NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SEPTEMBER/OCTOBER 2015 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: CHM 306

COURSE TITLE: Instrumental Methods of Analysis

Time: **2 Hours**
INSTRUCTION: **Answer any Four Questions**

QUESTION ONE

Explain how the concentration of a coloured sample can be estimated by colorimetry. ($17^{1}/_{2}$ marks)

QUESTION TWO

a) What happens when infrared radiation of a characteristic frequency interacts with a molecule? (10 Marks).

b) Distinguish between Finger print region and Group frequencies ($7^{½}$ marks)

QUESTION THREE

a) i. Describe briefly the basic principle ofNuclear Magnetic Resonance (NMR) spectroscopy.(7½ Marks)

ii. What factor accounts for the difference, in the pattern of NMR spectrum of hydrogens in different organic molecules. ($1^{1/}_{2}$ Mark)

b) Draw a schematic diagram of a spectrophotometer and state the function of the parts of thespectrophotometer ($8^{½}$ Marks)

QUESTION FOUR

a) Describe the electromagnetic radiation. (10 Marks)

b) Compare and contrast between the following:

i) Electronic spectroscopy

ii) Vibrational spectroscopy

iii) Rotational spectroscopy ($7^1/_2$ Marks)

QUESTION FIVE

a) i. Write short notes on the followings:

(a) Flame Emission Spectroscopy (FES).

(b) Flame Atomic Absorption Spectroscopy (FAAS).

(6 Marks)

ii. Which of the flame spectroscopic technique is used to analyze the followings?

(a) Alkali metals

(b) Trace metals

(4 Marks)

b) Expatiate on the working principle of flame emission spectroscopy. (7½ Marks)

QUESTION SIX

ai) State and show mathematically Beer and Lambert's law. (10Marks)

ii) Calculate the concentration of a sample solution whose absorbance and molarabsorptivity at 270nm is 1.92 and 19400 respectively. (5Marks)

b) Explain briefly Polarography. ($2^1/_2$Marks)