00141

The Open University of Sri Lanka
Faculty of Natural Sciences
B.Sc Degree Programme

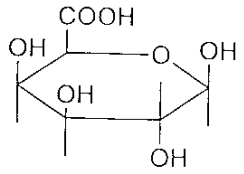
Department	: Chemistry
Level	: 5
Name of the Examination	: Final Examination
Course Title and - Code	: **CYU5307/ CYE5307 (Chemical Aspects of Food Industry)**
Academic Year	: 2024/2025
Date	: 17/05/2025
Time	: 1.30 p.m to 3.30 p.m
Duration	: 2 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **four (4)** questions on **four (4)** pages.
3. **All four (4) questions are compulsory.** All questions carry equal marks.
4. Answers to each question should commence from a new page.
5. Draw fully labelled diagrams where necessary
6. Involvement in any activity that is considered an exam offense will lead to punishment
7. Use blue or black ink to answer the questions.
8. Clearly state your index number in your answer script
9. Use of non-programmable calculators will be allowed.
10. Mobile phones and other electronic equipment are not allowed. Switch them off and leave them outside.

(1) Answer all parts (I) to (IV)

(I) The Haworth projection formulae of ß-D-Galacturonic acid is given below.



α-D-Galacturonic acid

(a) Draw the chemical structure of Pectic acid using the Haworth projection formulae of ß-D-Galacturonic acid given above.

(b) Describe the chemical structure of pectin and how they are formed from pectic acids.

(c) Name two main types of pectin based on their structure in terms of degree of methylation.

(25 marks)

(II)

(a) Explain the process of Gelatinization with reference to the "Brabender Amylograph" for potato starch.

(b) What is meant by Gelatinization temperature?

(c) What are modified starches? State their importance in the Food Industry?

(25 marks)

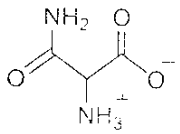
(III) (a) Draw the basic chemical structure of a simple lipid with two saturated fatty acid, Palmatic acid (C16:0) molecules and one monounsaturated fatty acid, Oleic acid (C18:1).

(b) Name a "compound lipid" found in high concentrations in egg yolk which is important in the food industry.

(c) Draw the basic structure of the compound lipid you mentioned in the above question Q(1)(III)(b).

(d) Explain the role of the compound lipid you mentioned above in Q(1)(III)(b) during the production of mayonnaise in the food industry. (25 marks)

(IV) Answer the following questions by considering the structure of an amino acid given below.



(a) Define the term zwitterion

(b) Can this amino acid be considered a zwitterion? Give reasons.

(c) Draw the structure of neutral/ ionic species of the above amino acid expected to form when the medium is basic (alkali) and acidic, respectively. (25 Marks)

(2) Answer all parts (I) to (III)

(I)

(a) Write down **five (5)** compositional changes that happen in milk when it is heated.

(b) Briefly explain how the iso-electric point of milk is being applied in milk processing.

(c) "Milk is an emulsion. Therefore, homogenization is an essential step for the processing of cow's milk". Explain the statement. (35 marks)

(II)

(a) Name **three (3)** permissible preservatives used in yogurt manufacturing.

(b) Write down **three (3) examples** for each following component.

(i) Proteins in egg white

(ii) Fats in egg yolk

(iii) Minerals in egg yolk

(iv) Vitamins in egg yolk

(c) Briefly explain **two (2)** widely used egg storage methods. (31 marks)

(III)

(a) Write down **four (4)** changes taking place during the ageing of meat.

(b) What do you mean by rigor mortis?

(c) write down **four (4)** advantages of smoking as a preservation method. (34 marks)

(3). Answer all parts (I) to (III)

(I)

(i) Name three categories of officers that could be appointed as Authorised officers (AO's) under the Food Act of Sri Lanka.

(ii) An imported jam is suspected to be of inferior quality. Among the food authorities appointed under the Food Act, under whose purview this matter will be considered.

(iii) Who is the chief of the Food Authority?

(iv) A trader was suspected of selling adulterated turmeric powder to customers. If you are an authorized person under the Food Act and have been asked to handle the case, state briefly the steps that you would follow.

(40 marks)

(II) (i) Define Good Hygienic Practices (GHP)

(ii) Explain the importance of GHP in food safety.

(iii) Identify roles (three) of the government according to the general principles of GHP in food hygiene?

(30 marks)

(III) (a) What is HACCP? Why is it important in the food industry?

(b) What is meant by the term Critical Control Points (CCP) of a food manufacturing process?

(c) Identify Critical Control Point/s of Pasteurisation of milk. Explain your answer in terms of the method used in the Pasteurisation of milk.

(30 marks)

(4) Answer all parts (I) to (III)

(I)

(a)Write down **four (4)** uses of cereals in the food industry.

(b) "Cooked meat appears brown while the cured meat will not change its colour and remain as pinkish red colour" Explain the statement.

(c) (i) What do you mean by fortification of flour?

(ii) Write down **three (3)** examples of the fortification of flour with additives.

(40 marks)

(II) (a) (i) Name the two main groups of enzymes important in food science, based on their action.

(ii) Give two (02) examples for each type of enzyme.

(b) Briefly explain the role of enzymes in bread making process. (26 marks)

(III)

(a) (i) Name four (04) types of inherent toxins.

(ii) Why are Aflatoxins considered a harmful chemical substance to human health? Explain.

(b) (i)What is meant by food intoxication?

(ii) Name four (4) examples of food intoxication. (34 marks)