

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

FIRST SEMESTER EXAMINATIONS – 2022

FOOD TECHNOLOGY - SECOND YEAR DEGREE

FT 212 FOOD CHEMISTRY

FRIDAY 03<sup>RD</sup> JUNE, 2022– 08:20 A.M.

**TIME ALLOWED: 3 HOURS**

**INFORMATION FOR CANDIDATES:**

1. You have 10 minutes to read the paper. You must not begin writing in the answer book during this time.
2. **ANSWER ALL QUESTIONS**
3. All answers must be written in the answer books provided.
4. Write your name and number clearly on the front page. Do it now.
5. Calculators are permitted in the examination room. Notes and textbooks are not allowed.
6. Show all workings and calculations in the answer book.

**MARKING SCHEME**

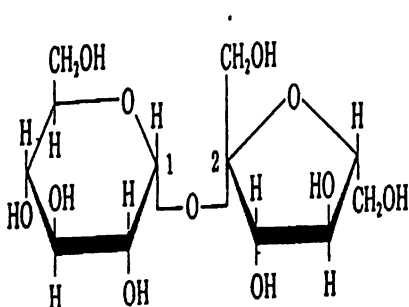
QUESTION 1	[32 MARKS]
QUESTION 2	[25 MARKS]
QUESTION 3	[31 MARKS]
QUESTION 4	[12MARKS]

**ANSWER ALL QUESTIONS**

1. (a) Define the following term: [4 marks]
- (i) Carbohydrate.
  - (ii) Heteroglycan.
  - (iii) Anomeric carbon.
  - (iv) Chiral Carbon.

- (b) Name and explain ANY TWO of the conformational changes of organic molecules. [2 marks]

- (c) Write the Scientific name of the following structure. [2 marks]



- (d) With the aid of illustrations, differentiate between 'L' and 'D' sugars. [4 marks]

- (e) Write notes on ANY THREE of the following: [9 marks]

- (i) Sucrose .
- (ii) Lactose.
- (iii) Maltose.
- (iv) Staychose.

- (f) State the differences between the following polysaccharides: [4 marks]

- (i) Dextran and Chitin.
- (ii) Cellulose and Starch.

- (g) Fully discuss ANY ONE of the following; [5 marks]

- (i) Granule structure of starch.
- (ii) The process of starch gelatinization.

- (h) Describe Retrogradation. [2 marks]

(Total = 32 marks)

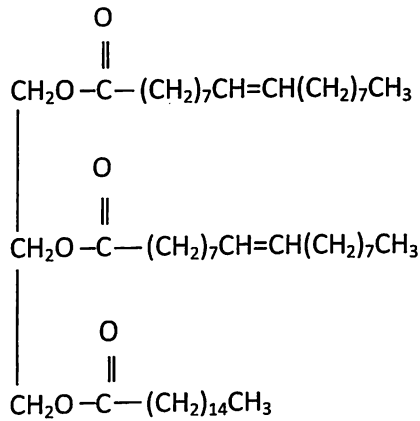
2. (a) Define the term Zwitterion. [1 mark]
- (b) In order for an amino acid to involve in a peptide bond to form a polypeptide, there are two requirements. What are they? [2 marks]
- (c) Write notes on ANY TWO of the following: [4 marks]
- (i) Simple protein.
  - (ii) Conjugated protein.
  - (iii) Derived protein.
- (d) Discuss ANY TWO of the following: [10 marks]
- (i) Primary Protein.
  - (ii) Secondary Protein.
  - (iii) Tertiary Protein.
  - (iv) Quaternary Protein.
- (e) Fully discuss ANY TWO of the following: [8 marks]
- (i) Hydration Capacity of protein.
  - (ii) Protein- protein interaction.
  - (iii) Surface property of protein.

(Total = 25 marks)

3. (a) What is polymorphism and what is its importance? [2 marks]

(b) Write the Nomenclature of the following structure.

[2 marks]



(c) Differentiate between the following:

[8 marks]

- (i) Saturated fatty acids and Unsaturated fatty acids.
- (ii) Polar lipids and Tryglycerols.

(d) Fully explain the process of extraction and refining of fats and oils.

[5 marks]

(e) There are several techniques/ methods used to improve the functional properties of fats and oils. Name and discuss ANY TWO of these techniques.

[4 marks]

(f) Below are some products in which fats and oils are used for its functional property. Discuss these functional properties of fats and oils in these foods.

[4 marks]

- (i) Bakery products.
- (ii) Ice cream.

(g) Oxidative rancidity is type of deterioration in lipids. Discuss ALL stages of oxidative rancidity.

[6 marks]

(Total =31 marks)

4. (a) Write notes on the following regarding their interactions with water;

[8 marks]

- (i) Ions and ionic compounds.
- (ii) Hydrophilic compounds.
- (iii) Hydrophobic compounds.
- (iv) Proteins.

(b) What are the differences between ice and water?

[4 marks]

(Total= 12 marks)