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**University Examinations 2016/2017**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY, BACHELOR OF SCIENCE IN FOOD SCIENCE AND NUTRITION.

**AFT 3302: INSTRUMENTAL METHODS IN FOOD ANALYSIS**

**DATE: DECEMBER, 2016 TIME: 2 HOURS**

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

**QUESTION ONE (30 MARKS)**

1. Define the following terms as commonly used in food analysis (5 marks)
2. Sampling error
3. Interferences
4. Derivatization
5. Elution
6. Analyzer
7. Briefly explain ten factors that should be considered when selecting any quantitative method for amino acid analysis (5 marks)
8. (i) Explain the principle of atomic spectroscopy in relation to minerals analysis (5 marks)

(ii) Explain in detail how fat lipids are prepared prior to gas-liquid chromatography analysis (3 marks)

(iii) Explain four reasons why food scientist should analyse food sample in the laboratory (3 marks)

1. (i) explain the principle of electophoreor method as used in amino acid analysis (2 marks)

(ii) What do you understand by the term band broadening in chromatography? How can it be controlled when analysing vitamins in the laboratory? (3 marks)

(iii) With an illustration, explain Beer Lambern law. State the actions why it is rarely used in quantification of samples (3 marks)

(iv) State four factors that affect rotation magnitude of optical activity during CHO carbohydrates analysis (2 marks)

**QUESTION TWO (20 MARKS)**

1. Discuss the similarities and differences between AES (Atomic Emission Spectroscopy) and AAS (Atomic Absorption Spectroscopy) (8 marks)
2. Explain the principle and instrumentia y Gas-liquid chromatography. (7 marks)
3. Compound x in a food sample was quantified by a colorimetric method lassay. A 4g of sample was ashed and then dissolved with 1 ml of Hcl and the volume brought to 250 ml. A 0.75 ml of alquot was used in a reaction in which the total volume of the sample was to be read in the spectrophotometer was 50 ml. Absorbance at 595nm in 1cm cuvete was 0.550 for the sample. The extinction coefficient was known to be 1580lg -1 cm-1. Calculate the content of compound x in the food sample in terms of mg compound x per 100g sample. (5 marks)

**QUESTION THREE (20 MARKS)**

1. Describe four modes of separation in liquids chromatograph (8 marks)
2. Explain the difference between following terms as commonly used in food analysis
3. Normal and revered chromatography (4 marks)
4. Chromatogram and chromatograph (4 marks)
5. Chromatography and spectroscopy (4 marks)

**QUESTION FOUR (20 MARKS)**

Write short notes on the following;

1. Colorimetry (4 marks)
2. Refractometry (4 marks)
3. Polarimetry (4 marks)
4. Electrophoresis in amino acid analysis (4 marks)
5. Errors in food analysis (4 marks)