070

The Open University of Sri Lanka
Faculty of Natural Sciences
Diploma in Food Science Programme

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| Department | : Chemistry |
| Name of the Examination | : Final Examination |
| **Course Code and Title** | **: CYD3612 Introduction to food science and constituents of food** |
| Academic Year | : 2022/2023 |
| Date | : 25/06/2023 |
| Time | : 9.30 am - 12.30 pm |
| Duration | : 3 hours |

**General Instructions**

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **FOUR** questions in **four** pages.
3. **Answer All FOUR (04) questions. All questions carry equal marks.**
4. Answer for each question should commence from a new page.
5. Draw fully labelled diagrams where necessary.
6. Having any unauthorized documents/ mobile phones in your possession is a punishable offense.
7. Use blue or black ink to answer the questions.
8. Circle the number of the questions you answered in the front cover of your answer script.
9. Clearly state your index number in your answer script.

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1. **A)** Food is consisted of different main nutrients including water.
   i) Name **three (3)** main nutrients found in food other than water and give a function for each nutrient.
   ii) Briefly explain the factors governing the composition of food.
   iii) Briefly explain the cause of lactose intolerance.

(35 marks)

B) Good quality product needs several parameters those should compile with stipulated international and local standards.

i) Name **four (4)** different aspects one should consider when developing a new product.

ii) What are the different areas tested in sensory analysis?

iii) State **three (3)** regulations assures the quality of food in the market.

(30 marks)

C) Water is an essential component in any food item.

i) Draw the structure of water and show the dipole nature indicating the direction of dipoles in water.

ii) Name the hybridization found in water molecule.

iii) Explain how the high heat capacity, high dielectric constant, and high latent heat of fusion of water are important in food processing.

(35 marks)

2. A) Proteins are essential components of food.

i) Draw the basic structure of an amino acid.

ii) How do you classify proteins based on structural features?

iii) The most stable structure you mentioned in **A) ii)** has different interactions that stabilizes its structure. Briefly explain the different interactions stabilizing that structure.

(30 marks)

B) Denaturation is a common phenomenon encountered in food processing.

i) What do you mean by denaturation of proteins?

ii) Briefly explain the factors that brings denaturation in Food.

iii) Briefly explain how denaturation can be beneficial in our day-to-day life.

(25 marks)

C) Carbohydrates undergo different chemical reactions.

i) Name the **two (2)** polysaccharides found in starch.

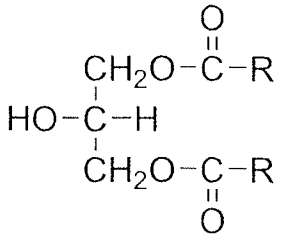
ii) Explain the difference between total hydrolysis and partial hydrolysis of carbohydrates.

iii) Give the chemical reaction for the total hydrolysis of sucrose. (no chemical formula is necessary)

iv) Briefly explain the chemical process behind dextrinization.

(45 marks)

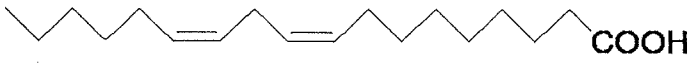
3. (A) i) Consider the structure of the following diglyceride. Write down the complete saponification reaction for the below diglyceride with KOH.



ii) Define the term, **saponification number.**

iii) Draw the structure of fatty acid, 18:1 (n-9).

iv) Give the shorthand notation of the following fatty acid molecule. (Show how you obtained it).




(35 marks)

B) i) Briefly describe the difference between flash point and smoke point of lipids.

ii) Explain the reason for the difference of the melting points of the following fatty acids.

Lauric acid 12:0 - 44 $^0$C

Stearic acid 18:0 - 69 $^0$C

(30 marks)

C) i) Write **four (4)** differences between fat soluble and water-soluble vitamins.

ii) Name **two (2)** functions of vitamin E.

iii) Name **three (3)** heat unstable vitamins.

(35 marks)

4. A) i) Write down **two(2)** functions of iron in the human body.

ii) What is the main functional difference between haem iron and non haem iron.

iii) It is recommended to use vitamin C (ascorbic acid) and Iron tablets together. Explain the reason.

(40 marks)

B) i) Name four natural colouring pigments found in food.

ii) Write down two changes that takes place in the texture of the plant food on cooling?

iii) Write down three advantages of using enzymes as catalysts in food industry.

(34 marks)

**C) i)** How do the trans fatty acids are formed?

**ii)** Why do trans fatty acids are considered as bad for human health?

**iii)** Name three compounds that impart bitter taste to the food.

(26 marks)