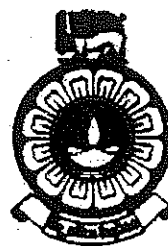


The Open University of Sri Lanka
Faculty of Natural Sciences
Diploma in Food Science



Department	: Chemistry
Level	: 3
Name of the Examination	: Final Examination
Course Title and Code	: Food Preservation and Processing (CYD3614)
Academic Year	: 2021-2022
Date	: 11 th March 2023
Time	: 9.30 a.m. – 12.30 p.m.
Duration	: 3 hr

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of (04) essay questions in (4) pages.
3. **Answer all (04) questions.**
4. Use a blue or black pen not a pencil. Use the given book to write down answers for (4) essay questions.
5. **Answer for each question should commence from a new page.**
6. Draw fully labelled diagrams where necessary.
7. The use of a non-programmable electronic calculator is permitted.
8. Clearly state your **index number in your answer script.**
9. Involvement in any activity that is considered as an exam offense **will lead to punishment.**

01. A) i) Define the term "Thermal Processing" giving its one of the important desirable effects. (06 marks)
- ii) Preservation is one of the main objectives of food processing ~~used in food~~ industry. Name **two techniques** for each of the following processing methods. (08 marks)
- (a) Heat processing using steam or water.
 (b) Heat processing direct or radiated heat or electromagnetic radiation.
- iii) Name **three** modes of heat transfer during thermal processing and arrange them according to the increasing order of rate of heat transfer. (07 marks)
- iv) Explain how the following major constituents in food effects on the thermal processing temperatures. (09 marks)
- (a) Moisture content
 (b) Sugar or starch
 (c) Fats and oils
- B) i) Define the term Decimal Reduction Time (D value). (05 marks)
- ii) Draw a graph to represent the "Thermal death rate curve" for Clostridium Botulinum spores and mark the D value in the same graph you have drawn. (15 marks)
- iii) What are the **two** important deductions that you could make from a 'Thermal Death Rate Curve'? (10 marks)
- C) i) How is preservation achieved through pasteurization? (06 marks)
- ii) Classify pasteurized milk according to the temperature-time program and define the **two** ways of pasteurization you mentioned in terms of pasteurization temperatures using in present days and properties after the process. (08 marks)
- iii) Explain the effectiveness in terms of microorganisms of sterilization conditions over pasteurization conditions as thermal processing techniques. (06 marks)
- iv) (a) Comment on the thermal processing technique used in retort packaging for the 'Ready-to-Eat food' and explain its shelf-life period.
 (b) Indicate the role played by each laminated surface in a retort package? (10 marks)
- v) (a) Giving examples for extruded food in market explain the term Extrusion used in food industry.
 (b) What are the parameters on which the product formed during the extrusion technique depends on. (10 marks)

02. A) Dehydration is one of the oldest and simplest technique that used to preserve food.

- i) Write down **four** factors within the food material that affect on rate of dehydration. (08 marks)
- ii) What do you mean by case hardening? What is the advantage of that? (10 marks)
- iii) "Dehydrated food is having long shelf life." Briefly explain the statement. (10 marks)
- iv) What will happen to each sample, if the two oat and wheat samples are dried under at 86°C and 75% relative humidity?
(Please note that vapour pressure of the wheat and oat is 0.028 bar, 0.035 bar and the vapour pressure of the air is 0.031bar) (14 marks)

B) i) Which kind of dryer would you use if you want to dry following food stuffs? (06 marks)

- a) Milk powder -
- b) Coffee beans -

- ii) Explain the reason for the above choice. (10 marks)
- iii) "Solar drying is better than sun drying" Explain the statement. (10 marks)

C) Concentration is a common technique that used to reduce the volume of water in a solute.

- i) Name **three** techniques of concentration used in food industry. (06 marks)
- ii) Write down **three** most suitable evaporators to concentrate fruit juice. (06 marks)
- iii) Write down **three** differences between freeze drying and freeze concentration. (12 marks)
- iv) a) What do you mean by starter culture?
b) Give **one** example of using starter culture during food fermentation in our day today life. (08 marks)

03. A) Homogenization is important for processing, storage and consumption of cow milk as a food for human.

- i) What is meant by homogenization of milk? (06 marks)
- ii) Write down **three** advantages of UHT sterilized milk over pasteurized milk. (12 marks)
- iii) Why milk is considered as an emulsion? (06 marks)
- iv) Explain the difference between acid cheese and rennet cheese. (08 marks)
- v) a) Write down the **five** major steps of manufacturing of butter. (10 marks)
b) What is the way of producing sour cream butter? (08 marks)

- B)**
- a)** List down the differences between herbs and spices. (12 marks)
 - b)** Spices contain both volatile components and non-volatile components.
 - (i)** Name **four** classes of non-volatile components. (12 marks)
 - (ii)** Piperine and curcumin are two examples for non-volatile compounds in spices. What is the major role played by each of them? (06 marks)
 - (iv)** Give the name of a spice which contains each of these constituents. (06 marks)
 - (c)** Explain what is meant by value addition in relation to spices. (05 marks)
 - (d)** What are the major types of value-added products? (09 marks)

- 04. A. i)** Rice is the main cereal grown in Sri Lanka. What do you mean by cereals? (05 marks)
- ii)** Draw and label the structure of a rice grain. (07 marks)
 - iii)** Briefly explain why Beri-beri disease can be prevented by consuming rice contain bran compared to polished rice. (08 marks)

- B. i)** Wheat flour is principally used to prepare bakery products. Briefly explain how the proteins in wheat flour cause the leavening of dough during the making of bakery products. (10 marks)
- ii)** Name **five** components added to wheat flour to make it fortified. (10 marks)
 - iii) a)** Briefly explain how you would classify the Bakery products according to the source of leavening agents. (20 marks)
 - b)** Classify the following bakery products according to the classification you mentioned in **ii) a)**. (10 marks)

C. Consider that you are going to be entrepreneur in biscuit manufacturing. You are planning to develop a new biscuit to the market from mangoes.

- i)** What are the main ingredients you will use in biscuit manufacturing? (10 marks)
 - ii)** Briefly explain the processes involved in the manufacture of biscuits. (Hint: no exact temperatures or timing is necessary) (20 marks)
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