



THE OPEN UNIVERSITY OF SRI LANKA
B. Sc. DEGREE PROGRAMME 2016 / 2017
LEVEL 5 - FINAL EXAMINATION
CMU3127 – CHEMICAL ASPECTS OF FOOD INDUSTRY
DURATION: 02 HOURS

Date: 23.01.2018 (Tue)

Time: 1.30 to 3.30 p.m.

Instructions to candidates:

This paper consists of six (06) questions. Question 1 is compulsory. You are required to answer four (04) questions out of six (06) including compulsory question number 1.

- (I) (I) State **one** method which can be applied to retain the original shape and the composition of the food product by retaining its water activity during food packaging. (10 marks)
- (II) Name **two** food products in the market where the gelatinization property of flour is used in the production. (10 marks)
- (III) Which groups of compounds are formed after hydrolysis of conjugated proteins? (10 marks)
- (IV) Write down the essential components of the meat curing mixture. (10 marks)
- (V) What is whey powder? (10 marks)
- (VI) Why is egg York considered a good emulsifier? (10 marks)
- (VII) What is meant by ageing of meat? (10 marks)
- (VIII) State **two** functional properties of eggs. (10 marks)
- (IX) What is the principle behind the Dean and Stark method of moisture analysis of food? (10 marks)
- (X) Suggest a **method** which can be suitable to determine total lipid content of a food that contains more lipoproteins. (10 marks)

(2) (I) The use of oligosaccharide in food industry is widely applicable in coconut based fermented products of coconut sap.

- (a) Name the major type of naturally occurring disaccharide in coconut sap.
- (b) State two major types of liquor industries available in Sri Lanka which uses the fermented products of coconut sap.
- (c) What are the basic chemical reactions occur during coconut vinegar production.

(40 marks)

(II) Meat industry is one of the most popular industries in Sri Lanka.

- (a) Name two types of meat proteins present in the muscle of raw meat.
- (b) State the conjugated protein responsible for color of the raw meat and state what type of groups are present in the conjugated protein you mentioned here.
- (c) Explain how the color variations are occurred during the processed meat production.

(40 marks)

(III) Wheat flour is white colored flour obtained from yellow colored wheat.

- (a) State the pigment responsible for the yellow color of wheat.
- (b) Explain how the color changes during the wheat flour preparation.

(20 marks)

(3) (I) (a) Name and explain one process used by food manufacturers to prolong the shelf life of milk.

- (b) What is the effect of the process on the nutritional value of milk?
- (c) What is meant by fortified milk?
- (d) Explain what is meant by UHT milk and why it is special.

(50 marks)

(II) (a) What is meant by "conditioning" of wheat?

- (b) Compare the shelf life of whole wheat flour to that of white flour. Give reasons.
- (c) What is gluten? Why is it considered important in Food industry?
- (d) Comment on the protein content and water holding capacity of whole wheat flour.

(50 marks)

- (4) (I) (a) Briefly describe the method "Hydrogenation" available for modification of Lipids.
 (b) Explain how the products formed during hydrogenation affects the human health.
 (c) Explain how the above health hazards can be eliminated during hydrogenation.

(II) "Enzymatic browning is an undesirable effect due to the brown color appearance in cut apples or pears". Explain this statement.

(40 marks)

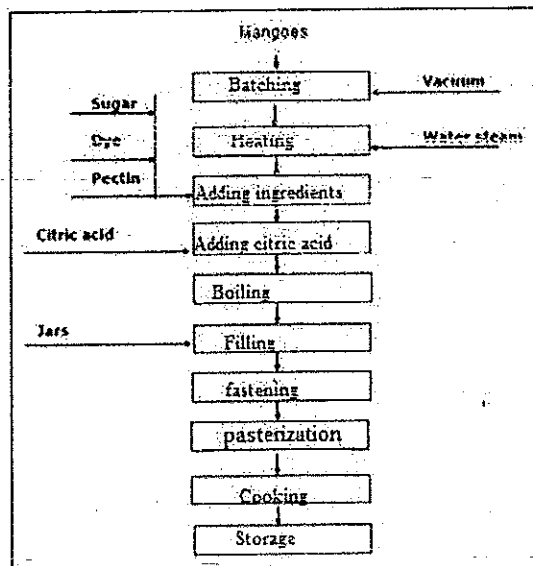
(III)

- (a) What is the difference between modified starch and native starch? Explain how the addition of modified starch is of benefit to the industry/consumer.
 (b) Comment on the statement "The biological value of fish is 80".
 (c) Explain how microbial activity is prevented through smoking of fish.
 (d) What are ω -3 fatty acids? Why are they considered important? Discuss its relevance in a fish containing meal.

(60 marks)

(5)

(I) HACCP certified factory follows the flow diagram shown in figure for production of Jam.



- (a) Identify a critical control point in the process. Give reasons for your answer.
 (b) State three benefits of having a HACCP plan for manufacturing.
 (c) What food preservation principle is used in the manufacturing of jam? (50 marks)

(II) State the main aspects covered by food regulations in a country.

(III) State how and where the following is displayed on a food label.

- (a) Common name of the contents (b) Any permitted food additive

(IV) An authorized officer was informed to carry out an investigation to adulterated chilli powder stock. State the essential steps he should follow.

(50 marks)

(6) (I) Moisture content analysis is one of the most commonly measured properties of a food material.

- (a) State two reasons why determination of moisture content is important in food analysis.

(II) Ash content represent the total mineral content of the food product.

- (a) State two reasons the importance of determination of ash content in food analysis?

(b) Suppose you are working in a certified food analysis lab. You receive two milk samples (sample A and B) from the same vendor. You analyzed the ash content of two samples A and B separately. Your results of ash content on dry weight basis shows a huge variation of the results.

Comment on the results you obtained for two samples.

(50 marks)

(III) The Kjeldahl method of protein analysis consists of three major steps.

- (a) List these three steps in the order they are done

(b) Explain why the conversion factor from Kjeldahl nitrogen to protein is different for various foods, and how is the factor of 6.25 obtained?

(IV) "Phenol-Sulfuric acid method determine the total carbohydrate content of the given food sample".

- (a) Explain the above statement using the principle behind the Phenol-Sulfuric acid method. (State what classes of carbohydrates are detected by this method).

(50 marks)