**NATIONAL OPEN UNIVERSITY OF NIGERIA**

Plot 91, Cadastral Zone, NnamdiAzikwe Expressway, Jabi, Abuja

**FACULTY OF SCIENCES**

**JULY EXAMINATION, 2017**

**COURSE CODE: ESM341 TIME: ALLOWED: 2:30mins**

**COURSE TITLE: INTRODUCTION TO INSTRUMENTATION MEASUREMENTS AND FIELD METHODS IN ENVIRONMENTAL SCIENCE CREDIT UNIT: 2**

**Instructions: 1. Attempt question Number one (1) and any other three (3).**

**2. Question number 1 is compulsory and carries 25 marks, while the other questions carry equal marks (15) each**

 **3. Present all your points in coherent and orderly manner**

**1a.** Explain the term“instrumentation”**(5 marks**)

**1b**. Discuss the scope of instrumentation measurement in environmental science **(10 marks)**

1c. Briefly discuss the instrumentation for field observation and laboratory analysis **(10 marks**).  **Total (25 marks**)

**2a.** Explain the term“Remote Sensing”**(5 marks)**

**2b**. Explain briefly any five of the processes of the remote sensing techniques **(10 marks)**

**3a.** Discuss the concepts of Global Positioning System (GPS) **(5 marks)**

**3b.** Discuss the preparation for each of the sampling trip **(10 marks)**

**4.**Write short notes on the following laboratory techniques and instrumentation

1. Chromatography **(3 marks)**
2. Mass Spectrometry **(3 marks)**
3. Colorimetric Analysis **(3 marks)**
4. Atomic Absorption Spectrophotometer ‘AAS’ **(3 marks)**
5. Random Sampling **(3 marks) Total (15 marks**)

**5a.**Briefly describe the two types of meteorological stations **(6 marks)**

**5b**. Discuss in detail the four meteorological variables and their techniques of measurement (**9 marks)**