



**National Open University of Nigeria**  
**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**  
**Faculty of Science**  
**OCTOBER, 2019\_2 EXAMINATIONS**

**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) Give two reasons why quality assurance is essential in a thorough scientific investigation **(4 marks)**
  - b) Explain how a stratified sample can be obtained. **(6 marks)**
  - c) List four criteria that are needed in selecting a particular instrument for laboratory analysis. **(4 marks)**
  - d) State one advantage of vertical configuration of Van Dorn sampler. **(2 marks)**
  - e) What is the use of a calibrator in a sound measuring device? **(2 marks)**
  - f) Differentiate between specialized and universal laboratory techniques. **(4 marks)**
  - g) List three factors that determine the interval to be used in a quadrant survey? **(3 marks)**
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- 2a) Give three cogent reasons why belt transect is more desirable than line transect? **(3 marks)**
  - b) Define electrical conductivity. **(1mark)**
  - c) On the basis of usage, differentiate between vertical configuration and horizontal configuration of Van Dorn sampler. **(1mark)**
  - d) Explain how a Global Position System (GPS) receiver works. **(7marks)**
  - e) Why is true randomness an important element in ecology? **(1mark)**
  - f) What are microlysimeters? **(1mark)**
  - g) Mention an important feature of plastic bag sampling. **(1mark)**
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- 3a) List any five essential parts of a colorimeter. **(8marks)**
  - b) Differentiate between preparative and analytical chromatography. **(2marks)**
  - c) In general terms, explain how electrical conductivity can be measured. **(5marks)**
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- 4a) List two functions of the neutron probe among radioactive methods? **(5 marks)**
  - b) Why is it that field survey equipment such as Global Position System (GPS), total stations, aerial and satellite sensors are also referred to as remote sensing devices? **(2marks)**.
  - c) Highlight three steps by which a liquid sample can be turned into an atomic gas. **(6 marks)**
  - d) What is a spectrometer? **(2 marks)**
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- 5a) Mention five instruments that are needed for field survey **(5 marks)**
  - b) Juxtapose in situ measurement from remote sensing measurement. **(4 marks)**
  - c) State three conditions under which integrated sampling procedure for air borne gaseous agents is desirable. **(6 marks)**