NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2022_1 EXAMINATION

COURSE CODE: **CHM 306**
COURSE TITLE: **INSTRUMENTAL METHODS OF ANALYSIS**
COURSE UNIT: **2**
TIME: **2 HOURS**
INSTRUCTION: **Answer question one and any other two questions.**

QUESTION ONE

1ai. What is electromagnetic radiation? 2 mks

1aii. Based on wavelength or frequency list the different regions of the electromagnetic. 3½ mks

1bi. Define the word fluorescence. 2½ mks

bii. Describe the effect of temperature and solvent on fluorescence spectroscopy. 5 mks

1biii. How does concentration of analyte affect fluorescence and how is it determined? 5 mks

1ci. What is polarography? 2 mks

1cii. How useful is polarography? 4 mks

1d. Differentiate between X- ray spectroscopy and X- ray diffraction methods. 6 mks

QUESTION TWO

2a. Describe what an atom or molecule experiences when it interacts or absorbs radiation. 6 mks

2b. Compare and contrast;

i. Atomic absorption and atomic emission 6 mks
ii. Molecular absorption and molecular emission 6 mks

2c. State the function of a monochromator in spectrophotometer. 2 mks

QUESTION THREE

3ai. List the basic components of NMR spectrometer. 4 mks

3aii. Explain briefly the basic principle of Nuclear Magnetic resonance spectroscopy (NMR). 10 mks

3b. What are optical methods? Hence state the five types of optical methods that you know. 6 mks

QUESTION FOUR

4a. Discuss briefly the voltametric method of analysis. 5 mks

4b. How can you obtain a polarogram? 3 mks

4c. Compare and contrast between finger print region and group frequencies. 12 mk

QUESTION FIVE

5a Write short note on coulometry. 9 mks

5b. Enumerate the advantages of coulometric titration over the conventional titrations. 9 mks

5c. List the applications of coulometry. 2 mks