



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2013/2014

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY AND BACHELOR OF SCIENCE IN FOOD SCIENCE AND NUTRITION

### AFS 2203: FOOD ANALYSIS

DATE: DECEMBER 2013

TIME: 2 HOURS

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INSTRUCTIONS: Answer questions *one* and any other *two* questions.

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#### QUESTION ONE (30 MARKS)

- You are considering the use of a new method to measure compound X in your food products. List 5 factors you will consider before adopting this new method in your quality assurance lab. (10 Marks)
- Method A used to quantitate a particular food component was reported to be more specific and accurate than method B, but method A had lower precision. Explain what this means. (7 Marks)
- Distinguish between sampling for attributes Vs sampling for variables. (6 Marks)
- Briefly describe the 3 sources of error in food analysis. (3 Marks)
- Differentiate the following: (4 Marks)
  - Consumer risk
  - Producer risk

#### QUESTION TWO (20 MARKS)

- Identify 5 factors that one would need to consider when choosing a moisture content analysis method for a specific food product (10 Marks)
- You have the following gravimetric result:
  - Weight of pan and liquid sample = 4.6274g
  - Weight of dried pan and glass disc = 1.0376g
  - Weight of pan and dried sample = 1.7321g

What was the moisture content of the sample and what is the percent solids (6 Marks)

- c) Discuss 2 advantages of using gravimetric methods as opposed to thermo gravimetric methods. (4 Marks)

**QUESTION THREE (20 MARKS)**

- a) Identify 4 potential sources of error in the preparation of samples for ash analysis and describe a way to overcome each. (8 Marks)
- b) Discuss the following (8 Marks)
- I. Dry aching
  - II. Wet aching
- c) Discuss the “Gerber Method” for milk fat analysis (4 Marks)

**QUESTION FOUR (20 MARKS)**

- a) Discuss 5 important considerations when selecting solvents to be used in fat analysis (10 Marks)
- b) The following data were obtained when an extruded breakfast cereal was analyzed for fiber by food science students:

Sample weight (mg)	1002.8
Residue weight (mg)	151.9
Pertain weight	13.1
Ash weight (mg)	21.1
Blank weight	6.1
Resistant starch (mg)	35.9

What is percent total fibre (4 Marks)

- i. Without corrections for resistant starch
  - ii. With correction for resistant starch
- c) A sample of 10g fruit pulp is mixed with 20ML distilled water and the mixture brought to boiling and cooled quickly. It is then titrated with 0.1N NaOH solution, 6 ML being obtained at the end point. Calculate the total titratable acidity of the pulp as percent citric acid.

Hint:  $\text{CH}_2\text{C}(\text{OOHC}(\text{OH})\text{COOH})\text{CH}_2\text{COOH}$

$$\begin{bmatrix} H = 1 \\ C = 12 \\ O = 16 \end{bmatrix}$$

(6 Marks)

**QUESTION FIVE (20 MARKS)**

- a) Discuss the following as used in carbohydrate assay (10 Marks)
- i. Molisch's tests
  - ii. Benedict's test
  - iii. Seliwanoh's tests
  - iv. Iodine test
  - v. Bial
- b) Food science students from MUST were analyzing crude protein content of beans in duplicate using the Kyeldhal method. The following were their data:
- |                                    |           |
|------------------------------------|-----------|
| Moisture content                   | = 8%      |
| Weight of sample 1                 | = 1.015g  |
| Weight of sample 2                 | = 1.025g  |
| Normality of HCL used in titration | = 0.1142N |
| HCL used for sample 1              | = 22.0 ml |
| HCL used for sample 2              | = 22.5 ml |
| HCL used for reagent blank         | = 0.2 ml  |

Calculate crude protein content on both wet and dry weight basis of these beans. Assume that beans protein contains 17.5% nitrogen. (10 Marks)