NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF PURE AND APPLIED SCIENCES
FEBRUARY/MARCH2018 EXAMINATION

COURSE CODE: **CHM 306**
COURSE TITLE: **INSTRUMENTAL METHODS OF ANALYSIS**
TIME: **2 HOURS**
INSTRUCTION: **Question one is compulsory. Answer question one and any other three questions.**

QUESTIONONE

1a) Calculate the concentration of a sample solution whose absorbance and molar absorptivity at 270nm is 1.92 and 19400 respectively. 4 marks

1b) What happens when radiation and matter interact?6 marks

1ci) Discuss the basic concept of X-ray diffraction method.7 marks

1cii)Explain briefly Polarography.4 marks

1dii) State one use of each of the following

I. Infrared spectroscopy
II. X- ray diffraction method
III. Flame Emission and Flame Atomic Absorption Spectroscopy
IV. Nuclear Magnetic Resonance Spectroscopy 4 marks

QUESTION TWO

2ai Describe briefly the basic principle of Nuclear Magnetic Resonance (NMR) spectroscopy. 7marks.

2aii) What factor accounts for the difference, in the pattern of NMR spectrum of hydrogens in different organic molecules.4 marks

2b) Enumerate on the function of the parts of a spectrophotometer.4 marks

QUESTION THREE

Explain how the concentration of a coloured sample can be estimated by colorimetry.
15 marks

QUESTION FOUR

4ai) What is infrared spectroscopy? $1^1/_2$ marks

4aii) How would you determine the functional groups present in an organic molecule using infrared spectroscopy? 8 marks

4b) Distinguish between Infrared spectrometer and Fourier Transformer Infrared spectrometer.

$4^1/_2$ marks

QUESTION FIVE

5a) With the aid of a well labelled schematic diagram, expatiate on the working principle of Flame Atomic Absorption Spetroscopy.$10^1/2$ marks.

5b Distinguish between the following terms used in Flame Atomic Absorption Spectroscopy

i. Interference
ii. Sensitivity
iii. Detection Limit$4^1/_2$ marks