NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS
SCHOOL OF SCIENCE AND TECHNOLOGY
JANUARY/FEBRUARY 2013 EXAMINATION

CHM 306: INSTRUMENTAL METHODS OF ANALYSIS
INSTRUCTION: ANSWER FOUR QUESTIONS ONLY
(Each question carriers a total 17 $\frac{1}{2}$ marks).
Duration: 2 hrs

Question 1
- **a) Distinguish clearly between absorption and emission spectroscopy.**
- **b) State Beer's and Lambert's law**
- **c) A sample in a 1.0-cm cell is determined with a spectrometer to transmit 80% light at a certain wavelength. If the absorptivity of this substance at this wavelength is 2.0, what is the concentration of the substance?**

Question 2
- **a) Discuss the types of molecular vibration.**
- **b) State the two radiation source used in infrared spectrometry as well as their respective composition.**
- **c) State the application of infrared spectrometry.**

Question 3
- **a) Compare and contrast between flame emission and flame absorption spectroscopy.**
- **b) Outline major types of interferences encountered in atomic absorption analysis and describe how such problems can be overcome.**

Question 4
- **a) Outline four application of X-ray fluorescence analysis.**
- **b) Outline seven application of fluorimetry.**
- **c) What is meant by each of the following:**

I) Quenching ii) Flourescent filter iii) Monochromator

Question 5
- **a) What advantages does coulometric has over the conventional titration.**
- **b) Outline five general applications of coulometric methods.**
- **c) State the five applications of refractometer.**
- **d) What is meant by refraction and refractive index?**

Question 6
- **a) What is meant by each of the following:**
  - **i) Specific conductance**
  - **ii) Molar conductance**
- **b) Explain the basic principles of conductimetric analysis.**

c) With the aid of a good diagram, describe the basic instrumental design of a conductivity meter.