCHOOL	AGRICULTURE AND FISHERIES SCIENCES		
DEPARTMENT	FOOD SCIENCE AND SYSTEMS		
SUBJECT	FOOD CHEMISTRY		
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DURATION	2 HOURS	MARKS	120

SECOND OPPORTUNITY EXAMINATION

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External Moderator:

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

Instructions:

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

QUESTION 1

- a) Discuss the mechanism of freezing in the preservation of fish. [6]
- b) State the key nutritional function of iodine and iron in humans. [2]
- c) State any two (2) functional properties of pregelatinised starch. [2]
- d) Define a food preservative. State three (3) mechanisms of preservation and outline a specific example of a preservative for each of the stated mechanisms. [8]
- e) Discuss the molecular differences for oils to be liquid and fats to be solids at ambient conditions. [10]
- f) State eight (8) functional and nutritional properties of edible oils and fats. [8]

QUESTION 2

- a) State whether each of the following statement is True or False: [10]
 - i) All triglycerides are lipids.
 - ii) Most naturally occurring sugars in foods are of D-configuration.
 - iii) Most naturally occurring amino acids in foods are of L-configuration.
 - iv) Margarine is a form of butter.
 - v) Milk is an oil-in-water emulsion.
 - vi) Caramelisation requires amino acids to occur.
 - vii) Maillard reaction occurs in freshly cut potatoes.
 - viii) Removal of O₂ can prevent enzymatic browning.
 - ix) Vitamin E is both a colourant and an antioxidant.
 - x) Sausage is a meat emulsion.
- b) A group of food chemistry students were studying in a small room in the library. Few of them complained of bloating when it was clear from the audible passing of gas by the students. Upon few queries of what they ate prior to coming to the library, beans, cabbage and asparagus were part of it.
Discuss and differentiate the specific main molecules that could have caused the bloating and flatulence among these students. Specify the process these molecules undergo and the three (3) common gases likely to be passed. [11]
- c) Discuss the synergistic role of α -amylase, β -amylase, pullulanase and amyloglucosidase in the manufacturing of glucose syrups from starch. [10]

QUESTION 3

- a) State any two (2) factors that affect the rate of enzymatic activity. [2]
- b) Outline the complete hydrolysis reaction including the enzyme responsible in the hydrolysis of each of the following:
- i) Malt sugar [4]
 - ii) Edible oil [4]
 - iii) Cane sugar [5]
- c) On the eve of her son's wedding day, Mrs Iiyambo instructed that a meat tenderizer must be used in the preparation of steaks, especially those intended for the elderly people. Discuss the effect of this use of a meat tenderizer. Include the mechanism of a meat tenderizer that brings about its effect. [4]

QUESTION 4

- a) Animal protein is considered of superior quality than that of plant source. State the reasons for this and briefly discuss each stated reason. [6]
- b) Outline two (2) human conditions that may arise as a result of protein-energy deficiency. [2]
- c) One of the ingredients listed on a food supplement for a body builder is whey protein. Discuss why whey protein is a useful ingredient in this supplement. [6]

QUESTION 5

- a) Briefly, describe three (3) main processes applied to fats and oils to modify their properties. Include why each process is applied. [12]
- b) In South Africa, lye (sodium hydroxide) peeling is still widely used to peel peaches and other fruits before canning. A peeling factory uses 9 Megaliters of 3.8 M lye concentration per week. It operates for 24 hours each day.
- i) Calculate how much lye (kg) is needed per hour for this factory. [4]
 - ii) What is the weight by volume % concentration of this peeling solution? [4]

END OF EXAMINATION!