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**University Examinations 2014/2015**

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND NUTRITION

**AFS 2303: INSTRUMENTAL METHODS IN FOOD ANALYSIS**

 **DATE: OCTOBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. State four advantages of thin layer chromatography over paper chromatography (4 Marks)
2. Define the following terms:
3. Analysis
4. Blank
5. Sample (6 Marks)
6. Distinguish the following terms as used in food analysis:
7. random and statistical sampling
8. accuracy and precision
9. gel filtration and gel permeation chromatography
10. single beam and double beam (8 Marks)
11. State two classifications of analytical methods. (2 Marks)
12. State four major strengths of instrumental over classical methods. (4 Marks)
13. What is the purpose of a flame in flame photometry? (3 Marks)
14. State three ways of increasing the selectivity of solvent extraction. (3 Marks)

**QUESTION TWO (20 MARKS)**

1. Distinguish between contamination and interference. (2 Marks)
2. Explain five reasons for analyzing food substances. (10 Marks)
3. Four food compounds were separated on chromatographic column whose length was 24.7cm. The following results were obtained:

 Compound Retention time (min) Width of peak (min)

 A 5.4 0.41

 B 13.3 1.07

 C 14.1 1.16

 D 21.6 1.72

Calculate the number of theoretical plates and height for each compound. (8 Marks)

**QUESTION THREE (20 MARKS)**

1. Explain four factors to be considered when choosing a method of food analysis (10 Marks)
2. In an experiment to determine amino acids in oranges, ninhydrin was sprayed on the paper after development and the results were as follows:

 Solvent front was 13.5 cm

 Amino acid A moved 8.5 cm

 Amino acid B moved 6.3 cm

Calculate the retardation factor, Rf values for solutes A and B (4 Marks)

1. Explain main steps involved in the process of separation in paper chromatography.

 (6 Marks)

**QUESTION FOUR (20 MARKS)**

1. (i) What do you understand by the term trace analysis? (2 Marks)

(ii) Explain three challenges facing trace analysis. (6 Marks)

1. Distinguish between repeatability and reproducibility as used in analysis. (2 Marks)
2. Explain four disadvantages of flame photometry. (8 Marks)
3. State two applications of ion exchange chromatography. (2 Marks)