NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Faculty of Health and Applied Sciences

Department of Health Sciences

QUALIFICATION: BACHELOR OF HUMAN NUTRITION	
QUALIFICATION CODE: 08B0HN	**LEVEL:** 6
COURSE CODE: FCH 621S	**COURSE NAME:** FOOD CHEMISTRY
SESSION: NOVEMBER 2019	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS
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 (20 MARKS)

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

1.1 C18:2 is another way of naming linoleic acid:
a. True
b. False

1.2 During the hydrogenation of polyunsaturated fats, double bonds are transformed from trans to cis isomerization:
a. True
b. False

1.3 Which of the following are secondary products of lipid oxidation:
a. Aldehyde and Ketones
b. Malondialdehyde and Alkyl radicals
c. Hydroperoxidases and Peroxyradicals
d. Aldehyde and Hydroperoxides

1.4 Chiral carbon atom is known to have different groups of atoms attached to it and these groups can be arranged in two different ways so that two different compounds are formed:
a. True
b. False

1.5 Which of the following are essential amino acids:
a. Histidine, Valine and Serine
b. Lysine, Arginine and Leucine
c. Tryptophan, Lysine and Valine
d. Alanine, Glycine and Lysine

1.6 Which of the following types of starch contributes to gel formation during starch processing:
a. Amylopectin
b. Amylose
c. Pectin and amylose
d. None of the above

1.7 The melting point of a C18:1 fatty acids with *cis* double bonds is higher than C18:1 fatty acids with *trans* double bonds:

a. True

b. False

1.8 During the formation of the protein primary structure, two amino acids are involved: Which of the following statements is correct regarding this reaction:

a. Both amino acids present carboxyl groups that react to form a peptide bond

b. Both amino acids present hydroxyl groups that react to form a peptide bond

c. The reaction is a hydrolysis in nature because it involves the release of water molecule

d. One amino acid presents a carboxyl group and the second amino acid presents a hydroxyl group and the groups react to form a peptide bond

1.9 Monosaccharide with five carbon atoms is referred to as:

a. Hexose

b. Heptose

c. Pentose

d. Tetrose

1.10 Two stereoisomers that are mirror images of the other are referred to as:

a. Chiral pair

b. Anomeric pair

c. Enantiomeric pair

d. Hemiacetal pair

1.11 Chemical bond formed when two monosaccharides react is called:

a. Glycophospholipid bond

b. Glycolipid bond

c. Glycosidic bond

d. Peptide bond

1.12 Pamitic acid is an example of unsaturated fatty acid

a. True

b. False

1.13 Hydrogenation of oleic acid changes it to stearic acid:

a. True

b. False

1.14 Vitamin B_9 is also known as folic acid:

a. True

b. False

1.15 Which of the following vitamins is best absorbed in presence of lipids:

a. Vitamin B1

b. Riboflavin

c. Cobalamin

d. None of the above

1.16 Which of the following statements best describes the starch dextrinization:

a. Is the process that occurs when starch is subjected to dry heat and it breaks down to form pyrodextrins

b. Is the process that occurs when starch reacts with water in presence of heat to form dextrins

c. Is the process that involves formation of hydrogen bonds when starch absorbs water

d. None of the above

1.17 Cholesterol can only be found in animal foods:

a. True

b. False

1.18 Trans-fatty acids are intermediate products of fat hydrogenation but also occur during fermentation in ruminants:

a. True

b. False

1.19 During enzymatic browning, formation of quinone compounds require the presence of phenolase and oxygen:

a. True

b. False

1.20 Van-der-Waal forces in the tertiary structure of protein are examples of:

a. H-bond interactions

b. Hydrophilic interactions

c. Hydrophobic interactions

d. Sulphur-sulphur interactions

SECTION B

QUESTION 2 **(50 MARKS)**

2.1 Outline three (3) reasons why fats are sometimes hydrogenated. (3)

2.2 Outline four (4) ways the degree of fatty acid hydrogenation can be controlled. (4)

2.3 Explain four (4) physicochemical changes that occur during hydrogen of fatty acids. (4)

2.4 Explain the major disadvantages of fat hydrogenation. (2)

2.5 Explain the structural hierarchy of proteins. (4)

2.6 Explain the meaning of the following terms as they apply to chemistry of carbohydrates.

2.6.1 Stereoisomer (2)

2.6.2 Structural isomer (2)

2.6.3 Mutarotation (2)

2.6.4 Caramelisation (2)

2.6.5 Enzymatic browning (2)

2.7 Outline the steps involved in maillard reactions. (5)

2.8 Explain the four (4) classes of caramel that important in the food industry. (8)

2.9 Outline the two (2) factors that determine the nutritive value of a given protein. (2)

2.10 Explain the biological method for determining the nutritive value of protein. (6)

2.11 Outline two (2) examples of antinutritional factors commonly found in food. (2)

QUESTION 3 (30 MARKS)

3.1 Describe the phases involved in lipid oxidation. (10)

3.2 Explain the common elements of emulsifiers. (2)

3.3 During food processing undesirable compounds are formed in food which render it unfit for human consumption. Such compounds include acrylamides.

3.3.1 Explain the term acrylamide. (2)

3.3.2 Explain four (4) ways of controlling acrylamide formation in food. (8)

3.4 Outline four (4) examples of water soluble vitamins. (4)

3.5 Outline four (4) sign/symptoms of vitamin A deficiency. (4)

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