

**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

1. Infrared spectroscopy
2. X- ray diffraction method
3. Flame Emission and Flame Atomic Absorption Spectroscopy
4. 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? 11/2 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.

41/2 marks

**QUESTION FIVE**

5a) With the aid of a well labelled schematic diagram, expatiate on the working principle of Flame Atomic Absorption Spetroscopy.101/2 marks.

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

1. Interference
2. Sensitivity
3. Detection Limit41/2 marks

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