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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2014/2015**

COURSE NAME : PROCESS ENGINEERING
COURSE CODE : BNQ 30203
PROGRAMME : 3 BNN
EXAMINATION DATE : DECEMBER 2014/JANUARY 2015
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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- Q1** Describe briefly the process involved in the refining of palm oil and palm kernel oil:
- (a) Degumming (5 marks)
 - (b) Bleaching (5 marks)
 - (c) Neutralization (5 marks)
 - (d) Deodorization (5 marks)
- Q2**
- (a) Define **STERILISATION** and explain its importance in oil palm milling processes. (5 marks)
 - (b) Explain the methods for palm kernel oil extraction. (15 marks)
- Q3**
- (a) Define **POME** and determine the sources of POME during the Palm Oil extraction processes. (8 marks)
 - (b) Explain **THREE (3)** common methods of treating POME. (12 marks)
- Q4.**
- (a) List **THREE (3)** important characteristics of fatty acid in human diet. (6 marks)
 - (b) Illustrate stoichiometry equation for the conversion of triglyceride to free fatty acid. (4 marks)
 - (c) Discuss **FIVE (5)** uses of fatty acid for food and non-food applications. (10 marks)

- Q5**
- (a) List **THREE (3)** reasons for fractionating palm oil and palm kernel oil. (3 marks)
 - (b) Explain the methods of fractionation. (8 marks)
 - (c) Explain the **INTERESTERIFICATION** term and discuss briefly each types of interesterification in fat modification process. (9 marks)

- END OF QUESTION -