



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

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CQB 21003
COURSE TITLE : FOOD WASTE MANAGEMENT SYSTEM
PROGRAMME NAME : BACHELOR OF FOOD SAFETY AND QUALITY TECHNOLOGY WITH HONOURS
DATE : 02 FEBRUARY 2026
TIME : 2:00PM - 5:00PM
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
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SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. Explain the objective achieved through compliance with concession service level agreements (SLA).
 - A. Consistent, efficient, and safe solid waste and public cleansing services
 - B. Reduction of waste generation at source
 - C. Transfer of enforcement authority to concessionaires
 - D. Removal of regulatory oversight
2. Identify the party responsible for compliance with source separation requirements at premises.
 - A. Premises owners or occupants
 - B. Local authority enforcement officers
 - C. Waste collection contractors
 - D. SWCorp officers
3. Determine the operational requirement that must be fulfilled during waste collection activities.
 - A. Issuance of compliance notices to premises
 - B. Approval of waste treatment technology
 - C. Adherence to approved collection routes, schedules, and service standards
 - D. Classification of scheduled waste

4. The main environmental advantage of diverting food waste from landfills to composting is the reduction of
 - A. Carbon dioxide emissions
 - B. Nitrous oxide release
 - C. Methane generation
 - D. Sulphur dioxide formation

5. Select the public cleansing activity performed by Southern Waste Management.
 - A. Treatment of scheduled waste
 - B. Licensing waste transport vehicles
 - C. Monitoring ambient environmental quality
 - D. Street sweeping, drain cleaning, and public area cleansing

6. Classify leftover cooked food discarded by households after spoilage during storage.
 - A. Post consumer food waste
 - B. Agricultural residue
 - C. Pre consumer food waste
 - D. Processing waste

7. Choose moisture content that supports efficient food waste composting without leachate formation.
 - A. 20–30%
 - B. 50–60%
 - C. 30–40%
 - D. 70–80%

8. Choose the optimal carbon-to-nitrogen (C:N) ratio that maximizes microbial activity during food waste composting.
 - A. 45:1–60:1
 - B. 15:1–20:1
 - C. 5:1–10:1
 - D. 25:1–30:1

9. Thermophilic composting conditions that enhance pathogen destruction are achieved at temperatures of
 - A. 35–45 °C
 - B. 70–85 °C
 - C. 45–65 °C
 - D. 25–35 °C

10. Identify the treatment challenge caused by high organic loading in wastewater from food waste.
 - A. Reduced sludge production
 - B. Oxygen depletion in receiving waters
 - C. Inhibition of microbial activity
 - D. Increased salinity

11. Identify the primary source of high biochemical oxygen demand (BOD) in wastewater generated from food processing activities.
 - A. Organic matter from food residues
 - B. Inorganic salts
 - C. Heavy metals
 - D. Dissolved minerals

12. Identify the core service delivered by Southern Waste Management under concession arrangements.
 - A. Collection, transportation, and disposal of solid waste within designated concession areas
 - B. Development of national waste policies
 - C. Enforcement of solid waste legislation
 - D. Approval of environmental permits
13. Determine the food waste source associated with overstocking and cosmetic quality standards.
 - A. Waste treatment sector
 - B. Retail sector
 - C. Household sector
 - D. Agricultural sector
14. Identify the consequence applied following non-compliance by Southern Waste Management.
 - A. Automatic reassignment of concession zones
 - B. Suspension of waste generation at premises
 - C. Immediate termination of all concession rights
 - D. Corrective instructions, penalties, or contractual actions imposed by the regulator
15. Recognize the food waste type produced from trimming, peeling, and cutting during food preparation activities.
 - A. Processing food waste
 - B. Retail waste
 - C. Plate waste
 - D. Post consumer food waste

16. Classify damaged or unsold packaged food discarded at retail outlets.
 - A. Household waste
 - B. Agricultural residue
 - C. Processing waste
 - D. Retail food waste

17. Identify the classification of food losses caused by inadequate cold storage during post-harvest handling.
 - A. Household food waste
 - B. Supply chain food waste
 - C. Plate waste
 - D. Catering waste

18. Determine the food waste category represented by vegetable peels and meat bones generated during meal preparation.
 - A. Retail food waste
 - B. Avoidable food waste
 - C. Unavoidable food waste
 - D. Post consumer waste

19. Classify expired packaged bread discarded by supermarkets under the appropriate food waste type.
 - A. Avoidable food waste
 - B. Agricultural waste
 - C. Unavoidable food waste
 - D. Processing residue

20. Identify the food waste category generated during harvesting, storage, and primary processing before reaching consumers
- A. Post consumer food waste
 - B. Pre consumer food waste
 - C. Household waste
 - D. Plate waste
21. Differentiate the process that prevents cream separation by reducing fat globule size.
- A. Drying
 - B. Homogenization
 - C. Pasteurization
 - D. Separation
22. Analyze the major source contributing to high BOD levels in dairy wastewater.
- A. Cleaning chemicals
 - B. Packaging activities
 - C. Cooling water
 - D. Cream, butter, cheese, and whey production
23. Recognize the primary objective of pasteurization in dairy processing.
- A. Improvement of milk color
 - B. Destruction of harmful microorganisms and shelf-life extension
 - C. Separation of cream from milk
 - D. Reduction of milk fat content

24. Determine the main function of screening in a dairy wastewater treatment plant.
- A. Elimination of large solids to protect downstream equipment.
 - B. Stabilization of pH.
 - C. Reduction of microbial activity.
 - D. Removal of dissolved nutrients.
25. Identify the fundamental condition required for anaerobic digestion to occur.
- A. Absence of oxygen
 - B. Alkaline chemical addition
 - C. High salinity environment
 - D. Presence of oxygen
26. Interpret the significance of high Biological Oxygen Demand (BOD) in dairy wastewater.
- A. Excessive suspended solids only
 - B. Presence of heavy metals
 - C. Elevated pH value
 - D. High organic content suitable for microbial activity
27. Identify the main reason Malaysia relies heavily on imported dairy products.
- A. Limited consumer demand
 - B. Inability of local production to meet demand
 - C. High export tax on dairy products
 - D. Absence of dairy processing facilities

28. Determine the primary purpose of preliminary treatment in slaughterhouse wastewater management.
- A. Separation of large solids and reduction of BOD
 - B. Nutrient recovery for reuse
 - C. Elimination of dissolved gases
 - D. Complete removal of pathogens
29. Assess one major advantage of anaerobic digesters in sludge treatment applications.
- A. Rapid treatment within hours
 - B. Complete elimination of maintenance needs
 - C. Generation of usable biogas as an energy source
 - D. Elimination of all dissolved solids
30. Determine the appropriate standard required by the Department of Environment (DOE) for wastewater discharged into sensitive catchment areas.
- A. Standard C
 - B. Industrial Standard
 - C. Standard B
 - D. Standard A
31. Recognize the primary end products formed during anaerobic digestion of organic matter.
- A. Methane and carbon dioxide
 - B. Oxygen and hydrogen peroxide
 - C. Nitrogen and phosphorus
 - D. Sulfur dioxide and ammonia

32. Differentiate the environmental impact most directly associated with improper management of fat, oil, and grease (FOG) from meat processing activities.
- A. Pipe blockages and wastewater overflow
 - B. Airborne particulate formation
 - C. Soil acidification
 - D. Heavy metal accumulation
33. Interpret the role of Halal certification in the Malaysian meat processing industry.
- A. It increases meat shelf life.
 - B. It ensures compliance with Islamic slaughtering guidelines.
 - C. It improves export taxation benefits.
 - D. It reduces wastewater generation.
34. Evaluate the most suitable wastewater treatment method for slaughterhouse effluent with high organic concentration and potential energy recovery.
- A. Aerobic activated sludge process
 - B. Anaerobic digestion
 - C. Chemical oxidation process
 - D. Sand filtration
35. Analyze the main contributor to high Biological Oxygen Demand (BOD) in slaughterhouse wastewater.
- A. Packaging materials
 - B. Blood and animal tissues
 - C. Cleaning detergents
 - D. Cooling water

36. Classify the waste generated from the gastrointestinal tract, bones, and skin during meat processing.
- A. Chemical Waste
 - B. Wastewater
 - C. Solid waste
 - D. Hazardous waste
37. Choose the regulatory authority responsible for monitoring and regulating the meat processing industry in Malaysia.
- A. Ministry of Health Malaysia (MOH)
 - B. Department of Environment (DOE)
 - C. Department of Veterinary Services (DVS)
 - D. Local Municipal Council
38. Identify the primary stage that ensures meat products are safe for consumption before packaging and distribution.
- A. Value addition
 - B. Seasoning
 - C. Distribution
 - D. Slaughtering
39. Explain the main objective achieved through source separation at the point of generation.
- A. Reduction in waste collection manpower
 - B. Elimination of waste treatment requirements
 - C. Improvement in recycling efficiency and reduction of landfill disposal
 - D. Increase in landfill operational lifespan

40. Select the waste category that falls outside SWCorp regulatory control.
- A. Household waste
 - B. Commercial waste
 - C. Institutional waste
 - D. Scheduled waste

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

"As the food industry contends with growing concerns about sustainability and environmental impact, understanding the challenges and benefits of source reduction strategies is crucial for creating a more efficient and eco-friendly food production system."

Describe an efficient waste treatment system for a slaughterhouse to reduce environmental impact and comply with regulations, considering factors like wastewater composition, energy use, and by-product recovery.

(20 marks)

Question 2

A food court generates large quantities of food waste and wastewater containing high organic load, oil, and grease. Poor management of food waste and effluent may lead to odour problems, pest infestation, microbial contamination, and water pollution, which can compromise food safety and public health.

- (a) Identify two food safety risks associated with improper management of food waste and effluent in food premises.

(4 marks)

- (b) Explain how accumulation of food waste and high-BOD effluent can promote microbial growth that affects food safety.

(4 marks)

- (c) Describe one effluent pre-treatment method used in food premises to reduce oil, grease, and solids before discharge

(6 marks)

- (d) Justify the importance of proper food waste and effluent management in ensuring compliance with food safety regulations and protecting public health.

(6 marks)

Question 3

Food waste is a significant issue today, but there are many effective strategies to tackle it. From reducing waste at the source to utilizing innovative technologies, there are numerous ways to manage and mitigate the impact of food waste.

- (a) Recommend a suitable technology or approach to tackle the problem of food waste originating from bakery industry,

(10 marks)

- (b) Discuss the evidence demonstrating the advantages of anaerobic digester processes in managing food waste. Explain the specific actions and reactions involved in these processes that render them more effective at waste reduction compared to alternative waste management methods.

(10 marks)

Question 4

A municipality collects 600 kg/day of food waste from wet markets and cafeterias. The food waste has the following characteristics:

High moisture content, high biodegradable organic matter, low calorific value, causes odour when stored. The municipality is considering incineration and composting as treatment options.

- (a) Identify two characteristics of the food waste that limit its suitability for incineration.
(4 marks)
- (b) Explain how high moisture content affects the efficiency of the incineration process.
(4 marks)
- (c) Describe two advantages of composting for treating food waste generated from wet markets and cafeterias.
(4 marks)
- (d) Compare incineration and composting in terms of odour control and environmental impact for this type of waste.
(4 marks)
- (e) Recommend the more appropriate treatment option for this municipality and justify your answer based on waste characteristics.
(4 marks)

END OF EXAMINATION PAPER