TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ANALYTICAL CHEMISTRY

ACH 2303 : **Instrumental Methods of Analysis II (paper 2)**

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. Attempt Choose instruction.

Do not write on the question paper.

Question ONE

a) Define the following terms as employed in Instrumental methods of analysis;
   I. Absorption **(2 marks)**
   II. Emission **(2 marks)**
   III. Allowed transtion **(2 marks)**
   IV. Forbiden transition **(2 marks)**

b) State the three components of a molecular energy state **(3 marks)**

c) The Absorption spectra of an atom is line spectra. Using atomic energy-level diagram explain this occurrence **(8 marks)**

d) Differentiate between phosphorescence and fluorescence **(4 marks)**

e) State the four quantum numbers which define the electronic energy levels and atomic orbitals of an atom **(4 marks)**

f) List any three processes by which atoms, ions, and molecules can be excited to one or more higher energy levels **(3 marks)**

QUESTION TWO

a) Describe the principle of a flame photometer **(3 marks)**

b) Draw a well labeled diagram of a flame photometer **(12 marks)**

QUESTION THREE

a) Draw a well labeled block diagram of a single-beam atomic absorption spectrometer. **(9 marks)**

b) Explain how source modulation is achieved in atomic absorption measurements **(6 marks)**

QUESTION FOUR

b) Explain why the symmetrical stretch of CO_2 is in active in IR **(5 marks)**

a) Discuss the applications of IR spectroscopy **(10 marks)**

QUESTION FIVE

a) Discuss how solid samples are handled in IR spectroscopy **(6 marks)**

a) Draw a well labeled block diagram of a general IR instrument. **(9 marks)**