



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION : BACHELOR OF HUMAN NUTRITION	
QUALIFICATION CODE: 08BOHN	LEVEL: 6
COURSE NAME: FOOD CHEMISTRY	COURSE CODE: FCH621S
SESSION: NOVEMBER 2022	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY QUESTION PAPER	
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INSTRUCTIONS	
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.	

PERMISSIBLE MATERIALS

NONE

THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

SECTION A

QUESTION 1

(10 MARKS)

Evaluate the following statements and select the most appropriate answer from the given possibilities. *(Each question carries 1 mark.)*

- 1.1 One of the main goals of food processing is to:
- A. To maximise profits for the food processor.
 - B. To make it more appealing to the elderly.
 - C. To modify sensory characteristics.
 - D. To prevent food losses.
- 1.2 Which of the following vitamins may be lost during oil processing into margarine:
- A. Vitamin E
 - B. Vitamin C
 - C. Vitamin B
 - D. Vitamin D
- 1.3 The chemical bond formed between two monosaccharides is called:
- A. Glycosidic bond.
 - B. Glycolipid bond
 - C. Peptide bond
 - D. Glycophospholipid bond
- 1.4 Which of the following classes of enzymes are popular in the food industry:
- A. Transferases and Lyases
 - B. Hydrolases and Oxidoreductases
 - C. Isomerases and Ligases
 - D. All of the above

- 1.5 Which of the following enzymes is used in the meat industry:
- A. Protease
 - B. Lactase
 - C. Amylase
 - D. Pectinase
- 1.6 Which of the following types of starch contributes to gel formation:
- A. Amylopectin
 - B. Amylose
 - C. Pectin and amylose
 - D. None of the above
- 1.7 Which of the following food additives is an anti-oxidant:
- A. Ascorbic acid.
 - B. Lecithin
 - C. Benzoic acid
 - D. Sulphur dioxide
- 1.8 Lactose in milk is a:
- A. Oligosaccharide
 - B. Monosaccharide
 - C. Polysaccharide
 - D. Disaccharide
- 1.9 Which of the following fatty acids will be more susceptible to lipid oxidation:
- A. Octadecanoic acid.
 - B. 11-Octadecenoic acid
 - C. Tetracosanoic acid
 - D. 5, 8, 11, 14-Eicosatetraenoic Acid

1.10 Which of the following enhances minerals bioavailability:

- A. Phytic acid
- B. Organic acids
- C. Polyphenolic compounds
- D. All of the above.

QUESTION 2

(10 MARKS)

Assess the following statements and decide whether they are **true or false**. Write only the number of the question and next to it indicate your answer as **true or false** in the ANSWER BOOK. *(Each question carries 1 mark)*

- 2.1 Saturated fatty acids are more prone to lipid oxidation.
- 2.2 Hydrolytic rancidity is the breakdown of triacylglycerol by the addition of an acid.
- 2.3 In basic media, chlorophyll is very stable towards heat, whereas in acidic media it is unstable.
- 2.4 Cellulose can be digested in the human body because the f-linkages can be broken down by digestive enzymes.
- 2.5 Physically entrapped water may result in a food product that has a high water activity.
- 2.6 The peptide bond is made via a hydrolysis reaction.
- 2.7 Lipoxygenase can initiate lipid oxidation.
- 2.8 Hydrogenation of oleic acid changes it to stearic acid.
- 2.9 C18:0 is another way of naming linoleic acid.
- 2.10 Anthocyanins are the most distributed pigment group in the plant world.

SECTION B

QUESTION 3

(20 MARKS)

- 3.1 State any two (2) potential drawbacks of food processing. (2)
- 3.2 Outline any two (2) main approaches to the study of food chemistry. (2)
- 3.3 What is the relationship between water activity and enzymatic hydrolysis? (1)
- 3.4 Mention any three (3) ways that one can utilise to reduce water activity. (3)
- 3.5 What are the key elements of an amino acid? (4)
- 3.6 What are lipids? (2)
- 3.7 Briefly explain the difference between *cis* and *trans* fatty acids. (2)
- 3.8 Fatty acids may be named according to the Delta nomenclature, what are the three key things that one needs to know if they intend on naming fatty acids based on this Nomenclature. (3)
- 3.9 *Trans* fatty acids may arise during hydrogenation, how can one ensure that this does not happen. (1)

QUESTION 4

(20 MARKS)

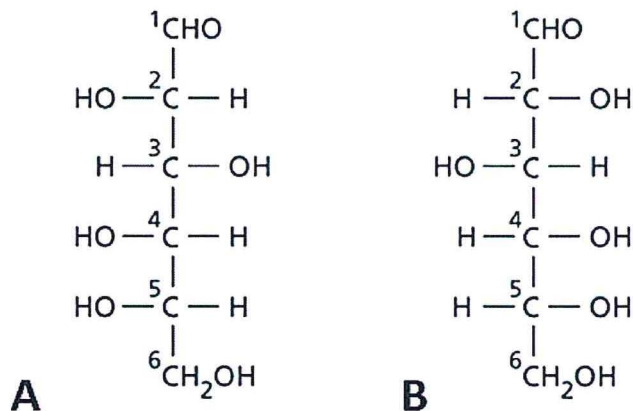
- 4.1 Apart from lipid oxidation, outline any other three (3) chemical reactions that may lead to the deterioration of lipids. (3)
- 4.2 Other than temperature, what other factors are said to affect the rate at which an enzyme works. (3)
- 4.3 Define the term "*Essential mineral*". (2)
- 4.4 What happens when mineral intakes are low over time. (1)
- 4.5 Outline any three factors that influence minerals bioavailability. (3)
- 4.6 Mention two non-enzymatic browning reactions involving carbohydrates. (2)
- 4.7 What is the difference between an aldose (aldehyde) and a ketose (ketone). (2)
- 4.8 Structural isomers are divided into three types. Name them. (3)
- 4.9 Why are monosaccharides sometimes referred to as simple sugars. (1)

SECTION C

QUESTION 5

(40 MARKS)

- 5.1 In its cyclic form, d-glucose may exist in an *alpha* (α) or *beta* (β) form. Differentiate between the two. (2)
- 5.2 When oxidized, monosaccharides yield sugar alcohols. Briefly describe how the following sugar alcohols are made:
- a) Aldonic acid. (1)
 - b) Uranic acid (1)
 - c) Saccharic acid. (1)
- 5.3 Which of the following Fischer projection diagrams shows D-glucose. Provide a reason for your answer. (3)



- 5.4 In order of occurrence, discuss the main stages of lipid oxidation. (8)
- 5.5 What is the *iso-electric point* and how does it influence protein digestibility. (4)
- 5.6 State any three (3) major forces that stabilise protein structures. (3)
- 5.7 What are food additives? (3)
- 5.8 A local entrepreneur who is into food processing approaches you for help on the use of food additives in his product. Using the Codex Alimentarius stipulations, how will you guide this individual. (3)
- 5.9 Briefly discuss any two main functions of preservatives and their principles. (4)
- 5.10 Differentiate between food fortification and food enrichment. (3)
- 5.11 Mention any two (2) lipid fat soluble vitamins. (2)
- 5.12 Mention any two states of water. (2)

GOOD LUCK!!!