UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022

COURSE NAME	:	FOOD ANALYSIS
COURSE CODE	:	BWD 21303
PROGRAMME CODE	:	BWD
EXAMINATION DATE	:	JANUARY / FEBRUARY 2022
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS.
		2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **OPEN BOOK**

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

Q1 (a) (i) A liter of yogurt contains 2 moles of lactic acid and 1 mole of lactate ion. The pK$_a$ of lactic acid is 3.86. Find the pH of this solution.

(4 marks)

(ii) Vinegar has a [H$^+$] of 1.77×10^{-3} M. Find the pH of vinegar. Recall the main acid found in vinegar and it's structure.

(4 marks)

(b) (i) You are performing duplicate titrations on five samples, each requiring 20 mL of 0.06 M hydrochloric acid. Determine the needed solution from 4 M reagent grade hydrochloric acid.

(4 marks)

(ii) Construct detailed procedures to perform a potassium hydroxide, KOH titration on a monoprotic juice sample. Illustrate the apparatus needed for the experiment and determine the concentration of KOH needed to neutralize 20 mL of the juice at pH of 5.43 in a volume of 24.5 mL.

(8 marks)

Q2 (a) The moisture content of cold-smoked salmon was found to be 20.18 %. A smoked salmon sample weighed 5.4166 g was transferred into a platinum crucible and further heated at 600 °C. The empty crucible weighs 28.5053 g while the crucible with ash is reported to be 28.5939 g. Calculate the percentage of ash of this sample on a dry basis.

(8 marks)

(b) Chloride concentration in the smoked salmon in **Q2(a)** can be determined by using Atomic Absorption Spectroscopy (AAS). Illustrate the entire structure of AAS and explain the function of flame atomizer in this approach.

(8 marks)

(c) A 1000 kg of corn is harvested at a moisture level of 25 % and dried to a moisture content of 14 %. Determine the final weight of the dried grain.

(4 marks)

Q3 (a) Ahmad is a food technologist who works at a milk drying factory. As a part of production process, Ahmad must quickly analyse the moisture content of condensed milk.

(i) Discuss the factors that Ahmad must consider when choosing a method for removing moisture from the milk.

(4 marks)

(ii) By illustrating the setting for Karl-Fischer technique for moisture analysis, outline the procedure of how to perform the analysis to a named food sample.

(4 marks)

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(b)   Your team operates a bakery factory. According to the production leader, she may have made an error in butter mixing. To ensure the quality of the product, recommend the appropriate preparation actions prior to performing a lipid analysis by using Soxhlet extraction method.

(12 marks)

Q4   (a)   A 0.5495 g of pouched curry beef was analysed using a modified Kjeldahl method. A volume of 10.30 mL of 0.0625 M diluted hydrochloric acid was utilised to titrate the liberated ammonia. Calculate the percentage of nitrogen in the sample.

(6 marks)

(b)   The Kjeldahl method was used to digest 1.462 g of corn flour. The resulting ammonia was absorbed in 100 mL of 1 N sulphuric acid. The remaining acid solution was diluted to 500 mL in an appropriate volumetric flask. Notably, 20 mL of the dilute solution required 32 mL of N/10 sodium hydroxide solution to neutralise completely. Calculate the percentage of nitrogen in the flour.

(6 marks)

(c)   A group of food scientists aims to compare protein assimilation in carcass products. Kjeldahl method is the most used method for determining protein particularly in carcass analysis. However, in the case of an incomplete set, propose an alternative that can replace the Kjeldahl method. Justify your answer.

(8 marks)

Q5   (a)   Describe **THREE (3)** critical considerations for measuring bulk physical properties when determining the total lipid content of food materials using instrumental methods.

(6 marks)

(b)   Describe **FOUR (4)** types of chemical methods for measuring the unknown concentration of glucose in a food sample, based on their principle procedure.

(8 marks)

(c)   For a grain wheat breakfast cereal product, consider the crucial methods for measuring different carbohydrate components by utilizing enzymatic methods.

(6 marks)

–   **END OF QUESTIONS**   –