



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**Faculty of Health and Applied sciences**

**Department of Health Sciences**

<b>QUALIFICATION: BACHELOR OF HUMAN NUTRITION</b>	
<b>QUALIFICATION CODE: 08B0HN</b>	<b>LEVEL: 6</b>
<b>COURSE CODE: FCH 621S</b>	<b>COURSE NAME: FOOD CHEMISTRY</b>
<b>SESSION: JANUARY 2020</b>	<b>PAPER: THEORY</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 100</b>

<b>SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	Mr. Waliomuzibu Mukisa George William
<b>MODERATOR:</b>	Dr. Adam Flowers

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Write clearly and neatly.</li><li>3. Number the answers clearly.</li></ol>

**PERMISSIBLE MATERIALS**

NONE

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

## SECTION A

### QUESTION 1

(20 MARKS)

*Select the most appropriate answer from the options provided. (Each correct answer earns 1 mark)*

- 1.1 Caramelisation is the same as Maillard reaction:
  - a. True
  - b. False
  
- 1.2 Cellulose can be digested in the human body because the  $\beta$ -linkages can be broken down by digestive enzymes:
  - a. True
  - b. False
  
- 1.3 Vitamin B5 is also known as Biotin:
  - a. False
  - b. True
  
- 1.4 A food emulsifier molecule usually contains.....in its molecular structure:
  - a. Atleast one hydrophobic moiety and one lipophilic moiety
  - b. Two lipophilic moieties
  - c. Atleast one lipophilic moiety and one hydrophilic moiety
  - d. Two hydrophilic moieties
  
- 1.5 Lactose in milk is a .....
  - a. Oligassacharide
  - b. Homo disaccharide
  - c. Disaccharide
  - d. Monosaccharide
  
- 1.6 Amylose is has more branched chains than amylopectin:
  - a. True
  - b. False

- 1.7 Which of the following minerals when taken in excess results into hair loss and fragile nails:
- a. Iodine
  - b. Iron
  - c. Selenium
  - d. Zinc
- 1.8 Which of the following terms is used to refer to enantiomeric pair of carbon compounds, which rotates a plane of polarized light in a clockwise direction:
- a. Levorotatory
  - b. Epilevorotatory
  - c. Dextrorotatory
  - d. a and c
- 1.9 Which of the following sugars is a non reducing sugar:
- a. Lactose
  - b. Maltose
  - c. Sucrose
  - d. Galactose
- 1.10 Which of the following is the product of oxidation of glucose molecule at the carbonyl carbon atom:
- a. Uronic acid
  - b. Saccharic acid
  - c. Aldonic acid
  - d. b and c
- 1.11 The following are key steps in the maillard reaction except:
- a. Amodori rearrangement
  - b. Formation of N-glucosamine
  - c. Integration of Amodori products
  - d. a and b

- 1.12 Acrylamide are carcinogenic compounds formed during food processing a reaction
- sugars only
  - Reducing sugars and L- asparagine
  - Reducing sugars and D-asparagine
  - b and c
- 1.13 Which of the following types of starch contributes to gel formation during starch processing:
- Amylose
  - Amylopectin
  - Homopolysaccharide
  - A and C
- 1.14 Elevated deficiency of Vitamin A leads to.....:
- Squamous metaplasia
  - Xerofthalmia
  - Teratogenia
  - a and c
- 1.15 Which of the following vitamins is best absorbed in presence of lipids:
- Vitamin B1
  - Riboflavin
  - Cobalamin
  - None of the above
- 1.16 Iron is an integral to the formation of haemoglobin and myoglobin:
- True
  - False
- 1.17 Hydrolysis of starch and glycogen yield glucose:
- True
  - False
- 1.18 Carbohydrate are polyhydroxy aldehyde or ketones:
- True
  - False
- 1.19 Lactose intolerance in humans is due to the absence of lactase enzyme:
- True
  - False

- 1.20 Heteropolysaccharides on hydrolysis yield a single type of monosaccharides and derivatives:  
a. True  
b. False

## SECTION B

### QUESTION 2

**(49 MARKS)**

- 2.1 Explain the following terms as they relate to caramelisation.
- 2.1.1 Caustic caramel. (3)
  - 2.1.2 Caustic sulfite caramel. (3)
  - 2.1.3 Ammonium caramel. (3)
  - 2.1.4 Sulfite ammonium caramel. (3)
- 2.2 Explain the health complications associated with consumption of trans-fatty acids. (4)
- 2.3 Explain four (4) chemical reactions that result into deterioration of fat. (8)
- 2.4 Explain three (3) reasons for fat hardening. (2)
- 2.5 Explain the primary and secondary structure of proteins. (4)
- 2.6 Explain the meaning of the following terms as they apply to chemistry of carbohydrates
- 2.6.1 Gelatinisation. (2)
  - 2.6.2 Position isomer. (2)
  - 2.6.3 Functional isomer. (2)
  - 2.6.4 Maillard browning. (2)
  - 2.6.5 Geometric isomer. (2)
  - 2.6.6 Chain isomer. (2)
  - 2.6.7 Acrylamide. (2)
- 2.7 Outline five (5) factors that are important in lipid oxidation. (5)

**QUESTION 3****(31 MARKS)**

- 3.1 Explain why an apple when cut and exposed to air turns to brown. (4)
- 3.2 Explain four (3) ways of controlling enzymatic browning. (6)
- 3.3 Explain digestibility and levels of essential amino acids in relation to protein Quality of a given food. (2)
- 3.4 Explain the chemical method for determining the nutritive value of protein. (6)
- 3.5 Outline two (2) advantages and three (3) disadvantages of chemical method in the determination of protein quality. (5)
- 3.6 Explain the four (4) types of caramelisation colors that important in the food industry. (8)

**GOOD LUCK**