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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014**

COURSE NAME : FOOD ANALYSIS 1
COURSE CODE : BWD 20303
PROGRAMME : 2 BWD
EXAMINATION DATE : DECEMBER 2013/JANUARY 2014
DURATION : 3 HOURS
INSTRUCTION : A) ANSWER ALL QUESTIONS
IN SECTION A
B) ANSWER ONLY TWO (2)
QUESTIONS IN SECTION B

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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SECTION A

- Q1** (a) The Kjeldahl method of protein analysis consists of three major steps. List these steps in the order they are done and describe what occurs in each step in (a)(i). (3 marks)
- (b) (i) For each type of product listed below, identify the governmental agency (EPA or FDA) that has regulatory or other responsibility for quality assurance. (3 marks)
- (ii) For the agency chosen in (b)(i), discuss the specific types of analyses associated with that responsibility on the following product:
Frozen fish stick
Residual pesticide on wheat grain
Imported chocolate products (9 marks)
- Q2** (a) A solution has an $[\text{OH}^-]$ of 1.4×10^{-7} M.
(i) Deduce solution's basic property by calculating its pH. ($K_w = 1.0 \times 10^{-14}$) (3 marks)
- (ii) Using Lowry's definition on acid, illustrate a reaction between water molecules to produce hydronium ion (H_3O^+) and OH^- . Identify acid and base according to Lowry. (6 marks)
- (b) Explain your recommendation to your technician in overcoming the following problems that arise in conventional dry ashing of various food samples.
(i) Volatilization of phosphorous, while determining phosphorous content in food sample.
(ii) Incomplete combustion of a high-sugar product after a typical dry ashing procedure. (8 marks)

- (c) Refer Table Q2(c) below. Analyse the fat results obtained via hydrolysis with and without acid. Discuss the results in terms of hydrolysis efficiency and the role of acid in the digestion.

	Percent fat	
	Acid hydrolysis	No acid hydrolysis
Flour	1.73	1.20
Noodles	3.77 – 4.84	2.1 – 3.91

(8 marks)

- Q3** (a) Contrast the moisture analysis techniques by copying and completing the Table Q3(a) below:

	What is actually measured	How is water being removed/identified	Precautions to ensure correct data
Microwave oven			
Karl fischer			

(10 marks)

- (b) In carbohydrate analysis,
- (i) Differentiate mono-, oligo- and poly-saccharides. (4 marks)
- (ii) Suggest a method that could be used for each of the following:
- To prevent hydrolysis of sucrose when sugars are extracted from fruits via hot alcohol extraction
 - To measure total carbohydrates
 - To measure glucose enzymically
- (6 marks)

SECTION B

- Q4** (a) Lane-Eynon and Nelson-Somogyi methods can be used to measure reducing sugar content. Compare and contrast these two methods with regard to the principles and procedures used. (10 marks)
- (b) Discuss the purpose of the following steps in the AOAC method for total dietary fibre determination.
(i) Heating the sample and treating with alpha amylase.
(ii) Treating the sample with protease.
(iii) One sample is ashed and another sample is analyzed for protein. (6 marks)
- (c) Justify why do sugar solutions need to be clarified before they are subjected to analysis. (4 marks)
- Q5** Evaluate each situation described below. For each situations:
- Nutrition labelling
- Rapid, quality control method for protein content of cereal grain
- (a) Choose a protein assay method most appropriate and justify your method of choice. (10 marks)
- (b) Discuss the chemical basis of the chosen method in **Q5** (a). In particular, what does the method actually measures? (6 marks)
- (c) Criticise the advantages and disadvantages of using Kjeldahl method in protein analysis. (4 marks)
- Q6** (a) In order to extract fat from food sample, the solvents of choice are petroleum ether and ethyl ether. The apparatus of choice are Soxhlet or Goldfish.
(i) Choose any combination of solvent to be used in your extraction via Soxhlet or Goldfish apparatus.
(ii) Support your choice in (a) (i) by giving suitable reasons. (9 marks)

- (b) Itemize the procedures in sample preparation that may be required to obtain accurate results in solvent extraction method. In the procedures, justify why is it necessary to carry out the steps. (7 marks)
- (c) In a Soxhlet method, a semi-moist food sample first underwent drying procedure in a vacuum oven. The moisture content obtained is 24.5%. The fat content obtained for the dried-food via Soxhlet was 13.5 %. Evaluate the fat content in the original semi-moist food product. (4 marks)

- END OF QUESTION -