



**National Open University of Nigeria**  
**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**  
**Faculty of Science**  
**2023\_2 EXAMINATIONS\_\_**

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**COURSE CODE: ESM 341**

**COURSE TITLE: Introduction to Instrumentation Measurements and Field Methods in Environmental Science**

**CREDIT: 2 Units**

**TIME ALLOWED: 2 Hours**

**Instruction:** Attempt question number ONE (1) and any other THREE (3) questions. Question number one (1) carries 25 marks, while the other questions carry (15) marks each.

- 1a) Explain the mode of operation of a GPS receiver. **(8 marks)**
- 1b) State five guidelines related to field activities. **(10 marks)**
- 1c) Enumerate five applications of a total station **(7marks)**
  
- 2a) Describe how a cluster sample can be obtained **(5 marks)**
- 2b) What is the use of a calibrator in a sound measuring device? **(1mark)**
- 2c) List five components of a sound measuring system **(5 marks)**
- 2d) List four types of fixed meteorological stations **(4 marks)**
  
- 3a) Explain any Six (6) elements that comprise the remote sensing process from the beginning to the end **(6marks)**
- 3b) Describe how a calorimetric equipment can be used **(6marks)**
- 3c) Attempt an explanation of laboratory techniques **(3marks)**
  
- 4a). Name the documentation and procedures on sample history that should be maintained **(7 marks)**
- 4b). Name any 3 remote sensing devices. **(3 marks)**
- 4c). What is a Spectrometer? **(2 marks)**
- 4d). Mention the six main reasons for sampling instead of doing a census. **(3 marks)**
  
- 5a). What are Direct Reading Instruments? **(3marks)**
- 5b). Name the items to be check-listed before embarking on sampling field trip **(9 marks)**
- 5c). Name the elements in a sound measuring system. **(3marks)**