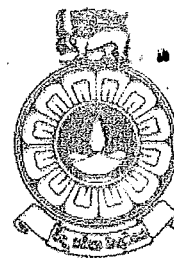


The Open University of Sri Lanka  
Faculty of Natural Sciences  
Diploma in Food Science Programme



Department	: Chemistry
Name of the Examination	: Final Examination
Course Code and Title	: <b>CYD3612 Introduction to food science and constituents of food</b>
Academic Year	: 2024/2025
Date	: 12/01/2025
Time	: 9.30 am - 12.30 pm
Duration	: 2 hours
Index number	:

### General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Four** questions in **six** 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.

1. A) Nutrients can be classified into macronutrients and micronutrients.

- i) Define the terms macronutrients and micronutrients.
- ii) Give two examples each for macronutrients and micronutrients.
- iii) Briefly explain the diseases resulting from
  - (a) overconsumption and
  - (b) under-consumption of nutrients.

(35 marks)

B) Sensory analysis is an essential aspect of Food Technology.

- i) What is meant by Sensory analysis?
- ii) What are the sensory qualities of food, and how do we detect them?
- iii) What is the importance of Quality assurance in food safety?
- iv) Name two good practices used in Quality assurance in food safety.

(25 marks)

C) Proteins are essential components of food.

- i) Name the monomer of proteins.
- ii) Draw the basic structure of the monomer of proteins.
- iii) Draw the zwitterion of the structure you drew in part (C)(ii) above.
- iv) Explain why the melting points of the monomer of proteins are usually greater than 200°C and are soluble in water.
- v) Give four uses of Proteins in the body.

(40 marks)

2. A) carbohydrates are essential components of food.

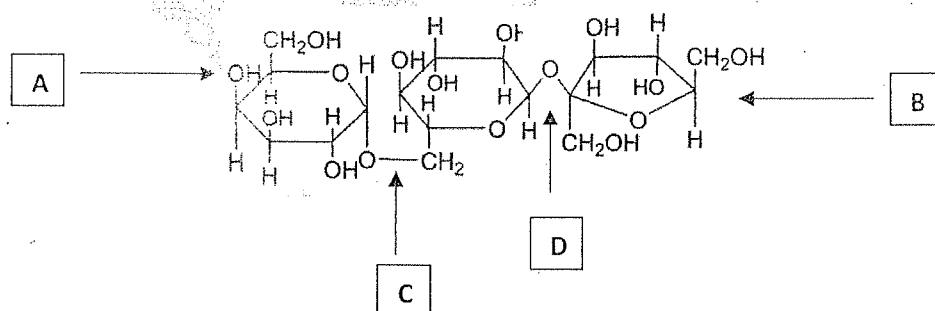
i) Classify the following sugars as monosaccharides, disaccharides, and polysaccharides.

- a) erythrose -
- b) maltose -
- c) cellulose -
- d) lactose -
- e) starch -

ii) Give the balanced chemical reaction to synthesize glucose from a natural phenomenon.

(30 marks)

B) Maltose is made out of  $\alpha$ -D-Glucose. The structure of  $\alpha$ -D-Glucose is given below.



- Name the sugar units labelled A and B depending on the number of carbon atoms in the ring.
- Name the bond found between two sugar units in maltose.
- Name the bonds labelled as C and D, stating  $\alpha$  or  $\beta$ .

(25 marks)

C) A laboratory technician in a Food laboratory receives an unknown sugar sample. He would like to perform several tests to identify it.

- Provide the tests, reagents, and inferences that the technician should use to identify the sample.
  - to test whether the sample is a carbohydrate
  - to test whether the sample is starch
  - to test whether the sample is a reducing sugar
- Dextrinization also converts starch to brown on dry heating. Briefly explain the reactions in Dextrinization.

(45 marks)

3. (A) The melting point of a few fatty acid molecules is given in the following table.

Name of Fatty acid	Melting point/ $^{\circ}\text{C}$
Lauric acid (12:0)	44
Myristic acid (14:0)	54
Palmitic acid (16:0)	63
Stearic acid (18:0)	70

Oleic acid 18:1(n-9)	16
Linoleic acid 18:2(n-6)	-5

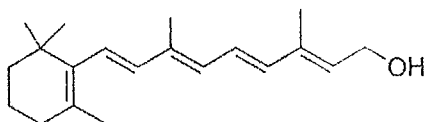
- Briefly explain why there are differences in the melting points of the fatty acids given in the table above.
- Arrange the fatty acid molecules in order of increasing solubility. Explain your answer.
- What do you mean by essential fatty acids?
- Name essential fatty acid/acids mentioned in the above table.
- Draw the structure of fatty acid, 18:1(n-9).

(45 marks)

- (B) i) What do you mean by interesterification?
- ii) Name four (4) properties of fats and oils use in food processing along with their applications.

(20 marks)

(C) The following shows the chemical structure of vitamin A



- What is the naturally occurring form of vitamin A in plant-based food materials?
- Name four (4) different storage forms of vitamin A in our body.
- Write down four (4) deficiency symptoms of vitamin A.
- Briefly describe the properties of fat-soluble vitamins.

(35 marks)

04. (A) i) Define the term "Recommended dietary intake"?

- Briefly describe the difficulties that arise in fortification with iron.
- Name four functions of calcium in our body.

(25 marks)

- (B) i) Briefly explain the role of potassium salt as a permitted additive in the food industry.
- ii) Name four (4) external factors that change the colour of pigments in food?

iii) Chemical reactions lead to the production of **desirable colour changes** during food processing. Explain the statement.

(35 marks)

(C) i) Name three (3) artificial sweeteners.

ii) Write down five (5) sensory properties used to evaluate food texture.

iii) Write down the five (5) advantages of using enzymes in the food industry.

iv) Briefly explain the effect of enzymes during the processing of tea to get brown colour tea leaves.

(40 marks)

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