

**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**

**JULY 2018 EXAMINATION**

**COURSE CODE: CHM 306**

**COURSE TITLE: INSTRUMENTAL METHODS OF ANALYSIS**

**COURSE UNIT: 2**

**TIME: 2 HOURS**

**INSTRUCTION: Question one is compulsory. Answer question one and**

 **any other three questions.**

**QUESTION ONE**

a) Compare and contrast between the following in terms of what happens when they absorb electromagnetic radiation, and the region of the electromagnetic radiation where they absorb energy:

Electronic spectroscopy

Vibrational spectroscopy

Rotational spectroscopy 71/2 Marks.

aii) Write short on absorption of radiation and emission of radiation. 61/2 marks

bi) What is fluorescence spectroscopy. 3 marks

bii) List one compound that can be determined by fluorescence spectroscopy. 1mark

biii) Mention one applications of fluorescence spectroscopy. 1 mark

ci) Explain the basic concept or theory of conductimetry. 5 marks

cii) Highlight the major application of conductimetry. 1 mark

**QUESTION TWO**

a) What is the principle behind optical methods of analysis? 11/2 marks

b) State and explain briefly the types of optical methods of analysis. 71/2 marks

ci) Write short note on the following terms:

 i. Absorbance

 ii. Transmittance. 3 marks

cii) Define the relationship between absorbance and transmittance. 3 marks

**QUESTION THREE**

a) What information can be obtained from measuring the refractive index of a compound using a refractometer? 51/2 marks

b) Describe how the refractive index of a compound can be determined using a refractometer.

 7marks

c) List the major classes of spectroscopy that is associated with the nature of the radiation that is been absorbed or emitted.21/2 marks

**QUESTION FOUR**

1. What happens when infrared radiation of a characteristic frequency interacts with a molecule? 71/2 marks

4b) Distinguish between Finger print region and Group frequencies. 71/2 marks

**QUESTION FIVE**

a) Discuss briefly the working principle of the following chemical instrumental method:

flame emission 71/2 marks

1. flame atomic absorption spectroscopy. 71/2 marks

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