****

**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR FOUR**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF PURE AND APPLIED SCIENCES**

**FOR THE DEGREE OF BACHELOR OF EDUCATION**

**COURSE CODE: CHE 411**

**COURSE TITLE: METHODS OF CHEMICAL ANALYSIS 11**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 10/02/2020 TIME: 09.00-11.00 AM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Define the following terms of Chemical analysis **[8 marks]**
2. Quantitative and qualitative Analysis
3. 0ptical emission spectroscopy
4. Nebulizers
5. Calibration curve
6. State three (3) advantages of Instrumental methods over wet chemical methods **[2 marks]**
7. State 3 common calibration methods of chemical analysis and give a brief description of each? **[6 marks]**
8. Explain in detail three (3) main deviation from Beer-Lambert law **[6 marks]**
9. Why is acid added to all samples during sampling or for sample digestion in FAAS, FAES, and ICP analysis? **[2 marks]**
10. What does the following electronic transitions suggest in UV-VIS spectroscopy **[5 marks]**
11. σ - σ \*
12. n - π\*

**QUESTION TWO**

1. What is the source of light in the following techniques **[2 marks]**
2. Raman spectroscopy
3. UV-VIS Spectroscopy
4. ICP
5. with aid of diagram explain the basic instrumentation difference between ICP-AES and ICP-MS **[12 marks]**
6. Discuss three (3) application of XRD in Analysis **[5 marks]**

**QUESTION THREE**

1. In simple schematic diagram explain how parameters of X-Ray Diffraction works in any Chemical analysis **[10 marks]**
2. How is Raman different from IR Spectroscopy and state 2 application of Raman spectroscopy  **[5 marks]**
3. Name three (3) methods of thermal analysis and explain their working principles **[5 marks]**

**QUESTION FOUR**

1. Define the following terms as used in chemical analysis **[5 marks]**
2. Electron Excitation
3. Atomic emission
4. Spray chamber
5. The Interferometer
6. Monochromator
7. Discuss in detail any Five (5) application of ICP-MS **[15 marks]**

**QUESTION FIVE**

1. What is the purpose of the torch in Inductively coupled Plasma (ICP)  **[2 marks]**
2. Differentiate between Raman and IR Spectroscopy and state 2 application of Raman spectroscopy  **[2 marks]**
3. State four advantages of FT-IR over other dispersive techniques **[5 marks]**
4. Explain the three zones present in the plasma  **[2 marks]**
5. List and explain the types of interferences in ICP-AES **[7 marks]**