JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATION FOR THEDEGREE OF BACHELOR OF EDUCATION (SCIENCE)

3RD YEAR 1ST SEMESTER 2017/18 ACADEMIC YEAR

MAIN REGULAR

___

COURSE CODE: SCH 310

COURSE TITLE: ANALYTICAL CHEMISTRY 1

EXAM VENUE: LAB 15   **STREAM: (BEd. Science)**

DATE: 20/12/17

TIME: 2.00 HOURS   **EXAM SESSION: 9.00 – 11.00AM**

_____

<u>**Instructions:**</u>

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

ANSWER <u>ALL</u> QUESTIONS IN SECTION A AND <u>ANY TWO</u> QUESTIONS IN SECTION B

<u>SECTION A: ANSWER ALL QUESTIONS (30 MARKS)</u>

<u>QUESTION 1</u>

a) Analytical Chemistry is a very versatile branch of chemistry, explain this?   (2 marks)
b) Define the following terms;   (10 marks)
    i) Elution
    ii) Electropogravimetry
    iii) Chromatogram
    iv) Flame photometry
    v) Drug analysis

c) Explain the meaning of the following terms as applied in Analytical Chemistry   (4 marks)
    i) Precision
    ii) Sampling

d) Explain any **<u>THREE</u>** types of error that you can encounter during analysis   (6 marks)

e) A 0.4960 g sample of a $CaCO_3$ is dissolved in an acidic solution. The calcium is
    precipitated as $CaC_2O_4.H_2O$ and the dry precipitate is found to weigh 0.6186 g
    What is the percentage of CaO in the sample?   (5 marks)
f) Discuss **<u>THREE</u>** factors that affect column efficiency during chromatography   (3 marks)

SECTION B: ANSWER <u>ANY TWO</u> QUESTIONS FROM THIS SECTION
EACH QUESTION CARRIES <u>20 MARKS</u>

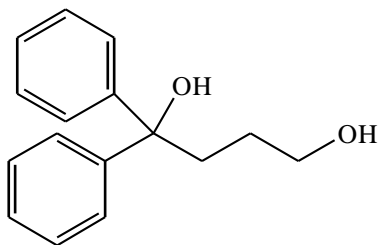## <u>QUESTION 2</u>

a) Explain **<u>FIVE</u>** conditions for a successful gravimetric analysis   (10 marks)
b) What is the main role of Infra Red (IR) spectroscopy?   (2 marks)
c) Explain the working principle of NMR spectroscopy   (5 marks)
d) What is a chemical shift?   (3 marks)

QUESTION 3
a) Sketch and explain the NMR spectrum of ethylethanoate   (5 marks)
b) What is electropotentiometry?   (3 marks)
c) Identify and describe how any **FOUR** parameters can be used in qualitative analysis (8 marks)
d) Explain the role of polarimetry in analytical chemistry   (4 marks)

QUESTION 4

a) With reference to the compound given below;
     i) Show using arrows all ^{13}C NMR active sites   (5 marks)
     ii) Identify the different carbons in the compound   (5 marks)

b) State and explain any **TWO** food and drug analytical techniques   (6 marks)
c) Explain the role of calorimetry in chemical analysis   (4 marks)

QUESTION 5
a) Distinguish between the following pairs of terms;   (10 marks)

     i) Analytical and Theoretical Chemistry
     ii) Qualitative and Quantitative analysis
     iii) Precipitation and Neutralization
     iv) Indicator and Titration curve
     v) Paper and Column chromatography

b) With the aid of a diagram, describe a liquid junction potential?   (4 marks)
c) Discuss any **THREE** general methods in elemental analysis   (6 marks)

E***********N***********D