NATIONAL UNIVERSITY OF LESOTHO

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF NUTRITION

FOOD CHEMISTRY AND ANALYSIS I - NUT 2302

SEMESTER II EXAMINATION

JUNE 2023 MARKS: 100 TIME: 3HRS

Instructions:

- Attempt all the questions.

- The paper consists of two (2) sections: Sections A and B.

- Section A is a multiple choice and each question carries 1 mark.

NB: atomic masses; Na= 22.9897 g/mol, O=15.9994 g/mol, H= 1.0080 g/mol, N=14.0070 g/mol, Cl= 35.4500 g/mol.

Section A: Multiple Choice **[20 Marks]**

1. Which technique can be used for determination of water for food of low moisture content and for products containing volatile oils?
    a. Drying oven at 100ºC
    b. Infrared drying lamps
    c. Distillation methods
    d. Vacuum ovens
2. Water activity values may range from_____.
    a. 0 to 1
    b. 0 to 100
    c. 1 to 10
    d. 0.97 to 1
3. Which technique is suitable for determination of moisture in apple fruits?
    a. Karl Fischer titration
    b. Distillation methods
    c. Drying oven at 100 ºC
    d. Vacuum ovens
4. Sampling is very important in _____.
    a. Making the sample uniform
    b. Purifying the sample to remove impurities
    c. Ensuring samples of the food taken for analysis are truly representative of the product to be analysed
    d. Ensuring that the data of analysis is of high quality
5. _____ involves the measurement of the volume of a known reagent required to react with the sample solution.
    a. Titrimetric analysis
    b. Gravimetric procedures
    c. Solvent extraction
    d. Refractometry
6. _____ is where the mass of a food constituent is measured after suitable treatment.
    a. Titrimetric analysis
    b. Gravimetric procedures
    c. Solvent extraction
    d. Refractometry
7. _____ involves the use of non-polar organic solvent in the analysis.
    a. Titrimetric analysis
    b. Gravimetric procedures
    c. Solvent extraction

d. Refractometry

8. A technique with high sensitivity means it _____.
    a. Has ability to detect and quantify specific food constituents even in the presence of similar compound.
    b. Has ability to complete analysis in short period of time.
    c. Has ability to detect and quantify food constituents at very low concentrations.
    d. Has ability to measure what is intended to be measured.
9. _____ is not considered in proximate analysis.
    a. Moisture content
    b. Crude protein
    c. Crude fibre
    d. Vitamin C
10. _____is used in ash content analysis.
    a. Microwave oven
    b. Vacuum oven
    c. Infrared drying lamp
    d. Muffle furnace
11. One characteristic of solvents used in soxhlet extraction is that_____.
    a. It should be flammable
    b. It should mix well with water
    c. It should be polar
    d. It should be volatile
12. Group of hydrocarbons with the functional group R- (COH) is_____.
    a. Ketones
    b. Aldehydes
    c. Carboxylic acids
    d. Alcohols
13. Ash content gives the estimation of _____ in food.
    a. Minerals
    b. Vitamins
    c. Fibre
    d. Moisture
14. _____ and _____ are isomers.
    a. Glucose and Fructose
    b. Glucose and Galactose
    c. Galactose and Fructose
    d. Maltose and glucose
15. _____ is not a monosaccharide.

a. Glucose
b. Fructose
c. Galactose
d. Maltose

16. _____ organic solvent has not been listed in solvents used for soxhlet extraction.
    a. Petroleum ether
    b. Diethyl ether
    c. Chloroform
    d. Ethanol
17. _____ is the IUPAC name of Chloroform.
    a. Trichloromethane
    b. Trichloroethene
    c. Dichloromethane
    d. Diethyl ether
18. _____ is the correct formula for percentage yield.
    a. $\text{Percentage yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100$
    b. $\text{Percentage yield} = \frac{\text{Theoretical yield}}{\text{Actual yield}} \times 100$
    c. $\text{Percentage yield} = \frac{\text{Theoretical yield} - \text{Actual yield}}{\text{Theoretical yield}} \times 100$
    d. $\text{Percentage yield} = \frac{\text{Total mass} - \text{Mass of crucible}}{\text{Actual yield}} \times 100$
19. Kjeldahl is a method composed of _____ steps.
    a. 6
    b. 3
    c. 9
    d. 2
20. In which step in Kjeldahl is the catalyst required?
    a. Titration
    b. Sample preparation
    c. Extraction
    d. Digestion

Section B: [80 Marks]

1. Define the following terms as used in analytical chemistry of foods: **[10]**
   a. Proximate analysis
   b. Analyte
   c. Blank solution
   d. Standard solution
   e. Replicates

2. Differentiate between the Qualitative and Quantitative analysis. **[10]**

3. How would you prepare 500.00 ml of 0.30 M NaOH from the solid? **[10]**

4. Discuss only three points on how to improve the quality of your data in the laboratory. **[9]**

5. Copy and complete the table below **[15]**

Component of Food	Functional group/formula	Building block
Water	……(1)	
Carbohydrates	……(2)	……..(2)
Proteins	……....(4)	……..(3)
lipids	……(3)	

6. Illustrate the procedural steps carried out in titration techniques. **[6]**

7. A 0.9092g sample of wheat flour was analyzed by the Kjeldahl procedure. The ammonia formed was distilled into 50.00ml of 0.05063 M HCL; a 7.46 ml back-titration with 0.04917 M NaOH was required. Calculate the percentage protein in the flour. **[20]**

The End