



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

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CFB30104
COURSE TITLE : FOOD PROCESSING AND INNOVATION
PROGRAMME NAME : BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (FOOD)
WITH HONOURS
DATE : 26 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 TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. When analyzing the effectiveness of various refrigeration techniques for preserving dairy products, which factor would not be typically considered?
 - A. Humidity levels
 - B. Storage temperature
 - C. Fat content of the product
 - D. Duration of storage

2. What is a new food product?
 - A. A product that is similar to existing products.
 - B. A product that has been modified slightly.
 - C. A product that has been sold before in the same market
 - D. A product that has not been presented before in any marketplace

3. In evaluating different sterilization methods for canned foods, which method would likely have the least impact on the food's flavor and texture?
 - A. Ultraviolet light sterilization
 - B. High-temperature steam sterilization
 - C. Gamma irradiation
 - D. Chemical sterilization

4. In assessing the impact of extrusion on protein-rich foods, what would not be a typical outcome of the process?
 - A. Increase in protein content
 - B. Denaturation of proteins
 - C. Improvement of digestibility
 - D. Enhancement of flavors

5. When analyzing the suitability of different packaging materials for aseptically processed beverages, which property would not be typically considered?
 - A. Light transmission
 - B. Resistance to temperature fluctuations
 - C. Color of the package
 - D. Oxygen permeability

6. In an analysis of food additives, which of the following would not be a typical reason for adding an emulsifier to a food product?
 - A. To stabilize mixtures
 - B. To increase nutritional value
 - C. To extend shelf life
 - D. To improve texture

7. When analyzing texture modification in yogurt production, which factor would not typically be considered in the process?
 - A. Type of culture used
 - B. Fermentation time
 - C. Color additives
 - D. Fat content

8. In examining different methods for extending the shelf life of bread, which of the following would not typically be considered?
- A. Increasing water activity
 - B. Adding preservatives
 - C. Adjusting pH levels
 - D. Modifying packaging
9. If a food product is sensitive to high heat, which drying method would be most suitable?
- A. Freeze drying
 - B. Sun drying
 - C. Spray drying
 - D. Hot air drying
10. What is the primary purpose of blanching vegetables before freezing?
- A. To enhance their flavor
 - B. To soften the vegetables
 - C. To add nutrients
 - D. To preserve color and prevent spoilage
11. Why is dehydration used in food processing?
- A. To increase the food's water content
 - B. To extend the shelf life by reducing water activity
 - C. To cook the food thoroughly
 - D. To make the food tastier

12. The primary objective of evaporation in food processing is to:
- A. Improve emulsification
 - B. Reduce water activity by freezing
 - C. Sterilize liquid foods
 - D. Increase total soluble solids by water removal
13. Compared to hot-water blanching, steam blanching results in:
- A. Higher vitamin loss
 - B. Longer blanching time
 - C. More water absorption
 - D. Better nutrient retention
14. Which of the following is NOT an objective of blanching?
- A. Color preservation
 - B. Enzyme inactivation
 - C. Removal of trapped air
 - D. Complete destruction of microorganisms
15. Rapid cooling after blanching is done mainly to:
- A. Remove moisture
 - B. Improve flavor
 - C. Stop further cooking
 - D. Increase enzyme activity

16. Which flow type is preferred for efficient heat and mass transfer in food processing?
- A. Laminar flow
 - B. Turbulent flow
 - C. Plug flow
 - D. Static flow
17. Flow in which fluid particles move in parallel layers without mixing is called:
- A. Turbulent flow
 - B. Transitional flow
 - C. Laminar flow
 - D. Pulsating flow
18. Which mixer is commonly used for high-viscosity food products such as dough and pastes?
- A. Propeller mixer
 - B. Static mixer
 - C. Paddle mixer
 - D. Rushton mixer
19. The main purpose of an impeller in a liquid mixer is to:
- A. Reduce viscosity
 - B. Heat the liquid
 - C. Filter solids
 - D. Create flow and turbulence

20. Over-blanching of vegetables leads to:
- A. Improved shelf life
 - B. Soft texture and nutrient loss
 - C. Poor enzyme inactivation
 - D. Increased firmness
21. The main role of gelatin in ice cream is to
- A. Add sweetness
 - B. Add flavoring
 - C. Get a soft texture
 - D. None of the above
22. What is the relationship between disembodied and embodied knowledge in product development?
- A. Embodied knowledge is created before disembodied knowledge
 - B. Disembodied knowledge is irrelevant to product development
 - C. Embodied knowledge is not influenced by tacit knowledge
 - D. Disembodied knowledge eventually becomes embodied in the product
23. In the context of product development, what is the significance of shelf-life testing?
- A. To simplify the production process
 - B. To increase the nutritional value of the product
 - C. To ensure consumer safety and product quality
 - D. To reduce production costs

24. What is the role of product support in the product introduction phase?
- A. To define the product specifications
 - B. To provide feedback for product improvements and new opportunities
 - C. To conduct market strategy and testing
 - D. To develop the initial prototype
25. During product commercialization, what is a critical factor to ensure the product is launched at the correct time?
- A. Developing a strategic plan
 - B. Conducting market opportunity assessment
 - C. Controlling financial resources and time
 - D. Creating a business plan
26. In the product design and process development phase, what is the purpose of benchmarking?
- A. To evaluate competitive products and identify flavor opportunities
 - B. To optimize the product formulation
 - C. To scale up production
 - D. To develop a prototype
27. What is the primary output of the situation analysis in the product strategy process?
- A. A list of new product options
 - B. A set of threshold criteria
 - C. A map of market opportunities
 - D. A compilation of current information about the customer, competition, and company competencies

28. Which step in the product strategy process involves creating a product development portfolio?
- A. Step One
 - B. Step Four
 - C. Step Six
 - D. Step Two
29. What is the main goal of shelf life testing in prototype development?
- A. To optimize the product formulation
 - B. To evaluate the product's sensory attributes
 - C. To determine the product's marketability
 - D. To establish the time when the product no longer maintains expected quality
30. Analyze the impact of Ultra High Temperature processing (UHT) on the nutritional quality of fruit juices. How does UHT compare to traditional thermal pasteurization?
- A. Both methods preserve nutrients equally
 - B. UHT preserves more nutrients
 - C. Thermal pasteurization preserves more nutrients
 - D. Neither method preserves nutrients
31. When analyzing a new snack food product made from grains, which extrusion characteristic would be most critical to its success in terms of texture and flavor?
- A. Feed moisture content
 - B. Die shape
 - C. Cooking temperature
 - D. Screw speed

32. In evaluating a food processing plant's safety procedure, which aspect would not typically be part of a Hazard Analysis and Critical Control Points (HACCP) plan?
- A. Cleaning schedules
 - B. Monitoring of cooking temperatures
 - C. Nutritional content of products
 - D. Verification of packaging integrity
33. Compare the effects of blanching and freezing on the nutritional content of vegetables. Which method is likely to better preserve vitamins?
- A. Neither
 - B. Both equally
 - C. Freezing
 - D. Blanching
34. Which drying method would you analyze as the most energy-efficient for dehydrating large quantities of liquid food products?
- A. Freeze drying
 - B. Sun drying
 - C. Drum drying
 - D. Spray drying
35. Considering the need to maintain nutrient content in processed foods, which of the following methods might lead to significant nutrient loss?
- A. Aseptic processing
 - B. High-temperature canning
 - C. Refrigeration
 - D. Freeze drying

36. If a food processor wants to retain the flavor and color of fruit juice, which processing method would be most appropriate?
- A. Aseptic processing
 - B. Freeze drying
 - C. High-temperature canning
 - D. Sun drying
37. Which of the following is a method of food preservation?
- A. Blanching
 - B. Fermentation
 - C. All of the mentioned
 - D. Freezing
38. Given that aseptic processing involves sterilizing the product and packaging separately, which of the following scenarios would be best suited for aseptic processing?
- A. Packaging of dairy products like milk
 - B. Sun drying fruits
 - C. Canning of vegetables
 - D. Baking bread
39. Which of the following is a major advantage of food irradiation?
- A. High nutritional losses
 - B. Extension of shelf life without significant quality loss
 - C. Complete sterilization of all foods
 - D. Increase in food moisture

40. Which parameter has the greatest influence on texture of extruded snacks?
- A. Screw speed and barrel temperature
 - B. Feed particle size
 - C. Storage humidity
 - D. Packaging material

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Answer these questions;

- (a) Discuss the principle of freeze-drying in food preservation.
(7 marks)
- (c) Develop a concept for a new functional beverage that addresses a specific health need (e.g., energy boosting, digestive health, etc.). Create a flow chart detailing the steps involved in bringing this beverage from concept to market, including research, ingredient selection, product testing, and distribution.
(10 marks)
- (b) Describe **THREE (3)** mechanism of heat transfer during baking process.
(3 marks)

Question 2

Product innovation is defined as: the development of new products, changes in design of established products, or use of new materials or components in the manufacture of established products.

- (a) Describe the development process of a plant-based meat alternative product.
(2 marks)
- (b) Illustrate the process with a detailed flow chart, including stages like ingredient sourcing, formulation, testing, and marketing.
(8 marks)
- (c) Analyze the advantages and potential disadvantages of this plant-based meat alternative compared to traditional meat products in terms of nutritional value, environmental impact, and consumer acceptance.
(10 marks)

Question 3

Food processing techniques such as extrusion and irradiation play significant roles in modern food production, enhancing the texture, safety, and shelf life of various products.

- (a) Discuss the principle of extrusion in food processing.
(4 marks)
- (b) Explain in detail the procedures for making extruded snack foods and pasta.
(6 marks)
- (c) Discuss the concept of food irradiation.
(4 marks)
- (d) The types of irradiation process can be categorized by the intention of processing and the dose used. Determine **THREE (3)** applications of food irradiation.
(6 marks)

Question 4

Food processing plays a crucial role in ensuring the safety, shelf-life, and quality of food products. Techniques such as pasteurization, canning, and freezing are widely used to preserve food . Understanding these methods and their critical factors is essential for anyone involved in the food industry.

- (a) Discuss the principle of pasteurization in food processing.
(4 marks)
- (b) Explain in detail the procedures to produce canned vegetables and yogurt from your point of view.
(10 marks)
- (c) Discuss **THREE (3)** critical factors influencing the quality of frozen foods from your point of view.
(6 marks)

END OF EXAMINATION PAPER

