



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF CHEMICAL AND BIO-ENGINEERING TECHNOLOGY

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CFB30203
COURSE TITLE : FOOD PACKAGING TECHNOLOGY
PROGRAMME NAME : BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (FOOD)
WITH HONOURS
DATE : 24 JANUARY 2026
TIME : 9:00AM - 12:00PM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
 2. This question paper is printed on both sides of the paper.
 3. This question paper consist of ONE sections.
 4. Section A consist of five questions. Answer FOUR (4) questions only.
 5. Please write your answer on the answer booklet provided.
 6. Please answer all questions in English only.
 7. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*
 8. *Food Act 1983 (Act 281) & Regulations book is ALLOWABLE IN THE EXAMINATION HALL.*
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THERE ARE 8 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

- (a) Describe FIVE (5) advantages of using glass with respect to its uses in food packaging.

(5 marks)

- (b) Figure 1 shows a packaging material utilised for banana chips that are frequently retailed at roadside stalls.



Figure 1

- i. Discuss TWO (2) packaging environments that will influence the quality of banana chips.

(6 marks)

- ii. Suggest an alternative packaging material and design that is more appropriate than the one depicted in Figure 1.
(1 marks)
 - iii. Explain with justification the reasoning behind your answer in (b)ii.
(4 marks)
- (c) Your manager at a food manufacturing company has tasked you to design the packaging for a ready-to-eat *nasi goreng* that shall be stored frozen.
- i. Describe THREE (3) factors that need to be considered in designing the packaging of the food product mentioned above.
(6 marks)
 - ii. Suggest the appropriate packaging material and give reasons for your selection.
(3 marks)

Question 2

(a) Vacuum packaging is commonly used technology to improve shelf life of food products.

- i. Name TWO(2) package configurations used for vacuum packaging of chilled foods.

(2 marks)

- ii. Table 1 shows typical shelf lives of some vacuum packaged products. Explain how the technology improve the shelf lives of the products.

(4 marks)

Table 1

Item	Normal Refrigerated Life	Estimated Refrigerated Life (Vacuum Packaging)
Smoked Fish	1-2 Weeks	6-12 Weeks
Fresh Fish	1-2 Days	1 Week

(b) Aseptic packaging is another technology to improve shelf life of food products.

- i. On your own words, define aseptic packaging for food product.

(3 marks)

- ii. Suggest TWO(2) food products that commonly used aseptic packaging.

(2 marks)

- iii. Discuss the advantages and disadvantages of aseptic filling.

(7 marks)

(c) Fresh fruits are categorized as perishable food. However, the freshness of the fruits need to be maintained at the highest quality until it reached the consumers.

- i. Suggest a specialty package used for the fresh fruits.
(1 marks)
- ii. Explain how the above answer in (b)i above improves the shelf life of the fruits.
(6 marks)

Question 3

- (a) A manufacturer produces a pasteurised fruit juice with a declared shelf life of 6 months at ambient temperature. To shorten product development time, the company applies Accelerated Shelf Life Testing (ASLT) by storing samples at 37°C and 45°C.
 - i. The shelf life of food can be divided into two: Primary and secondary shelf life. Differentiate between primary shelf life and secondary shelf life of food.
(4 marks)
 - ii. Explain the principle of ASLT used in this study.
(4 marks)
 - iii. In designing suitable packaging for foods, it is essential to first define the critical descriptors or indices of failure (IoFs) of the product. These are the quality attributes that indicate when the food is no longer acceptable to consumers. Identify TWO (2) IoFs for the juice that limit its shelf life.
(2 marks)
- (b) The shelf life of a food product is influenced by several packaging properties, including water vapor transfer, gas and odor transfer, light transmission, package dimensions, package-product interaction, and the distribution environment. Choose THREE (3) of these properties and explain how they affect the shelf life of the food product.
(9 marks)
- (c) Discuss how temperature fluctuations experienced by a packaged food product during transportation can affect its quality, safety, and shelf life.
(6 marks)

Question 4

Food labelling is a critical regulatory tool to ensure consumer protection, accurate information, and fair trade practices under the Food Regulations 1985.

- (a) Figure 2 shows label of a food product sold at an airport in Bangkok, Thailand.



Figure 2: Front label of a food product

- i. If the product is to be exported to Malaysia, identify TWO (2) labeling requirements (Figure 2) that the manufacturer must update in accordance with the Food Regulations 1985.
(4 marks)
- ii. "5% Mango Juice Carrageenan Jelly"
Explain this statement and specify the regulation number and its statement according to Food Regulation 1985.
(4 marks)

- (b) A locally manufactured ready-to-drink fruit beverage branded as "VitaFresh Plus" is sold widely in supermarkets and convenience stores across Malaysia. The product label includes the following information:

Product name: *VitaFresh Plus – Natural Fruit Drink*

Net volume: 250 mL

Ingredients listed as: *Water, fruit juice, sugar, flavouring*

Claims on the front label:

"100% Natural"

"No Added Sugar"

"Rich in Vitamin C"

Manufacturer name and address are stated.

No nutrition information panel is provided.

No date marking (expiry or best before date) is displayed.

The label does not indicate the percentage of fruit juice used.

The product contains permitted food colouring, but this is not declared on the label.

- i. During a routine inspection, the Ministry of Health (MOH) identifies potential non-compliance with the Food Regulations 1985 and issues a notice for corrective action. Identify THREE (3) non-compliant or potentially misleading elements, support your evaluation with relevant regulatory requirements.

(6 marks)

- ii. Based on your answer in b(i), discuss the potential implications from the aspect of consumer protection and public health by providing TWO (2) potential implications for each aspect.

(4 marks)

- (c) There are regulations related to packages for food according to Food Regulation 1985. By specifying the relevant regulations, discuss the following:

- i. The packages that prohibited to be recycled.

(4 marks)

- ii. The prohibition of container reuse.

(3 marks)

Question 5

Recent advancements in food packaging systems have paved the way for innovative methods of packaging commonly referred to as “smart packaging technology” that involve mechanisms to precisely monitor the changes happening inside the food product.

- (a) Identify TWO (2) classification of smart packaging. (2 marks)

- (b) Based on your answer in (a), compare these two types of smart packaging with respect to their definitions. (6 marks)

- (c) Intelligent food packaging systems are increasingly found in the market.
- i. Select one example of an intelligent food packaging system used in the food industry. (1 marks)
 - ii. Explain how the selected intelligent packaging system works, including its operating principle and the type of information it provides. (5 marks)
 - iii. Critically discuss ONE (1) advantage and ONE (1) limitation, considering technical reliability, cost, consumer acceptance, and regulatory issues. (6 marks)
 - iv. Evaluate whether this intelligent packaging system is suitable for large-scale commercial applications. Provide TWO (2) justifications based on your evaluation. (5 marks)

END OF EXAMINATION PAPER

