JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL & PHYSICAL SCIENCES

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES

4th YEAR 2ND SEMESTER TWO 2019/2020 ACADEMIC YEAR

REGULAR

COURSE CODE: **SBI: 3423**

COURSE TITLE: **Physical Methods of Analysis**

EXAM VENUE: **STREAM: (BSc Bio)**

DATE: **EXAM SESSION:**

TIME: 2 HOURS

Instructions:

1. **Answer ALL questions in Section A and ANY TWO questions in Section B**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A: SHORT ANSWER QUESTIONS (30 MARKS)

1. Name and describe the two main classes that constitute chemical analysis (4 marks)
2. Name two levels by which substances interact with light (4 marks)
3. Define the term chromatography and give its relevance in chemical analysis (4 marks)
4. Briefly explain what you understand by cryogenic grinding and show what kind of samples it can be used for (4 marks)
5. Name two methods of separation (chromatography) under high performance chromatography and explain their differences (4 marks)
6. Briefly state the uses of the following parts found in various analytical instruments: Detectors, Transducers and Sensors (6 marks)
7. Name and give brief description of two techniques applied in the Microscopic analysis. (4marks)

SECTION B: ESSAY QUESTIONS (40 MARKS)

8. A) With the aid of a suitable diagram for column chromatography, briefly describe what you understand by the following terms: Stationary phase, mobile phase, analyte, flow rate. (10 marks)

   B) Describe five characteristics to be considered in the choice of an analytical method (10 marks)

9. A) Chemical and physical properties form the basis of instrumental methods of analysis. Name six methods and the corresponding characteristics they are used to analyze(6 marks)

   B) Explain three types of transducers that can be used with biosensors in bioanalytical laboratories (6 marks)

   C) Explain the term hyphenated techniques as used in the analysis of chemical and biological samples and state three of the methods and give the general advantages of these techniques in chemical analysis (8 marks)

10. A) Differentiate between Inductively coupled plasma spectroscopy and Atomic Emission spectroscopy techniques citing the main advantage of the former. (6 marks)

    B) Grinding using Mortar and Pestle is said to be one of the best known method for grinding samples. Give three strengths and three limitations of this method. (6 marks)

    C) Describe four bioanalytical techniques. (8 marks)