



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BSC (FOOD TECHNOLOGY AND QUALITY ASSURANCE)

B.TECH (APPLIED CHEMISTRY) - ANALYTICAL OPTION

AFS 4303 : FOOD ANALYSIS

SPECIAL/ SUPPLIMENTARY EXAMINATIONS

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Pick Date Sep 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a) Explain the following types of risks associated with sampling food for analysis

i) Consumer risk [3
marks]

ii) Vendor risk [2
marks]

b) Explain the purpose of testing for phosphatase activity in the dairy industry [4
marks]

c) Compare petroleum ether and ethyl ether as the two commonly used solvents in lipid extraction [4
marks]

- 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 the bromonaphthalene beef extract are 1.466, 1.658, and 1.529 respectively. Calculate the fat content of the beef [3 marks]
- d) State the importance of determining the Coefficient of variation (CV) in food analysis [2 marks]
- e) State one major disadvantage of the stationary phase in Reversed phase HPLC in Carbohydrate analysis [1 mark]
- f) A vegetable sample weighing 23.5000g was found to have 0.0940g acid insoluble ash. Determine the concentration of the acid insoluble ash in the product [2 marks]
- g) State any three advantages of dry ashing over wet ashing method in determination of ash in foods [3 marks]
- h) State the principle for determination of Vitamin A by HPLC [3 marks]
- i) Distinguish between sensitivity and detection limit of an analytical instrument [4 marks]

Question TWO

- a) List examples of foods that Near-Infrared Spectroscopy is used in protein analysis [2 marks]
- b) Describe each of the following steps in protein determination of foods by the Kjeldahl method:
- i) Oxidation [3 marks]
 - ii) Neutralization [2 marks]
 - iii) Distillation [2 marks]
 - iv) Titration [2 marks]
- 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 = 0.8 ml

Volume of 0.1N HCl for sample = 13.7 ml

Weight of sample used = 0.46g

Moisture content of the food = 23.8%

Calculate the percent crude protein content of the foodstuff on dry matter basis. Protein factor = 6.25. RAM of N=14
marks] [5

d) State the drawbacks of Kjeldahl method for estimation of protein in foods
marks] [4

Question THREE

a) State the importance of sulphuric acid in the Gerber method for milk fat determination
marks] [2

b) State the importance of the following in preparation of samples for solvent extraction in of fat.

i) Pre-drying [5 marks]

ii) Acid hydrolysis [5 marks]

c) Describe the Soxhlet method of fat determination [4 marks]

d) 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
marks] [4

Question FOUR

a) Explain the principle of Karl Fischer titration method for determination of moisture content in foods [8 marks]

b) Discuss the importance of mineral analysis in foods
marks] [5

c) A 25g food 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 endpoint.

Determine;

- i) The moisture content of the sample expressed as percent H₂O (wt/wt) [2 marks]
- ii) The ash content of the sample expressed as percent ash (wt/wt) on a dry weight basis [2 marks]
- iii) The salt content of the original sample in terms of percent (wt/wt) NaCl. (RAM Na=23, Cl=35.5 [5 marks]

Question FIVE

a) State the issues of concern when analyzing the following samples in a quality assurance program for food products

- i) Raw materials [5 marks]
- ii) Process control samples [2 marks]
- iii) Finished products [5 marks]
- iv) Competitors samples [2 marks]

b) 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 for resistant starch
- ii) With correction for resistant starch

[3 marks]

[3 marks]