NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi, Abuja
FACULTY OF SCIENCE

OCTOBER/ NOVEMBER, 2016 EXAMINATION

COURSE CODE: CHM 309

COURSE TITLE: APPLIED SPECTROSCOPY

COURSE UNIT: 2Units

TIME: 2 hours

INSTRUCTION: Answer *any Four (4) questions*

Q1

a) i) Define the term luminescence (2 marks).

ii) Differentiate between Bathochromic shift and hypsochromic shift (2 marks)

b) Describe using a Schematic diagram the basic components of UV/visible Spectrophotometer (12 ½ marks)

Q2
a) List and explain the factors governing absorption of radiation in the UV/Vis region (10 marks)
b) Outline seven limitations of Beer-Lambert law (7 ½ marks)

Q3

(a) An electromagnetic wave incident on a point forms a number of peaks per second, if the distance between two successive peaks of the wave is 6 $x10^4$m. Calculate the frequency of the wave. (7 marks)

b. The energy of an electromagnetic radiation is 6.4 x 10^{12}. Evaluate the wavelength? (12marks)

(Speed of light =3.0 x 10^8 ms^{-1} , Planck's constant = 6.626 $x10^{-34}$ Js)

Question 4
a. State five ionization techniques you know in mass spectroscopy.(5 marks)
b. Explain the following terms: (12 ½ mark)
   i. Mass analyser.
   ii. Magnetic sector.
   iii. Ion trap mass analyzer

iv. Quadrupole mass analyzer
v. Tandem mass analyzers

Question 5

a. Describe the principles of Infrared Spectroscopy (2 ½ marks)
b. Explain the different methods of sample preparation in IR spectroscopy.(13 marks)
c. What is finger print region and its use. (2 marks)

Question 6

a. Discuss the basic principle of a mass spectroscopy. (7 marks)
b. With the aid of a well labeled diagram represent the basic components of mass spectrometer.(6 marks)
c) How would you Determination of Partition Coefficient of a drug.(4 ½ marks)