



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN APPLIED CHEMISTRY & FOOD AND QUALITY
ASSURANCE
BTAC 11S / BSFQ 12S

AFS 4303 , ACH 4405 : FOOD ANALYSIS

SPECIAL/SUPPLEMENTARY EXAMINATION

MARCH 2014 SERIES

2 HOURS

Instructions to candidates:

This paper consists of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

Question ONE

- a) Explain the following types of risks associated with sampling for food analysis
 - (i) Consumer risk (3marks)
 - (ii) Vendor risk (2marks)
- b) Explain the purpose of testing for phosphatase activity in the dairy industry (4marks)
- c) Compare 'Quartz crucibles' with 'Quartz fibre crucibles used in dry ashing of foods (4marks)
- d) To determine the fat content of beef by the refractive index method, 5ml of bromonaphthalene was used to extract fat from 20g beef. The density of fat is 0.9g/ml,

and the refractive indices of beef fat, bromonaphthalene, and bromonaphthalene beef extract are 1.466, 1.658, and 1.529 respectively. Calculate the fat content of the beef

(3marks)

- e) State the importance of determining the co-efficient of variation (CV) in food analysis

(2marks)

- f) A vegetable (23.5000g) was found to have 0.0940g acid insoluble ash. Determine the concentration of the acid insoluble ash in the product **(2marks)**

- g) State any three advantages of dry-ashing over wet-ashing method in determination of ash in foods **(3marks)**

- h) State the principle for determination of vitamin A in food by HPLC **(3marks)**

- i) Distinguish between 'sensitivity' and 'detection limit' of an analytical instrument

(4marks)

Question TWO

- a) List examples of foods that near infrared spectroscopy is used in protein analysis

(2marks)

- b) Describe each of the following steps in protein determination in foods by the Kjeldahl method.

(i) Digestion **(3marks)**

(ii) Neutralization **(2marks)**

(iii) Distillation **(2marks)**

(iv) Titration **(2marks)**

- c) The data below was recorded by an analyst during the determination of protein content of a food stuff using the Kjeldahl method.

- Volume of 0.1N HCl for blank = 0.8ml
- Volume of 0.1N HCl for sample = 13.7ml
- Weight of sample used = 0.46g
- Moisture content of the food = 23.8%

Calculate the percent crude protein content of the food stuff on dry matter basis given the protein factor = 6.25 and R.A.M of N = 14. **(5marks)**

- d) State the draw backs of the Kjeldahl method for estimation of protein in foods. **(4marks)**

Question THREE

- a) State the importance of sulfuric acid in the Gerber method for milk fat determination
(2marks)
- b) Discuss the following methods as used in food analysis
- (i) Soxhlet method **(4marks)**
 - (ii) Biuret method
(4marks)
 - (iii) Wet ashing **(3marks)**
 - (iv) Dry ashing **(4marks)**
- c) To determine the fat content of a semi-moist food by the soxhlet method, the food was first vacuum oven dried. The moisture content of the product was 25%. The fat in the dried food was determined by the soxhlet method. The fat content of the dried food was 13.5%. Calculate the fat content of the original semi-moist product **(3marks)**

Question FOUR

- a) Explain the principle of Karl Fisher titration method for determination of moisture content in foods **(8marks)**
- b) Discuss the importance of mineral analysis in foods **(5marks)**
- c) A 25g sample was dried, then ashed, and finally analysed for salt (NaCl) content by the volhard titration method. The weight of the dried sample was 5g, and the ashed sample weighed 1g. Then 30ml of 0.1N AgNO₃ was added to the ashed sample, the resultant precipitate was filtered out, and a small amount of ferric ammonium sulphate was added to the filtrate. The filtrate was then titrated with 3ml of 0.1M KSCN to a red end point. Determine;
- (i) The ash content of the sample expressed as percent ash (wt/wt) on a dry weight basis **(2marks)**
 - (ii) The salt content of the original sample in terms of percent (wt/wt) NaCl (RAM Na = 23, Cl = 35.5) **(5marks)**

Question FIVE

- a) The following data were obtained when an extruded breakfast cereal was analysed for fibre by the AOAC method.

Sample weight, mg 1002.8

Residue weight, mg 151.9

Protein weight, mg 13.1

Ash weight, mg 21.1

Blank weight, mg 6.1

Resistant starch , mg 35.9

Calculate total fibre

- (i) Without correction of resistant starch **(3marks)**
 - (ii) With correction for resistant starch **(3marks)**
- b) State the issues of concern when analyzing the following samples in a quality assurance program for food products
- (i) Raw materials **(5marks)**
 - (ii) Process control samples **(2marks)**
 - (iii) Finished products **(5marks)**
 - (iv) Competitors sample **(2marks)**