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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME	:	**FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR III**
COURSE CODE	:	**FSNT 307**
TITLE OF PAPER	:	**FOOD NUTRIENT ANALYSIS**
TIME ALLOWED	:	**TWO (2) HOURS**
INSTRUCTIONS	:	**ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS.**

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QUESTION 1 (COMPULSORY)

(a) Explain how you would conduct the following procedures:-
   i. Random sampling
   ii. Systematic sampling **(6 Marks)**

(b) The equation of a standard calibration curve (protein concentration (μg/ml) on x-axis vs absorbance at 650 nm on y-axis) is $y = 0.0061x + 0.0048$. Calculate the concentration of a sample with a mean absorbance value of 0.38. **(6 Marks)**

(c) Describe the principles of the following moisture content determination methods and give **one (1) food** example which could be analyzed by each of the methods:-
   i. Distillation method
   ii. Refractometry **(8 Marks)**

(d) Discuss the following steps in the Kjeldahl protein determination method:-
   i. Digestion
   ii. Distillation
   iii. Titration

(15 Marks)

(e) What is colorimetry? Give an example of its use in the food industry.

(5 Marks)

[TOTAL MARKS = 40]

QUESTION 2

(a) Explain the following terms:-
   i. Reproducibility
   ii. Repeatability **(6 Marks)**

(b) Explain the principle behind the Dumas method for protein content determination in food. **(5 Marks)**

(c) Describe the Soxhlet extraction method for crude fat determination. List **three (3)** other compounds that are extracted together with true fats in this method.

(7 Marks)

(d) Describe the equipment and principles in gas chromatography (GC) and give an example of its application in food analysis. **(12 Marks)**

[TOTAL MARKS = 30]

QUESTION 3

(a) Differentiate between determinate and indeterminate error. **(4 Marks)**

(b) Explain the principles of the Geber method for fat content determination in milk. **(6 Marks)**

(c) Describe the equipment and principles in high performance liquid chromatography (HPLC) and give an example of its application in food analysis. **(12 Marks)**

(d) What are the **four (4)** main types of liquid chromatography (LC)? **(8 Marks)**

[TOTAL MARKS = 30]

QUESTION 4

(a) Define the terms accuracy and precision. **(6 Marks)**

(b) Explain the following fat characteristics:-
   i. Iodine number
   ii. Peroxide value **(8 Marks)**

(c) Explain the principles in crude fibre determination method. What are the main components in crude fibre? **(10 Marks)**

(d) Explain **three (3)** factors that might have an effect on moisture content determination in food using the oven drying method. **(6 Marks)**

[TOTAL MARKS = 30]