



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

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CPB30303
COURSE TITLE : OIL & FAT PROCESS TECHNOLOGY
PROGRAMME NAME : BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY
(PROCESS) WITH HONOURS
DATE : 28 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.

Question 1

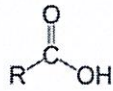
State FIVE (5) physical properties of Fatty Acids:

(10 marks)

Question 2

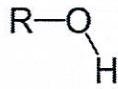
Identify the following functional groups

(a)



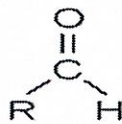
(2 marks)

(b)



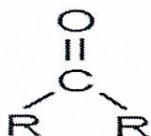
(2 marks)

(c)



(2 marks)

(d)



(2 marks)

(e)



(2 marks)

Question 3

Bleaching of crude palm oil is an adsorptive process that happens after degumming.

(a) Describe the adsorption process

(4 marks)

(b) Determine the effective bleaching's process parameters.

(6 marks)

Question 4**Fat Splitting Process and Recovery**

(a) Define the following terms:

i. Fat Splitting

(2 marks)

ii. Glycerine or Glycerol

(2 marks)

iii. Splitting agent

(2 marks)

(b) Predict the substances removed during distillation of crude fatty acids in splitting process

(4 marks)

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Dry Fractionation of refined, bleached, and deodorized palm oil is well known for producing palm olein and stearin with identical Iodine Values of 58 of mid-fraction and > 60 Super Olein. This process will undergo a few steps with significant control of process variables such as temperature, filter press cake pressure and agitator speeds. The surrounding temperature is 29.0° C. Given below is the condition of one experimental variable proposed by an engineer of Deschamp Oil Corporation:

Crystallizer heating is done until 85.0° C for 25 minutes.

Cooling system has been set gradually decrease set of each 1.5° C in 3 minutes.

- (a) Identify the heating process objectives at early stage

(5 marks)

- (b) Sketch the process of dry fractionation sequence completely

(8 marks)

- (c) Determine the reason of fractionate oil having varies melting points

(7 marks)

Question 2

Margarine is one of the end product created using edible oil. It has plasticity effects that used to bake, frying and coating.

- (a) Explain the fundamentals of margarine processing
(5 marks)
- (b) Evaluate the crystal margarine which gives feature for the quality
(8 marks)
- (c) Water and oil are known of immiscibility phenomena. Discuss how industries solve this issue.
(7 marks)

Question 3

Polymorphism is defined as several crystalline phases with the same chemical composition with a different structure, but yield identical liquid phases upon melting. Most of the industry uses transition to get more stable crystallines such β' from α and β . One example of a product is margarine or spread. For this statement answer the following questions

- (a) Arrange the properties of melting, density, stability, activation energy and spontaneous nucleation for α , β and β' crystalline
(5 marks)
- (b) Relate the concept of phase diagram to polymorphism occurrences.
(8 marks)
- (c) Characterize **TWO** polymorphic forms of Triacylglycerol's by thermal stability, subcell packing or chain-length structure
(7 marks)

Question 4

Analysis in the oil and fat industries is critical, especially for evaluating product manufacturing or developing new products. Examples of analysis such as unsaturated components analysis, peroxide values analysis, and gas chromatography analysis. Based on the statement given answer the following questions:

- (a) Determine the oil oxidation activities which increase peroxide value.
(6 marks)
- (b) Explain the mechanism in gas chromatography analysis of edible oil
(6 marks)
- (c) Iodine value test is used to measure unsaturated of components. Discuss the principle of analysis
(8 marks)

END OF EXAMINATION PAPER

