



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A constituent of JKUAT)

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN APPLIED CHEMISTRY SECOND YEAR

ACH 4405: FOOD ANALYSIS

SPECIAL/SUPPLEMENTARY EXAMINATION

February 2013 SERIES

2 HOURS

Instructions to candidates:

This paper consist of **FIVE** questions

Answer question **ONE** (compulsory) 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 phosphates activity in the dairy industry (4marks)
- c) Compare petroleum ether and diethyl ether as the two commonly used solvents in lipid extraction (4marks)
- d) Distinguish between sensitivity and detection limits of an analytical instrument (4marks)
- e) State the principle for determination of vitamin A by HPLC (3marks)
- f) State any THREE advantages of dry ashing over wet ashing method in determination of ash in foods (3marks)
- g) 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)
- h) State the importance of determining the co-efficient of variation (CV) in food analysis (2marks)
- i) 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 the bromonaphthalene beef extract are 1.466, 1.658, and 1.529 respectively. Calculate the Fat content of the beef (3marks)

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 of foods by the kjeldahl method.
- (i) Oxidation (3marks)
 - (ii) Neutralization (2marks)
 - (iii) Distillation (2marks)
 - (iv) Titration (2marks)
- c) The data below was recorded by an analyst during 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 of the food stuff on dry matter basis.
Protein factor = 6.25. RAM of N = 14 (5marks)
- d) State the drawbacks of kjeldahl method for estimation of protein in foods (4marks)

Question THREE

- a) State the importance of sulfuric acid in the Gerber method of milk fat determination.
- b) Discuss the following methods as used in food analysis
- (i) Soxhlet method in fats (4marks)
 - (ii) Biuret method in proteins (4marks)
 - (iii) Dry ashing (3marks)
 - (iv) Wet 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 sample was determined by the soxhlet method was determined by the soxhlet method.
- Calculate the fat content of the original semi moist product (3marks)

Question FOUR

- a) Explain the principle of Karl-Fischer titration method for determination of moisture content in foods. (8marks)
- b) Discuss the importance of mineral analysis in foods (5marks)
- c) A 25g food sample was dried, then ashed, and finally analyzed 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 silver nitrate 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 0.1N KSCN to a red end point.

Determine

- (i) The ash content of the sample expressed as percent as (w⁺/w⁺) on a dry weight basis **(2marks)**
- (ii) The salt content of the original sample in terms of percent (w⁺ /w⁺) NaCl. **(5marks)**

RAM Na = 23, Cl = 35.5

Question FIVE

- a) The following data were obtained when 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 for 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 sampled **(2marks)**