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QUALIFICATION : BACHELOR OF HUMAN NUTRITION	
QUALIFICATION CODE: 08BOHN	LEVEL: 6
COURSE: FOOD CHEMISTRY	COURSE CODE: FCH621S
DATE: JANUARY 2024	SESSION: 2
DURATION: 3 HOURS	MARKS: 100

### SECOND OPPORTUNITY/SUPPLEMENTARY: EXAMINATION QUESTION PAPER

**EXAMINER: MR. ERICK NATANGWE UUKULE**

**MODERATOR: MS. FIINA K. NAMUKWAMBI**

#### INSTRUCTIONS:

1. Answer all questions on the separate answer sheet.
2. Please write neatly and legibly.
3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.
4. No books, notes and other additional aids are allowed.
5. Mark all answers clearly with their respective question numbers.

#### PERMISSIBLE MATERIALS:

1. None

#### ATTACHMENTS

1. None

**This question paper consists of 5 pages including this front page**

**QUESTION 1: MULTIPLE CHOICE QUESTIONS****[10 MARKS]**

Evaluate the statements in each numbered section and select the most appropriate answer or phrase from the given possibilities. Fill in the appropriate letter next to the number of the correct statement/phrase on your ANSWER SHEET.

**[10]**

1.1 Temperature and humidity are crucial parameters for which of the following stages:

- A. Production and Storage.
- B. Transport and Storage.
- C. Processing and Storage.
- D. All the above.

1.2 NOVA classifies all foods and food products into:

- A. Two groups.
- B. Four groups.
- C. Six groups.
- D. None of the above.

1.3 Which of the following food products is an example of an emulsion:

- A. Jam.
- B. Ice cream.
- C. Raw custard.
- D. Mayonnaise.

1.4 Maillard browning is at a maximum at the following water activity:

- A. 0.8 – 0.9  $a_w$
- B. 0.7 – 0.8  $a_w$
- C. 0.6 – 0.7  $a_w$
- D. 0.5 – 0.6  $a_w$

1.5 Which of the following vitamins are also anti-oxidants:

- A. Vitamin A and B<sub>12</sub>.
- B. Vitamin D and K.
- C. Vitamin B<sub>6</sub> and B<sub>3</sub>.
- D. Vitamin C and E.

1.6 Vitamin B<sub>3</sub> is also known as:

- A. Folate.
- B. Niacin.
- C. Riboflavin.
- D. Folate

- 1.7 Which of the following Vitamins increases the absorption of Calcium in the intestine:
- A. Vitamin A
  - B. Vitamin B<sub>3</sub>
  - C. Vitamin C
  - D. Vitamin D
- 1.8 Which of the following disaccharides are classified as reducing sugars:
- A. Lactose and Sucrose
  - B. Maltose and Glucose
  - C. Glucose and Sucrose
  - D. Maltose and Lactose
- 1.9 Which of the following fatty acids is not a saturated fatty acid:
- A. Oleic Acid
  - B. Capric Acid
  - C. Palmitic Acid
  - D. Stearic Acid
- 1.10 Which of the following minerals is needed to help muscles relax and contract:
- A. Calcium
  - B. Iron
  - C. Phosphorus
  - D. All of the above.

**QUESTION 2: TRUE/FALSE QUESTIONS**

**[10 MARKS]**

Evaluate the statements and select whether the statement is true or false. Write the word 'True' or 'False' next to the corresponding number on your ANSWER SHEET. [10]

- 2.1 Ester, glycosidic and peptide bonds are all formed via a dehydration reaction.
- 2.2 Glucose and Gluconic acid are functional group isomers of one another.
- 2.3 Exogenous enzymes are usually difficult to control, since they exist in the food matrix.
- 2.4 The use of food additives is regulated by the Codex Alimentarius Commission.
- 2.5 As a preservative, Sulphur dioxide is mostly used in jams and salad dressings.
- 2.6 Saturated fatty acids typically have two or more double bonds.
- 2.7 Hygroscopic foods are able to readily lose water to their immediate surroundings.
- 2.8 Emulsifiers are able to keep the oil and water phases of a salad dressing from separating.
- 2.9 In a fresh cut of beef, the red colour we see is because of the blood present in the meat.

2.10 Starch exists in the form of granules which are mostly soluble in cold water.

**SECTION B: SHORT/LONG ANSWER QUESTIONS**

**[80 MARKS]**

Please answer ALL of the questions in this section.

**QUESTION 3**

**(26 MARKS)**

3.1 Define the following terms:

- a) Essential mineral (2)
- b) Interesterification (3)
- c) Isoelectric point. (1)
- d) Monosaccharides (2)
- e) Water activity (2)

3.2 Mention any three (3) essential amino acids (3)

3.3 Mention any three (3) key elements of an amino acid. (3)

3.4 Clearly differentiate between protein hydrolysis and protein denaturation. (4)

3.5 Describe how you would identify whether a particular fatty acid is in a *cis* or *trans* configuration when presented with a diagram of its structure. (2)

3.6 Fatty acids may be named according to the Delta and Omega nomenclatures respectively. Study the diagram of the fatty acid below and name it according to:



- a) Delta nomenclature. (2)
- b) Omega nomenclature. (2)

**QUESTION 4**

**(27 MARKS)**

4.1 Based on its digestibility, nutritionally starch important fractions have been grouped into three (3) categories. Name and briefly describe these categories. (6)

4.2 Mention two (2) carbohydrates that are positional isomers of each other. (2)

4.3 The melting point of a triacylglycerol is determined by three things. Mention them. (3)

4.4 What is *Lipid hydrogenation* and why is it employed in the food industry? (4)

- 4.5 Mention two (2) non-enzymatic browning reactions involving carbohydrates. (2)
- 4.6 Clearly state the difference between amylose and amylopectin. (4)
- 4.7 Outline reasons why food processors use food flavourings. (3)
- 4.8 Outline any three (3) factors that influence the stability of meat colour and pigment stability. (3)

#### QUESTION 5

(27 MARKS)

- 5.1 When oxidised, monosaccharides yield sugar acids. Briefly describe how the following sugar acids are made:
- a) Aldonic acid. (1)
  - b) Uranic acid. (1)
  - c) Saccharic acid. (1)
- 5.2 Draw the structure (Fischer projection) of D-glucose. (3)
- 5.3 In order of occurrence, discuss the main stages of lipid oxidation. (8)
- 5.4 Briefly explain how the *salting in* and *salting out* phenomena affects protein solubility. (4)
- 5.5 State any three (3) major forces that stabilise protein structures. (3)
- 5.6 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)
- 5.7 Differentiate between food fortification and food enrichment. (3)

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END OF QUESTION PAPER