UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

B.Sc. ENVIRONMENTAL HEALTH AND FOOD SCIENCE

SEMESTER II

FINAL EXAMINATION PAPER - MAY 2016

TITLE OF PAPER: FOOD ANALYSIS

COURSE CODE: EHM325

DURATION: 2 HOURS

INSTRUCTIONS:

1. READ THE QUESTIONS CAREFULLY.
2. ANSWER **ANY 4 QUESTIONS.**
3. EACH QUESTION CARRIES 25 MARKS. WHERE A QUESTION IS SUBDIVIDED INTO PARTS, THE MARK FOR EACH PART IS SHOWN IN BRACKETS.
4. NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
5. WRITE NEATLY AND CLEARLY
6. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

SPECIAL REQUIREMENTS: CALCULATOR

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION 1

a. Using the Van Deemter equation, HETP, and N, as appropriate, explain why the following changes may increase the efficiency of separation in column chromatography:

    i. Changing the flow rate of the mobile phase. [2 Marks]

    ii. Increasing the length of the column. [2 Marks]

b. State the factors and conditions that lead to poor resolution of two peaks. [6 Marks]

c. To describe how using internal standards works, answer the following questions:

    i. What specifically is done with the standards? [5 Marks]

    ii. What is actually measured and plotted? [5 Marks]

    iii. How is the plot used? [5 Marks]

[25 Marks]

QUESTION 2

a. Three of most common detectors for Gas Chromatography (GC) are Flame Ionisation Detector (FID), Flame Photometric Detector (FPD), and Electron Capture Detector (ECD). Describe the operating principles of each. [15 Marks]

b. Use a schematic diagram to show how Atomic Absorption Spectrophotometer (AAS) operates. [10 Marks]

[25 Marks]

QUESTION 3

a. A 5g sample of oil was saponified with excess KOH. The unreacted KOH was then titrated with 0.500N HCl. The difference between the blank and the sample was 25.8ml of titrant. Calculate the saponification value. [3 Marks]

b. Peroxide value and TBA number can both be used to help characterise a fat sample.

    i. What do results of these tests tell about the sample? [6 Marks]

    ii.   What is the difference between the two tests with regard to the chemical being measured? [6 Marks]

c.   You are responsible for writing the specifications for vegetable oil purchased from your supplier for use in deep fat frying several foods processed by your company. State the tests required on the list of specifications. For each test, briefly state what useful information is obtained. [10 Marks]

[25 Marks]

QUESTION 4

a.   Define dietary fibre. [2 Marks]

b.   List the major constituents of dietary fibre. [5 Marks]

c.   Explain the difference between dietary fibre and crude fibre. [6 Marks]

d.   Proximate composition refers to analysis for moisture, ash, fat, protein and carbohydrate.

    i.   Which of these components are actually required on a nutrition label? [4 Marks]

    ii.   Explain why it is necessary to determine all of these components quantitatively. [8 Marks]

[25 Marks]

QUESTION 5

a.   Why is it necessary to pre-dry a sample before fat analysis? [4 Marks]

b.   Explain the following terms:

    i.   Dry ashing. [3 Marks]

    ii.   Wet ashing. [3 Marks]

c. Discuss the factors that one would need to consider when choosing a method for moisture analysis in food. [15 Marks]

[25 Marks]

END OF QUESTION PAPER