



**UNIVERSITY OF SWAZILAND**

**FACULTY OF HEALTH SCIENCES**

**B.Sc. ENVIRONMENTAL HEALTH AND FOOD  
SCIENCE**

**SEMESTER II**

**SUPPLEMENTARY EXAM JUNE 2018**

**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:** NONE

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

### QUESTION 1

- a. Write notes on the following concepts and their applications:
- i. Ionisation suppression in Atomic Absorption Spectroscopy. [5 Marks]
  - ii. Beer-Lambert Law. [6 Marks]
  - iii. Wet oxidation. [5 Marks]
  - iv. Gradient elution [5]
  - v. Acid value. [4 Marks]

**[Total: 25 marks]**

### QUESTION 2

- a. Explain how analytes are detected during Thin Layer Chromatography (TLC) analysis. [5]
- b. Explain the difference between normal phase and reversed phase HPLC [10].
- c. Briefly discuss how chromatographic column efficiency can be evaluated under the following headings:
- i. Partition coefficient. [5]
  - ii. Resolution. [5]

**[Total: 25 marks]**

### QUESTION 3

Explain the chemical basis of the following techniques that can be used to determine proteins in food:

- a. Kjeldahl method. [10 marks]
- b. Dumas method (N combustion). [5 marks]
- c. Biuret method. [5 marks]
- d. Lowry method. [5 marks]

**[Total: 25 marks]**

**QUESTION 4**

a. The following is an extract from the procedure for determining peroxide value in oils.

Read the procedure carefully and answer the questions that follow:

1. Melt any samples that are solid at room temperature by heating to a maximum of 15°C above the melting point. Filter melted fat and oil sample through filter paper to remove impurities.
2. Accurately weigh c.a. 5g fat or oil into each of 250ml glass stoppered Erlenmeyer Flasks. Add 30ml acetic acid and –chloroform solution and swirl to dissolve. Add 0.5ml saturated KI solution. Let stand with occasional shaking for 1 min.
3. Add 30ml distilled water. Slowly titrate samples with 0.1N sodium thiosulphate solution, with vigorous shaking until yellow colour is almost gone.
4. Add c.a. 0.5ml 1% starch solution and continue titration, shaking vigorously to release all iodine from chloroform layer, until the blue colour just disappears. Record the volume of titrant used (if <0.5ml of sodium thiosulphate solution is used, repeat the determination).
5. Prepare (omitting only the oil) and titrate a blank sample. Record volume of titrant used.
  - i. Indicate whether this is a gravimetric or volumetric procedure. [2 marks]
  - ii. Explain what is meant by the term “Accurately weigh...” used I step 2 above. [2 marks]
  - iii. What is the purpose of the starch solution? [2 marks]
  - iv. What is the role of the blank sample? [2 marks]
  - v. What property of the oil does this method determine? [6 marks]

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

- i. Identify which of these components of proximate composition are actually required on a nutrition label. [3 marks].
- ii. Explain why it is important to measure the non-required components quantitatively if one is developing a nutrition label. [3 marks]
- iii. Distinguish between crude fibre and dietary fibre. [5 marks]

[Total: 25 marks]

**QUESTION 5**

a. Discuss the principles involved in moisture determination using reflux distillation. [15]

b. Discuss the potential sources of error associated with method. [10]

[Total: 25 marks]

**END OF EXAMINATION**