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UNIVERSITY OF ESWATINI

RE-SIT EXAMINATION PAPER

PROGRAMME   :   FOOD SCIENCE, NUTRITION AND TECHNOLOGY
                               LEVEL II

COURSE CODE   :   FNS204

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)   Discuss the **three (3)** forms of water and indicate which form is not determined by the oven drying method.

(8 Marks)

(b)   A soy bean sample has a moisture content of 8% and a crude fat content of 30%. Calculate the percentage fat content on dry weight basis?

(4 Marks)

(c)   Explain how you would conduct the following procedures:-
   i.   Random sampling
   ii. Systematic sampling
   iii. Composite sampling
   iv. Stratified sampling

(12 Marks)

(d)   Explain the following fat characteristics:-
   i.   Iodine number
   ii. Peroxide value
   iii. Solid fat index
   iv. Acid value

(12 Marks)

(e)   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.

(4 Marks)

[TOTAL MARKS = 40]

QUESTION 2

(a)   Explain the principles of the following methods for moisture content determination.
      i.   Distillation method
      ii.   Gas production method

(8 Marks)

(b)   Describe the different parts of a high performance liquid chromatography (HPLC) system and their function.

(12 Marks)

(c)   Explain the following terms in column chromatography:-
      i.   Stationary phase
      ii.   Mobile phase

(4 Marks)

(d)   Give three (3) sources of organic nitrogen other than protein that contribute to the crude protein content of food as determined by the Kjeldahl nitrogen determination method.

(6 Marks)

[TOTAL MARKS = 30]

QUESTION 3

(a)   Explain the following:-
      i.   Consumers risk in sampling
      ii.   Vendors risk in sampling
      iii. Continuous sampling
      iv. Manual sampling

(12 Marks)

(b)   What is an outlier?

(4 Marks)

(c)   List the four (4) types of liquid chromatography.

(8 Marks)

(d)   Explain the principles of the Geber method for fat content determination in milk.

(6 Marks)

[TOTAL MARKS = 30]

QUESTION 4

(a)   Give **four (4)** examples where pH measurement is an important aspect of analysis in the food industry.

(8 Marks)

(b)   Differentiate between strong and weak acids.

(6 Marks)

(c)   Explain the following indirect protein determination methods
   i.   Biuret method
   ii.   Dye binding method

(10 Marks)

(d)   Explain the "difference" method for determining the carbohydrate content of food and three disadvantages of this method.

(6 Marks)

[TOTAL MARKS = 30]