Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF **PURE AND APPLIED SCIENCES**

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY
(DSLT 12J)

ACH 2209 : INSTRUMENTAL METHODS OF ANALYSIS I

SEMESTER: EXAMINATIONS

SERIES: DECEMBER 2013

TIME: 2 HOURS

INSTRUCTIONS:

You should have the following for this paper

- *Answer booklet*

This paper consists of ***FIVE*** questions.
Answer Question **ONE (compulsory)** and any other **TWO** questions
*This paper consists of **4 PRINTED** pages*

Question ONE

a) Briefly explain the terms below using appropriate examples

(i) Spectroscopy **(2marks)**

(ii) Electromagnetic radiation **(2marks)**

(iii) The energy of a photon **(2marks)**

(iv) Emission spectroscopy **(2marks)**

(v) Absorption spectroscopy **(2marks)**

b) If a molecule absorbs IR radiation of 1 = 900nm, Calculate the energy absorbed per mole. **(6marks)**

c) Differentiate between:

(i) Classical and instrumental methods of analysis **(4marks)**

(ii) Continuum and line source of electromagnetic radiation **(4marks)**

d) The relationship between incident and transmitted radiation during spectrophoto metric analysis is given by Beer Lambert law which can be written as $A = \varepsilon CI$

(i) Define Beer-Lambert Law **(2marks)**

(ii) Define the terms A, ε, C and I **(4marks)**

Question TWO

Discuss the following wavelength selection methods

(a) Filters **(4marks)**

(b) Prisum menochromator **(5marks)**

(c) Scanning monochromator **(6marks)**

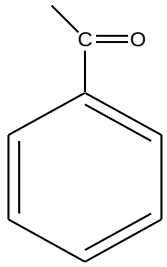
Question THREE

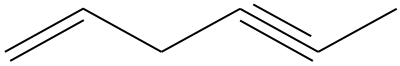
a) Define the following terms:

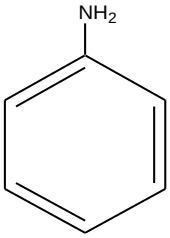
(i) Chromophore **(2marks)**

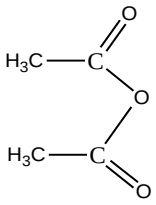
(ii) Wavelength **(1mark)**

b) Identify the chromophores in each of the following compounds.

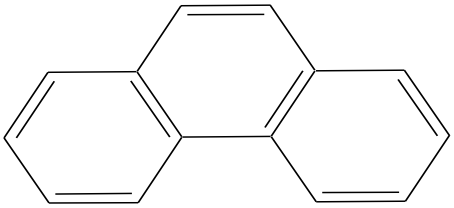
(i) 

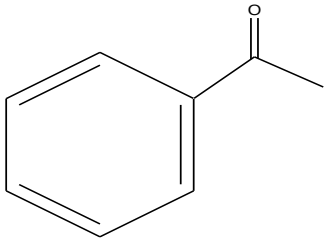
(ii) 

(iii) 

(iv) 

c) Identify the number of conjugated double bounds in each of the following molecules shown below.

(i)  **(2marks)**

(ii) 

(2marks)

Question FOUR

Discuss the working principle of the following detectors.

(i) Photo-tube (use a well –labelled diagram) **(7marks)**

(ii) Photo-multiplier tube **(8marks)**

Question FIVE

a) Explain the following:

(i) Signal to noise enhancement **(4marks)**

(ii) Signal to noise ratio **(4marks)**

b) Discuss the applications of UV-visible spectorphotometry **(3marks)**

c) Describe the effect of different ligands on the splitting of the orbitals in transition metal complexes. **(4marks)**